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Preparación para el examen ACT®

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- Examen ACT de práctica completo, incluyendo el examen de redacción opcional
- Información sobre las secciones de redacción y opción múltiple
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Esta publicación también se puede ver o descargar en español

The ACT® www.act.org

Un mensaje para los estudiantes

Este documento es un primer paso importante a medida que te preparas para la universidad y tu carrera profesional.

Esta información está diseñada para ayudarte a dar lo mejor de ti en el examen ACT para obtener la admisión en institutos de educación superior y universidades. Se incluyen consejos útiles y estrategias para tomar el examen, así como un examen ACT de práctica completo, con preguntas obsoletas de exámenes anteriores que se aplicaron en fechas de examen anteriores en centros de examen de ACT. También se incluye un examen de redacción de práctica, un documento de respuestas de ejemplo, claves de respuestas e instrucciones para que te califiques tú mismo.

Lee este documento detenidamente y toma los exámenes de práctica con bastante anticipación al día del examen. De esa manera, estarás familiarizado con las materias de los exámenes, qué miden y las estrategias que puedes usar para dar lo mejor de ti en el día del examen.

Te recomendamos considerar también *el curso oficial de ritmo determinado por el estudiante ACT®, respaldado por Kaplan®* para aprender el contenido del examen y estrategias en un salón de clases virtual. Para ver todas nuestras opciones de preparación para el examen, visita **www.act.org/the-act/testprep**.

Contenido

Información general del examen ACT

El examen ACT consiste en cuatro secciones de opción múltiple—inglés, matemáticas, lectura y ciencias, con un examen de redacción opcional. Algunos institutos de educación superior y universidades requieren o aceptan las calificaciones de redacción de ACT, por lo que puedes considerar tomar la sección de redacción.

Examen	Preguntas	Minutos por examen
Inglés	75	45
Matemáticas	60	60
Lectura	40	35
Ciencias	40	35
Redacción (opcional)	1 ensayo	40

Después del examen de ciencias debes esperar tomar un examen de opción múltiple más corto que cubre una de las materias anteriores. Los resultados del quinto examen ayudan a desarrollar futuras preguntas para el examen y no se reflejarán en las calificaciones, así que haz tu mejor esfuerzo.

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Estrategias para tomar el examen

Estrategias para el examen ACT

Cada sección de opción múltiple contiene preguntas con cuatro o cinco respuestas entre las cuales puedes elegir la respuesta correcta o la mejor respuesta.

Si no completas todas tus secciones y quieres volver a hacer el examen, tendrás que volver a registrarte y pagar por una nueva fecha de examen. Una vez que tengas acceso al contenido del examen, no puedes solicitar un cambio de la fecha de examen.

Estrategias para ayudarte a prepararte para el examen ACT

✓ *Familiarízate con el contenido de las secciones.*

Revisa la información de este documento. Observa cuáles áreas de contenido conforman la proporción más grande de las secciones. Los temas incluidos en cada área de contenido son ejemplos de temas posibles, pero no incluyen todas las posibilidades.

✓ *Actualiza tu conocimiento y aptitudes en las áreas de contenido.*

Revisa las áreas de contenido que has estudiado, pero que no recuerdas bien. Refresca tu conocimiento en las áreas de contenido que forman las porciones más grandes del examen.

✓ *Estudia las áreas de contenido con las que no estás familiarizado.*

Si no estás familiarizado con algunas áreas de contenido del examen ACT, considera realizar estudios en esas áreas antes de tomar el examen.

Sugerencias para tomar las secciones de opción múltiple

✓ *Distribuye tu tiempo.*

Es importante que tengas suficiente tiempo para leer los pasajes/preguntas y decidir tus respuestas. Para cada sección, resta el número de minutos que estimas que pasarás leyendo rápidamente los pasajes o leyendo la información proporcionada, luego divide el total de los minutos restantes permitidos entre el número de preguntas para determinar el tiempo estimado que debes dedicar a cada pregunta. Si es posible, dedica menos tiempo a cada pregunta y usa el resto del tiempo permitido para una sección para revisar tu trabajo y regresar a las preguntas de esa sección que te parecieron más difíciles.

Los límites de tiempo establecidos para cada sección dan casi a todos los estudiantes suficiente tiempo para contestar todas las preguntas. Sin embargo, distribuye tu tiempo evitando usar demasiado tiempo en un pasaje o tratando de encontrar la respuesta a un problema específico. Pasa a otras preguntas y regresa al problema pendiente si te queda tiempo.

✓ *Lee detenidamente las instrucciones.*

Antes de comenzar cada sección, lee las instrucciones detenidamente.

- Las secciones de inglés, lectura y ciencias piden la mejor respuesta. Lee y considera todas las respuestas y selecciona la que responda mejor a la pregunta.
- La sección de matemáticas pide la respuesta correcta. Puedes deducir la respuesta que piensas que es la correcta y buscarla entre las opciones que se dan. Si tu respuesta no se encuentra entre las opciones proporcionadas, vuelve a leer la pregunta y considera todas las opciones de respuesta.

✓ *Lee detenidamente cada pregunta.*

Necesitas entender exactamente lo que se te pide en cada pregunta. Algunas preguntas requerirán que realices varios pasos para encontrar la respuesta correcta o la mejor respuesta, mientras que otras se podrán contestar más rápidamente.

✓ *Contesta primero las preguntas fáciles.*

Una buena estrategia es contestar las preguntas fáciles y saltarte las que te parezcan difíciles. Después de contestar las preguntas fáciles, regresa y responde las preguntas más difíciles si tienes tiempo.

✓ *Usa la lógica en preguntas más difíciles.*

Cuando regreses a las preguntas más difíciles, trata de usar la lógica para eliminar las respuestas incorrectas. Compara las opciones de respuestas entre sí y observa cuál es la diferencia. Tales diferencias pueden proporcionarte pistas sobre lo que la pregunta requiere. Elimina tantas respuestas incorrectas como puedas, luego haz una conjetura fundamentada de las respuestas restantes.

✓ *Contesta todas las preguntas.*

Tus calificaciones de las secciones solo se basarán en el número de preguntas que contestes correctamente; no se te penalizará por adivinar. Debes tratar de contestar todas las preguntas dentro del tiempo que se permite para cada sección.

✓ *Revisa tu trabajo.*

Si después de haber contestado todas las preguntas de una sección aún tienes tiempo, regrésate y revisa tu trabajo. Cuando se anuncie que el tiempo ha terminado para una sección, ya no se te permitirá que revises o que marques las respuestas de otra sección.

Al hacer el examen con un documento de respuestas:

✓ *Elige con precisión tus respuestas.*

Si vas a tomar el examen ACT en papel, asegúrate de seleccionar adecuadamente la respuesta deseada en tu documento de respuestas. Las marcas en tu documento de respuestas que se extiendan más allá del óvalo elegido pueden ser calificadas como incorrectas.

✓ *Borra completamente.*

Si deseas cambiar una respuesta de opción múltiple en papel, asegúrate de borrarla por completo. No taches las respuestas ni uses un corrector líquido o en cinta; debes usar una goma de borrar. Los borrones o las marcas involuntarias pueden causar errores en la calificación.

Prepárate

Prepárate con bastante anticipación al examen ACT.

- Entérate de lo que debes esperar el día del examen. Revisa este documento y visita **www.actstudent.org** para obtener más información, incluida una descripción general de cada materia del examen, varios recursos de preparación para el examen y una lista de verificación completa del día del examen.
- Toma los exámenes de práctica en el orden que se muestran en este cuadernillo, toma el tiempo en cada uno de los exámenes y revisa tus respuestas usando las claves de respuestas.
- Descansa suficiente la noche anterior a los exámenes.

Nota: La mayoría de los procedimientos de este documento se refieren a tomar un examen en una fecha de examen nacional en un centro de examen de ACT (dentro de Estados Unidos, territorios de Estados Unidos o Puerto Rico). Los procedimientos pueden diferir un poco si tomas una aplicación diferente del examen ACT.

El día del examen

Preséntate a tiempo

- Para las fechas de examen nacionales, debes reportarte en tu centro del examen asignado a la hora indicada en tu boleto de admisión (usualmente a las 8:00 a.m.). Si llegas tarde, no se te permitirá tomar el examen. Si tu boleto no indica un salón de examen específico, el personal del examen o los letreros publicados te dirigirán.

Qué llevar

- Una copia impresa de tu boleto de admisión. Tu boleto contiene información importante que ayuda a relacionar tu documento de respuestas con el registro. Si perdiste tu boleto, puedes imprimir otro a través de tu cuenta MyACT. Si no llevas tu boleto el día del examen, tus calificaciones podrían retrasarse.
- Una identificación con fotografía aceptable. No se te permitirá tomar el examen si tu identificación no cumple los requisitos de ACT. Consulta los requisitos de identificación de ACT en tu boleto o en **www.act.org/the-act/id**.
- Lápiz del número 2 Lleva lápices N.° 2 con punta y buenas gomas de borrar (no se permiten lápices mecánicos ni bolígrafos). No lleves ningún otro instrumento para escribir. No se te permitirá usarlos.*Nota: En los centros internacionales de aplicación del examen se proporcionan pizarrones blancos y marcadores no permanentes.*.
- Reloj u otro dispositivo para medir el tiempo. Puedes llevar un reloj de pulsera para medir tu tiempo durante el examen, pero no debe tener alarma. Debes quitarte el reloj u otro dispositivo para medir el tiempo y colocarlo en tu escritorio mientras estés en el salón del examen, de manera que permanezca a la vista del personal durante el examen. Si tu alarma suena durante el examen, se te pedirá que te retires y no se calificarán tus respuestas.
- Calculadora. Si deseas utilizar calculadora (no se requiere usarla), es tu responsabilidad asegurarte de que la calculadora esté permitida de acuerdo con la **Política de uso de calculadoras de ACT**.
- Bocadillos. Puedes consumir bocadillos y bebidas fuera del salón del examen durante el descanso.

Qué NO llevar

- Libros de texto, diccionarios de idiomas extranjeros o de cualquier tipo, papel para anotar, notas u otras ayudas
- Marcadores, bolígrafos o lápices de colores, líquido/cinta de corrección
- Ningún dispositivo electrónico que no sea una calculadora permitida
- Materiales de lectura

En el salón del examen

- El personal del examen te dirigirá a tu asiento. Si necesitas un escritorio para zurdos, habla con el personal al llegar.
- No salgas del salón del examen después de que te admitan.
- Sólo se permitirá que tengas en tu escritorio lápices, gomas para borrar, una calculadora permitida, tu reloj (si lo trajiste al centro de examen) y tu boleto de papel.
- Se te pedirá que guardes todas tus demás pertenencias personales.
- La hora para presentarte al examen será a las 8:00 a.m. El examen comenzará tan pronto como todos los examinados que estén presentes a las 8:00 a.m. se hayan registrado y estén sentados.
- Escucha atentamente todas las instrucciones que lea el personal del examen.
- Es importante que sigas todas las instrucciones al pie de la letra.
- Normalmente saldrás más o menos a las 12:35 p.m. si tomas el examen ACT (sin redacción), o aproximadamente a la 1:35 p.m. si tomas el examen ACT con redacción.

Para estudiantes aprobados para tomar un examen en centros de exámenes nacionales con tiempo y medio

El examen con tiempo y medio está disponible en las secciones de redacción y de opción múltiple para estudiantes con discapacidades diagnosticadas o con dominio limitado del idioma inglés.

Si estás autorizado para tomar el examen con tiempo y medio en un centro de examen nacional, tendrás 50% de tiempo adicional para terminar cada sección.

El ACT:

Examen	Preguntas	Minutos por examen
Inglés	75	70
Matemáticas	60	90
Lectura	40	55
Ciencias	40	55
Redacción (opcional)	1 ensayo	60

Después del examen

Anulación de tu examen el día del examen

Si tienes que salir del centro del examen antes de completar todos las secciones, debes decidir si deseas que se califique tu examen o no y luego informar tu decisión al personal del examen. Si no lo haces, tu examen será calificado.

Si no completas todas tus secciones y quieres volver a hacer el examen, tendrás que volver a registrarte y pagar por una nueva fecha de examen. Una vez que tengas acceso al contenido del examen, no puedes solicitar un cambio de la fecha de examen.

Tomar el examen más de una vez

Si deseas volver a tomar el examen para aumentar tu calificación, ACT calculará y reportará una súper calificación para los estudiantes que hayan tomado el examen ACT más de una vez. Esto les da las universidades la opción de usar las mejores calificaciones del estudiante de todas las aplicaciones del examen, en lugar de las calificaciones de un solo examen, para sus decisiones sobre admisiones y becas.

Para obtener información sobre las calificaciones combinadas visita **www.act.org/the-act/superscore**.

Para más información sobre cómo volver a tomar el examen ACT, consulta **www.act.org/the-act/retaking**.

Tomar el examen más de una vez en la misma aplicación

No puedes recibir calificaciones de más de un examen que hayas tomado durante una fecha programada de examen nacional o internacional. Por ejemplo, puedes tomar el examen en sábado, en una fecha autorizada que no sea sábado o en una fecha de examen reprogramada, pero no en más de uno de esos días en una fecha de examen particular. Si se te admite y se te permite tomar el examen por segunda vez, en una fecha de examen particular, reportaremos solo las calificaciones del primer examen. El segundo conjunto de calificaciones se cancelará sin reembolso.

Solicitud de una copia de las preguntas y respuestas de tu examen

En ciertas fechas de examen, puedes pedir (por una cuota adicional) una copia de las preguntas de opción múltiple utilizadas para determinar tus calificaciones, una lista de tus respuestas y la clave de respuestas. Si tomaste la sección de redacción, también recibirás una copia de las instrucciones para el ensayo, las pautas de calificación y las calificaciones de tu ensayo.

Este servicio no está disponible para todas las fechas de examen y está disponible únicamente para los exámenes nacionales o exámenes especiales en los Estados Unidos, territorios de Estados Unidos y Puerto Rico. Aplican restricciones.

Si te interesa este servicio, revisa **www.act.org/the-act/tir** para más detalles.

Comportamientos prohibidos en el centro de examen

Se proporcionó una lista de las conductas prohibidas durante el proceso de inscripción. Las siguientes conductas también pueden causar cancelación. Recuerda lo siguiente:

- No puedes llenar o alterar las respuestas a ninguna de las preguntas de opción múltiple ni continuar escribiendo o alterar el ensayo después de que se indique que se agotó el tiempo. Esto incluye arreglar marcas mal hechas.
- No puedes mirar ninguna sección del examen fuera del tiempo designado para ese examen.
- No puedes acceder a ningún dispositivo electrónico (aparte de la computadora y el ratón que estás usando para hacer el examen en línea) en ningún momento durante los exámenes o durante los recesos. Todos los demás dispositivos deben estar apagados y estar fuera de la vista desde el momento en que que te dan entrada al salón del examen hasta que te indiquen que te puedes retirar.
- No puedes prestar ni recibir ayuda de ninguna manera. Esto incluye mirar el examen de otra persona.
- El examen es confidencial y permanece así aun después de terminar el examen. No puedes sacar ningún material del salón del examen. No puedes comentar ni compartir el contenido del examen, las respuestas ni los números de identificación del formulario del examen durante la administración del examen, durante los descansos ni después del examen.
- No puedes divulgar las preguntas del examen ni las respuestas de ninguna manera, en ningún momento, incluyendo en redes sociales, en su totalidad o en parte.
- No se permite comer, beber ni utilizar material de lectura en el salón del examen.

Si se te observa o se sospecha que estás involucrado en una conducta prohibida, se te pedirá que te retires y tu examen no se calificará.

Contenido de las secciones del examen ACT

Sección de inglés

La sección de inglés consiste en varios ensayos o pasajes, cada uno seguido de un conjunto de preguntas de opción múltiple.

- Algunas preguntas se refieren al pasaje en su totalidad o a porciones subrayadas o resaltadas del pasaje y ofrecen varias alternativas para dichas porciones. Tú decides cuál respuesta es la más apropiada tomando en cuenta el contexto del pasaje.
- Muchas preguntas ofrecen la opción de "NO CAMBIAR" el pasaje.

La sección de inglés te coloca en la posición de un escritor que toma decisiones para revisar y editar un texto. Los ensayos en diferentes géneros proporcionan una variedad de situaciones retóricas. Estos pasajes se seleccionan por su idoneidad para evaluar las aptitudes de lenguaje y redacción, y para reflejar los intereses y las experiencias de los estudiantes.

Se reportan cuatro calificaciones para el examen de inglés: una calificación para la sección en general y tres calificaciones de las categorías del reporte con base en conocimiento y aptitudes específicas. El porcentaje aproximado de la sección dedicada a cada categoría del reporte es:

Producción de redacción (29-32%)

Esta categoría requiere que apliques tu entendimiento del propósito y enfoque de un escrito.

- **Desarrollo del tema:** Demostrar un entendimiento y control sobre los aspectos retóricos de los textos. Identificar los propósitos de las partes de los textos, determinar si un texto o parte de un texto ha cumplido con su objetivo previsto y evaluar la relevancia del material en términos del enfoque de un texto.
- **Organización, unidad y cohesión:** Usar diferentes estrategias para asegurar que un texto esté lógicamente organizado, sea fluido y tenga una introducción y una conclusión efectivas.

Conocimiento de la lengua (15-17%)

Estas preguntas requieren que demuestres el uso efectivo del lenguaje al asegurar una elección de palabras precisa y concisa y mantener la consistencia del estilo y tono.

Convenciones del inglés estándar (52-55%)

Estas preguntas requieren que apliques un entendimiento de las convenciones de gramática del inglés estándar, uso y mecánica del inglés estándar para revisar y editar textos.

- **Estructura y formación de oraciones:** Aplicar el entendimiento de la estructura y formación de la oración en un texto y hacer revisiones para mejorar la redacción.
- **Puntuación:** Reconocer los problemas comunes con la puntuación del inglés estándar y hacer revisiones para mejorar la redacción.
- **Uso:** Reconocer los problemas comunes con el uso del inglés estándar en un texto y hacer revisiones para mejorar la redacción.

Sugerencias para tomar la sección de inglés

✓ *Presta atención al estilo de redacción que se usa en cada pasaje.*

Los pasajes cubren una variedad de temas y están redactados en una variedad de estilos. Es importante que tomes en cuenta el estilo de redacción que se usa en cada pasaje. Al responder una pregunta, asegúrate de entender el contexto de la misma. Considera cómo la oración que contiene una porción subrayada o resaltada encaja con las oraciones circundantes y con el pasaje como un todo.

✓ *Examina las porciones subrayadas o resaltadas del pasaje.*

Antes de responder una pregunta con una porción subrayada o resaltada, examina cuidadosamente lo que está subrayado o resaltado en el texto. Considera los elementos de redacción que se incluyen en cada porción subrayada o resaltada.

- Algunas preguntas te pedirán que bases tu decisión en algún elemento específico de la escritura, como el tono o el énfasis que el texto debe comunicar.
- Algunas preguntas te indicarán que selecciones la alternativa a la porción subrayada o resaltada que NO es aceptable o que es LA MENOS aceptable.

Las respuestas opcionales de cada pregunta contendrán cambios en uno o más de estos elementos de la escritura.

✓ *Presta atención a las preguntas que no tienen porciones subrayadas.*

Se te harán algunas preguntas sobre una sección del pasaje o sobre el pasaje como un todo, considerando una situación retórica dada. Las preguntas de este tipo frecuentemente están identificadas por un número de pregunta ubicado en un recuadro que se encuentra en el punto apropiado del pasaje o mediante un asterisco resaltado en paréntesis.

Las preguntas sobre todo el pasaje se encuentran al final del pasaje. Para el examen en papel, estas preguntas se introducen mediante un recuadro horizontal que encierra la siguiente instrucción: "Las preguntas ___ y___ se refieren al pasaje anterior en su totalidad". En el examen en línea, aparecerán instrucciones similares arriba de las preguntas.

✓ *Nota las diferencias en las respuestas opcionales.*

Muchas de las preguntas de la sección involucran más de un aspecto de redacción. Examina cada respuesta opcional y determina cuál es su diferencia con las otras. Ten cuidado de no elegir una respuesta que corrija un error, pero que genere un error diferente.

✓ *Determina cuál es la mejor respuesta.*

Cuando una pregunta te pida que elijas la mejor alternativa para una porción subrayada o resaltada, considera el siguiente método:

- Decide cómo la porción subrayada o resaltada se pudiera expresar mejor en inglés escrito estándar o en términos de la pregunta particular formulada.
  - ~ Si la porción subrayada o resaltada es la mejor respuesta, selecciona NO CHANGE (NO CAMBIAR).

- Si no, revisa para ver si tu expresión es una de las respuestas opcionales. Si no encuentras tu expresión, selecciona la mejor de las respuestas que se presentan.

- En el caso de las preguntas indicadas por un número en un recuadro o un asterisco resaltado en paréntesis, decide cuál es la opción más apropiada en términos de la pregunta formulada o de la situación retórica indicada.
- Vuelve a leer la oración usando la respuesta que seleccionaste. Una vez que hayas seleccionado la respuesta que te parece mejor, vuelve a leer la oración u oraciones correspondientes del pasaje, e inserta la respuesta seleccionada en el lugar apropiado del texto para asegurarte de que es la mejor respuesta dentro del contexto del pasaje.

Sección de matemáticas

La sección de matemáticas está diseñada para evaluar las aptitudes matemáticas que los estudiantes han adquirido típicamente en los cursos que toman hasta el principio del grado 12.

La mayoría de las preguntas son autocontenidas. Algunas preguntas pueden pertenecer a un conjunto de varias preguntas (por ejemplo, cada una acerca de la misma gráfica o tabla).

El material que se cubre enfatiza las principales áreas de contenido que son un requisito para el desempeño satisfactorio en las matemáticas de los cursos del primer año universitario. Se asume el conocimiento de fórmulas básicas y aptitudes de cálculo como antecedentes para resolver los problemas, pero no se requiere recordar fórmulas complejas ni cálculos extensos.

Nota: Puedes usar una calculadora permitida en la sección de matemáticas. En **www.act.org/calculator-policy.html** *puedes encontrar detalles de los modelos y funciones que se prohíben.*

Se reportan nueve calificaciones para la sección de matemáticas: una calificación para la sección en general y ocho calificaciones de las categorías del reporte con base en el conocimiento y aptitudes específicas en matemáticas. El porcentaje aproximado de la sección dedicada a cada categoría del reporte es:

Preparación para matemáticas de nivel superior (57-60%)

Esta categoría cubre las matemáticas más recientes que los estudiantes están aprendiendo, empezando cuando comenzaron a usar álgebra como una manera general de expresar y resolver ecuaciones. Esta categoría se divide en cinco subcategorías:

- **Número y cantidad (7-10%):** Demostrar conocimiento de sistemas numéricos reales y complejos. Razonar con cantidades numéricas en muchas formas, incluyendo expresiones con integrales y exponentes racionales así como vectores y matrices.
- **Álgebra (12-15%):** Resolver, graficar y modelar varios tipos de expresiones. Interpretar y usar diferentes tipos de ecuaciones, como relaciones lineales, polinomiales, radicales y exponenciales. Encontrar soluciones a sistemas de ecuaciones, incluso cuando son representados mediante matrices simples y aplicar los resultados a contextos del mundo real.
- **Funciones (12-15%):** Demostrar conocimiento de la función: definición, notación, representación y aplicación. Usar funciones, incluyendo las funciones lineales, radicales, segmentadas, polinomiales, exponenciales y logarítmicas. Manipular y trasladar funciones, así como interpretar y usar características importantes de las gráficas.
- **Geometría (12-15%):** Aplicar tu conocimiento de figuras y cuerpos sólidos, usando conceptos tales como las relaciones de congruencia y similitud o el área de una superficie y medición de volúmenes. Aplicar tu entendimiento a objetos compuestos y resolver valores faltantes en triángulos, círculos y otras figuras. Usar razones trigonométricas y ecuaciones de secciones cónicas.
- **Estadística y probabilidad (8-12%):** Describir el centro y la dispersión de distribuciones. Aplicar y analizar métodos de recolección de datos. Entender y modelar las relaciones en datos bivariados. Calcular probabilidades reconociendo los espacios de muestreo relacionados.

Integración de aptitudes esenciales (40-43%)

Esta categoría se centra en medir qué tan bien puedes sintetizar y aplicar tus entendimientos y aptitudes para resolver problemas más complejos. Las preguntas te piden que abordes conceptos como:

- tasas y porcentajes
- relaciones proporcionales
- área, área superficial y volumen
- promedio y mediana
- expresión de números de diferentes maneras

Resolverás problemas no rutinarios que implican combinar aptitudes en cadenas de pasos, aplicar aptitudes en contextos variados, entender conexiones y demostrar destreza.

Modelado

Esta categoría representa todas las preguntas que implican producir, interpretar, entender, evaluar y mejorar modelos. Cada pregunta también se cuenta en otras categorías de matemáticas adecuadas del reporte. Esta categoría es una medida general sobre qué tan bien usas las aptitudes de modelado en todos los temas de matemáticas.

Sugerencias para tomar la sección de matemáticas

✓ *Si utilizas una calculadora, hazlo de manera prudente.*

Todos los problemas de matemáticas se pueden resolver sin una calculadora. Muchos de ellos se resuelven mejor sin calculadora. Usa tu buen criterio para decidir cuándo usar y cuándo no usar la calculadora. Por ejemplo, en algunos problemas tal vez quieras realizar trabajo preliminar para aclarar tus pensamientos sobre la pregunta antes de comenzar a usar la calculadora.

✓ *Resuelve el problema.*

Para encontrar las soluciones a los problemas, generalmente realizarás trabajo preliminar. Tal vez quieras revisar las respuestas opcionales después de leer las preguntas. Sin embargo, trabajar al revés desde las cinco opciones de respuesta puede requerir mucho tiempo y puede no ser eficaz.

✓ *Busca tu solución entre las opciones de respuesta.*

Una vez que hayas resuelto el problema, busca la respuesta que obtuviste entre las opcionales. Si tu respuesta no está incluida entre las opcionales, vuelve a leer detenidamente el problema para ver si pasaste por alto información importante. Presta mucha atención a la pregunta que se te hace. Si debes seleccionar una ecuación, revisa si la ecuación que piensas que es la mejor se puede transformar en una de las respuestas opcionales proporcionadas.

✓ *Asegúrate de contestar la pregunta.*

Las soluciones de muchas de las preguntas involucran varios pasos. Asegúrate de que tu respuesta tome en cuenta todos los pasos necesarios. Con frecuencia, una opción de respuesta es un resultado intermedio, no la respuesta final.

✓ *Asegúrate de que tu respuesta sea razonable.*

Algunas veces un error de cálculo da como resultado una respuesta que no es prácticamente posible para la situación que se describe. Siempre piensa en tu respuesta y determina si es razonable.

✓ *Verifica tu respuesta.*

Puedes llegar a una solución incorrecta cometiendo errores comunes en el proceso de resolución de problemas. Si tienes tiempo restante antes de que termine la sección de matemáticas, es importante que vuelvas a leer las preguntas y que verifiques tus respuestas para asegurarte de que sean correctas.

Sección de lectura

La sección de lectura que mide tu habilidad de leer con atención, razonar lógicamente sobre textos usando evidencia e integrar información de varias fuentes.

Las preguntas se centran en aptitudes de apoyo mutuo que los lectores deben utilizar al estudiar materiales escritos en una variedad de materias. Específicamente, las preguntas te pedirán que:

- determines las ideas principales
- localices e interpretes detalles significativos
- entiendas secuencias de eventos
- hagas comparaciones
- comprendas las relaciones causa-efecto
- determines el significado de palabras, frases y declaraciones que dependen del contexto
- dibujes generalizaciones
- analices la voz y el método del autor o narrador
- analices afirmaciones y evidencia en argumentos
- integres información de múltiples textos

La sección de lectura se compone de varias partes. Algunas partes consisten en un pasaje en prosa largo y otras consisten en pasajes en prosa cortos. Los pasajes representan los niveles y las clases de textos que comúnmente se encuentran en los planes de estudio del primer año universitario.

Cada pasaje va precedido por un encabezado que identifica el autor y el origen y puede incluir información de trasfondo importante para ayudarte a entender el pasaje. Cada parte contiene un conjunto de preguntas de opción múltiple. Estas preguntas no evalúan la memorización de hechos ajenos al pasaje o reglas de lógica formal, ni contienen preguntas aisladas de vocabulario. En las secciones que contienen dos pasajes cortos, algunas de las preguntas tienen que ver con ambos pasajes.

Se reportan cuatro calificaciones para el examen de lectura: una calificación para la sección en general y tres calificaciones de las categorías del reporte con base en conocimiento y aptitudes específicas. Los reportes de calificaciones también incluyen un indicador de comprensión de textos complejos. El porcentaje aproximado de la sección dedicada a cada categoría del reporte es:

Ideas y detalles clave (52-60%)

Esta categoría requiere que leas los textos detenidamente para determinar las ideas y los temas centrales; que resumas información e ideas con precisión; y que demuestres comprensión de las relaciones y saques inferencias y conclusiones lógicas, incluida la comprensión de las relaciones secuenciales, comparativas y de causa-efecto.

Elaboración y estructura (25-30%)

Estas preguntas te piden que:

- determines el significado de palabras y frases
- analices la elección de palabras de un autor retóricamente
- analices la estructura del texto
- comprendas el propósito y la perspectiva del autor
- analices los puntos de vista de los personajes
- interpretes las decisiones del autor retóricamente
- diferencies entre varias perspectivas y fuentes de información

Integración de conocimiento e ideas (13-23%)

Esta categoría requiere que entiendas las aseveraciones de los autores, diferencies entre hechos y opiniones y uses evidencia para hacer conexiones entre los diferentes textos que están relacionados según el tema. Algunas preguntas necesitarán que analices cómo los autores construyen los argumentos y evalúes el razonamiento y la evidencia de diferentes fuentes.

Información visual y cuantitativa en la sección de lectura

Un pasaje puede ir acompañado de un elemento como una gráfica, figura o tabla que contiene información pertinente para la tarea de lectura. En el pasaje que contiene estos elementos visuales y cuantitativos, algunas de las preguntas te pedirán que identifiques o interpretes información de la gráfica o que integres la información del pasaje y la gráfica para determinar la mejor respuesta.

Sugerencias para tomar la sección de lectura

✓ *Lee cada pasaje detenidamente.*

Antes de comenzar a contestar una pregunta, lee el contenido detenidamente. Sé consciente de las relaciones entre las ideas. Toma nota sobre las ideas importantes de los pasajes.

✓ *Consulta los pasajes cuando contestes las preguntas.*

Encontrarás las respuestas a algunas de las preguntas refiriéndote a lo que se indica explícitamente en el texto de los pasajes. Otras preguntas requerirán que tú determines los significados implícitos y que saques conclusiones y hagas comparaciones y generalizaciones. Considera el texto antes de contestar cualquier pregunta.

Sección de ciencias

La sección de ciencias mide las aptitudes de interpretación, análisis, evaluación, razonamiento y resolución de problemas que se requieren en las ciencias naturales. La sección presenta varios escenarios científicos auténticos, cada uno de ellos seguido por preguntas de opción múltiple.

El contenido incluye biología, química, ciencias de la Tierra y del espacio (por ejemplo, geología, astronomía

y meteorología) y física. No se requiere un conocimiento avanzado de estas áreas, pero necesitarás conocimiento previo adquirido en cursos de ciencias introductorios generales para contestar correctamente algunas de las preguntas.

La sección de ciencias se centra en la evaluación multidimensional, con preguntas que evalúan el contenido de ciencias en combinación con aptitudes y prácticas de ciencias.

Las preguntas requieren que:

- reconozcas y entiendas las características básicas de la información proporcionada y los conceptos relacionados con ella
- examines críticamente la relación entre la información proporcionada y las conclusiones extraídas o las hipótesis desarrolladas
- generalices a partir de información dada para obtener nueva información, sacar conclusiones o hacer predicciones

Nota: No se permite usar una calculadora en la sección de ciencias.

Se reportan cuatro calificaciones para la sección de ciencias: una calificación para la sección en general y tres calificaciones de las categorías del reporte con base en conocimiento, habilidades y práctica científicos. El porcentaje aproximado de la sección dedicada a cada categoría del reporte es:

Interpretación de datos (40-50%)

Esta categoría te pide manipular y analizar datos científicos presentados en tablas, gráficas y diagramas científicos (por ejemplo, reconocer tendencias en datos, trasladar datos tabulares a gráficas, interpolar y extrapolar, y razonar matemáticamente).

Investigación científica (20-30%)

Esta categoría te pide entender las herramientas experimentales, procedimientos y diseño (por ejemplo, identificar controles y variables), y comparar, prolongar y modificar experimentos (por ejemplo, predecir los resultados de ensayos adicionales).

Evaluación de modelos, inferencias y resultados experimentales (25-35%)

Estas preguntas te piden juzgar la validez de la información científica y formular conclusiones y predicciones con base en esa información (por ejemplo, determinar cuál explicación para un fenómeno científico es sustentada por nuevos hallazgos).

La sección de ciencia presenta información en tres formatos:

- **Representación de datos (25–35%):** Este formato presenta material gráfico y tabular similar al de las revistas y textos de ciencias. Las preguntas asociadas con este formato miden aptitudes como reconocer relaciones entre datos en tablas y gráficas; interpolar y extrapolar; y trasladar datos tabulares a gráficas.
- **Resúmenes de investigación (45–60%):** Este formato proporciona descripciones y resultados de uno o más experimentos relacionados. Las preguntas se centran en el diseño de los experimentos y en la interpretación de los resultados experimentales.
- **Puntos de vista conflictivos (15–20%):** Este formato presenta dos o más explicaciones del mismo fenómeno científico que, debido a que se basan en diferentes premisas o datos incompletos, son inconsistentes uno con el otro. Las preguntas se centran en la comprensión, análisis y comparación de puntos de vista o hipótesis alternativas.

Sugerencias para tomar la sección de ciencias

✓ *Lee detenidamente el pasaje.*

Antes de comenzar a contestar una pregunta, lee el material científico que se te proporciona. Es importante que leas todo el texto y examines todas las tablas, gráficas o figuras. Puedes tomar notas sobre las ideas importantes. Algunos de los conjuntos de información describirán experimentos. Debes considerar el diseño experimental, incluso los controles y las variables, porque probablemente las preguntas abordarán este componente de la investigación científica.

✓ *Nota los diferentes puntos de vista en los pasajes.*

Algunos materiales presentarán puntos de vista conflictivos y las preguntas te pedirán que distingas entre ellos. Puede ser útil tomar notas resumiendo cada punto de vista de las partes específicas de la sección.

Sección de redacción (opcional)

Si te inscribes para el examen ACT con redacción, tomarás la sección de redacción después de que termines las cuatro secciones de opción múltiple. Tu calificación en la sección de redacción no afectará las calificaciones de los exámenes de opción múltiple ni tu calificación global.

La sección es un examen de 40 minutos que mide tus aptitudes de escritura, específicamente las que se enseñan en las clases de inglés de la escuela secundaria y en los cursos de composición de primer ingreso de la universidad.

La sección consiste en una instrucción para la redacción que describe un tema complejo y proporciona tres perspectivas diferentes sobre el mismo. Se te pide que leas la instrucción y escribas un ensayo en donde desarrolles tu propia perspectiva sobre el tema. Tu ensayo debe analizar la relación entre tu propia perspectiva y una o más de las otras perspectivas. Puedes adoptar una de las perspectivas proporcionadas en la instrucción como la tuya o puedes introducir una que es completamente diferente a las proporcionadas. Tu calificación no se verá afectada por la perspectiva que adoptes sobre el tema.

Se reportan cinco calificaciones para la sección de redacción: una sola calificación a nivel de materia reportada a una escala de 2 a 12 y cuatro calificaciones de los dominios que se basan en una rúbrica de calificación analítica. La calificación de la materia es el promedio redondeado de las cuatro calificaciones de los dominios. Los cuatro dominios de redacción son:

Ideas y análisis

Las calificaciones de este dominio reflejan la habilidad de generar ideas productivas e interactuar críticamente con múltiples perspectivas sobre el tema en cuestión. Los escritores competentes entienden el tema que se les invita a abordar, el propósito de la redacción y la audiencia. Ellos generan ideas que son relevantes a la situación.

Desarrollo y sustentación

Las calificaciones en este dominio reflejan la habilidad de debatir ideas, ofrecer razonamiento y estimular un argumento. Los escritores competentes explican y exploran sus ideas, discuten las implicaciones e ilustran a través de ejemplos. Ellos ayudan al lector a entender su manera de pensar acerca del tema.

Organización

Las calificaciones en este dominio reflejan la habilidad de organizar ideas con claridad y propósito. Las opciones de organización son integrales para una redacción efectiva. Los escritores competentes organizan su ensayo de una manera que demuestra claramente la relación entre las ideas y guían al lector durante su discusión.

Uso del lenguaje y convenciones

Las calificaciones en este dominio reflejan la habilidad de usar el lenguaje escrito para transmitir argumentos con claridad. Los escritores competentes hacen uso de las convenciones de la gramática, sintaxis, uso de palabras y mecánica. También están conscientes de su audiencia y ajustan el estilo y tono de su redacción para expresarse efectivamente.

Sugerencias para tomar la sección de redacción

✓ *Distribuye tu tiempo.*

Organiza tu tiempo de acuerdo con la experiencia que tengas tomando exámenes de ensayos en la escuela o de cuando hayas tenido que redactar dentro de un tiempo limitado. Es poco probable que tengas tiempo de hacer un borrador, revisar y pasar en limpio tu ensayo.

✓ *Planifica.*

Antes de escribir, lee y considera detenidamente todo el material de las instrucciones. Asegúrate de entender el tema, las diferentes perspectivas sobre el tema y tu tarea de redacción del ensayo.

Se incluyen preguntas de planificación con las instrucciones, las cuales te ayudarán a analizar las diferentes perspectivas y a desarrollar la tuya propia. Usa estas preguntas para pensar críticamente en las instrucciones y generar una respuesta efectiva. ¿Cómo organizarías y sustentarías mejor tus ideas en un argumento escrito? Dedica tiempo a estructurar o bosquejar tu respuesta.

Nota: Las preguntas de planificación son opcionales y no se calificarán.

✓ *Escribe.*

Establece el enfoque de tu ensayo siendo muy claro en tu argumento y sus ideas principales.

- Explica e ilustra tus ideas con razonamiento lógico y ejemplos significativos.
- Debate la importancia de tus ideas: ¿cuáles son las implicaciones de lo que tienes que decir y por qué es importante considerar tu argumento?

Mientras escribes, pregúntate si tu lógica es clara, si has sustentado tus aseveraciones y si has elegido palabras precisas para expresar tus ideas.

✓ *Revisa tu ensayo.*

Trata de redactar tu ensayo de la manera más refinada que puedas. Antes de que se termine el tiempo, dedica unos minutos a revisar tu ensayo y corregir cualquier error.

Si tomas el examen ACT en papel, asegúrate de escribir tu ensayo de manera legible. Si encuentras palabras que son difíciles de leer, vuelve a escribirlas. Haz las correcciones y revisiones con pulcritud, entre las líneas. No escribas en los márgenes, si corresponde.

✓ *Practica.*

Hay muchas maneras de prepararse para la sección de redacción. Lee periódicos y revistas, escucha los análisis de las noticias en línea, en la televisión o en el radio, o participa en discusiones y debates pensando detenidamente sobre otras perspectivas en relación con la tuya.

Una buena manera de prepararte para la sección de redacción es practicar redactando con diferentes propósitos para diferentes lectores. La redacción que realices en tus clases te ayudará, al igual que escribir en un diario personal, historias, ensayos, editoriales u otras cosas que escribas independientemente.

También es buena idea practicar escribiendo dentro de un límite de tiempo. Hacer el examen de redacción de práctica te dará una buena idea de cuánta práctica adicional puedes necesitar. Puede ser buena idea tomar la sección de redacción de práctica, aunque no planees tomar el examen ACT con redacción. Te ayudará a desarrollar aptitudes que son importantes en el aprendizaje universitario y el mundo laboral.

Cómo hacer los exámenes de práctica

Es una buena idea hacer los exámenes de práctica bajo condiciones tan similares como sea posible a las que te enfrentarás el día del examen. Las siguientes sugerencias te ayudarán:

- Si vas a tomar el examen ACT (sin redacción), los cuatro exámenes de opción múltiple requieren 2 horas y 55 minutos. Hazlos en orden, en una sola sesión, con un descanso de 10 a 15 minutos entre los exámenes 2 y 3.
- Solamente necesitarás lápices N.° 2 blandos y afilados, y buenas gomas para borrar. Retira todos los demás objetos de tu escritorio. No se te permitirá usar papel para notas no aprobado, pero puedes usar el cuadernillo del examen para tomar notas.
- Si planeas usar una calculadora permitida en el examen de matemáticas, usa la misma calculadora que utilizarás el día del examen.
- Utiliza un reloj o cronómetro digital para tomar el tiempo en cada uno de los exámenes de práctica. Ajusta tu reloj cinco minutos antes del tiempo de terminación de cada examen, para que te acostumbres al anuncio verbal de que quedan cinco minutos.
- Date solo el tiempo permitido para cada examen.
- Desprende y usa el documento de respuestas de las páginas 55 y 56..
- Lee las instrucciones para el examen en la primera página de cada examen de opción múltiple. Estas son las mismas instrucciones que aparecerán en tu cuadernillo del examen en el día del examen.
- Enciende tu cronómetro y comienza con el examen 1. Continúa hasta el examen 4, tomándote un descanso de 10 a 15 minutos entre los exámenes 2 y 3. Usa la tabla de tiempos de la página página 1 para calcular el tiempo de cada sección del examen.
- Califica tus exámenes de opción múltiple usando la información que aparece a partir de la página página 63.
- Si planeas tomar el examen ACT con redacción, lee las instrucciones de la primera página del examen de redacción de ACT de práctica (página página 52). Estas son las mismas instrucciones que aparecerán en tu cuadernillo del examen en el día del examen. Activa tu cronómetro (programado para 40 minutos) y luego lee las instrucciones de la página página 53. Después de que sepas lo que las instrucciones te están pidiendo, planifica tu ensayo y luego escríbelo o imprímelo en hojas con rayas. El día del examen, si haces el examen en papel, tu documento de respuestas tendrá páginas a rayas para que escribas tu ensayo. Califica tu ensayo usando la información de las páginas 68 y 69.
- Hay un examen de práctica accesible para lectores de pantalla disponible en **https://practice-two.actdigitalservices.org/**.

Secciones de práctica de opción múltiple

EXAMINEE STATEMENTS, CERTIFICATION, AND SIGNATURE

1. **Statements:** I understand that by registering for, launching, starting, or submitting answer documents for an ACT® test, I am agreeing to comply with and be bound by the *Terms and Conditions: Testing Rules and Policies for the ACT® Test* ("Terms").
   I UNDERSTAND AND AGREE THAT THE TERMS PERMIT ACT TO CANCEL MY SCORES IN CERTAIN CIRCUMSTANCES. THE TERMS ALSO LIMIT DAMAGES AVAILABLE TO ME AND REQUIRE ARBITRATION OF CERTAIN DISPUTES. BY AGREEING TO ARBITRATION, ACT AND I BOTH WAIVE THE RIGHT TO HAVE THOSE DISPUTES HEARD BY A JUDGE OR JURY.
   I understand that ACT owns the test questions and responses, and I will not share them with anyone by any form of communication before, during, or after the test administration. I understand that taking the test for someone else may violate the law and subject me to legal penalties.
   I consent to the collection and processing of personally identifying information I provide, and its subsequent use and disclosure, as described in the ACT Privacy Policy (www.act.org/privacy.html). I also permit ACT to transfer my personally identifying information to the United States, to ACT, or to a third-party service provider, where it will be subject to use and disclosure under the laws of the United States, including being accessible to law enforcement or national security authorities.
2. **Certification:** Copy the italicized certification below, then sign, date, and print your name in the spaces provided.
   *I agree to the **Statements** above and certify that I am the person whose information appears on this form.*

Your Signature | Today's Date | Print Your Name

The ACT®

Form 2176CPRE

Directions

This booklet contains tests in English, mathematics, reading, and science. These tests measure skills and abilities highly related to high school course work and success in college. **Calculators may be used on the mathematics test only.**

The questions in Tests 1–4 are numbered, and the suggested answers for each question are lettered. On the answer document, the rows of ovals are numbered to match the questions, and the ovals in each row are lettered to correspond to the suggested answers.

For each question, first decide which answer is best. Next, locate on the answer document the row of ovals numbered the same as the question. Then, locate the oval in that row lettered the same as your answer. Finally, fill in the oval completely. Use a soft lead pencil and make your marks heavy and black. **Do not use ink or a mechanical pencil.**

Mark only one answer to each question. If you change your mind about an answer, erase your first mark thoroughly before marking your new answer. For each question, make certain that you mark in the row of ovals with the same number as the question.

Only responses marked on your answer document will be scored. Your score on each test will be based only on the number of questions you answer correctly during the time allowed for that test. You will **not** be penalized for guessing. **It is to your advantage to answer every question even if you must guess.**

You may work on each test **only** when the testing staff tells you to do so. If you finish a test before time is called for that test, you should use the time remaining to reconsider questions you are uncertain about in that test. You may **not** look back to a test on which time has already been called, and you may **not** go ahead to another test. To do so will disqualify you from the examination.

Lay your pencil down immediately when time is called at the end of each test. You may **not** for any reason fill in or alter ovals for a test after time is called for that test. To do so will disqualify you from the examination.

For Test 5, follow the directions on the first page of that test.

Do not fold or tear the pages of your test booklet.

DO NOT OPEN THIS BOOKLET UNTIL TOLD TO DO SO.

ENGLISH TEST

45 Minutes—75 Questions

DIRECTIONS: In the five passages that follow, certain words and phrases are underlined and numbered. In the right-hand column, you will find alternatives for the underlined part. In most cases, you are to choose the one that best expresses the idea, makes the statement appropriate for standard written English, or is worded most consistently with the style and tone of the passage as a whole. If you think the original version is best, choose "NO CHANGE." In some cases, you will find in the right-hand column a question about the underlined part. You are to choose the best answer to the question.

You will also find questions about a section of the passage, or about the passage as a whole. These questions do not refer to an underlined portion of the passage, but rather are identified by a number or numbers in a box.

For each question, choose the alternative you consider best and fill in the corresponding oval on your answer document. Read each passage through once before you begin to answer the questions that accompany it. For many of the questions, you must read several sentences beyond the question to determine the answer. Be sure that you have read far enough ahead each time you choose an alternative.

PASSAGE I

The following paragraphs may or may not be in the most logical order. Each paragraph is numbered in brackets, and question 14 will ask you to choose where Paragraph 3 should most logically be placed.

Bar Codes: A Linear History

[1]

In 1948, graduate students, Norman Woodland[1] and Bernard Silver,[1] took on a problem that had troubled retailers for years: how to keep track of store inventories. Inspired by the dots and dashes of Morse code, however,[2] Woodland and Silver created a system of lines that could encode data. Called a *symbology*, the pattern created by the spacing and widths of the lines encodes information by representing different characters.

1. **A.** NO CHANGE
B. students, Norman Woodland and Bernard Silver
C. students Norman Woodland and Bernard Silver
D. students Norman Woodland and Bernard Silver,

2. **F.** NO CHANGE
G. in other words,
H. consequently,
J. DELETE the underlined portion.

[2]

The first bar code was composed of four white lines set at specific distances from each other on a black background. The first line was always present. [4] Depending on the presence or absence of the remaining three lines, up to seven different arrangements were susceptible and, therefore, seven different encodings.

Today, twenty-nine white lines making more than half a billion encodings possible.

[3]

To create a bar code scanner, Woodland and Silver adapted technology from an optical movie sound system. Their prototype scanner used a 500-watt bulb, a photomultiplier tube (a device that detects light), and an oscilloscope (a device that translates electronic signals into readable information). Although successful, the concoction was both large and costly. For example, progress stalled until the 1970s, when laser technology (both more compact and less expensive) became available.

[4]

In today's scanners, a laser sends light back and forth across a bar code. While the black lines absorb the light, the white lines reflect it back at a fixed mirror inside the scanner. In this way, the scanner reads the symbology and decodes the information.

3. **A.** NO CHANGE
B. distances so that each was separated, one from the
C. locations, each one set apart from the
D. lengths of distance from each

4. The writer is considering deleting the preceding sentence. Should the sentence be kept or deleted?
F. Kept, because it begins the description that is completed in the sentence that follows.
G. Kept, because it gives a clear image of what the first bar code looked like.
H. Deleted, because it provides an extra detail that is not relevant to the subject of the paragraph.
J. Deleted, because it contradicts a point made later in the paragraph.

5. **A.** NO CHANGE
B. responsible
C. possible
D. capable

6. **F.** NO CHANGE
G. which make
H. to make
J. make

7. **A.** NO CHANGE
B. contraption
C. substance
D. stuff

8. **F.** NO CHANGE
G. As a result,
H. However,
J. Even so,

9. **A.** NO CHANGE
B. them
C. ones
D. one

[5]

10 Today,

being that there are one- and
11
two-dimensional bar codes using numeric

and alphanumeric symbologies. Bar codes

are used not only for a pack of gum or an airline

ticket, but also for research. In one study, for

instance, tiny bar codes were placed on bees tracking
12
their activities. Shaping the way we gather, track, and

share information, we have almost certainly exceeded
13
even Woodland and Silver's expectations.
13

10. Which of the following true statements, if added here, would most effectively lead into the new subject of the paragraph?

- **F.** In the 1940s, Woodland and Silver were graduate students at the Drexel Institute of Technology in Philadelphia.
- **G.** Woodland and Silver were granted a patent for their bar code on October 7, 1952.
- **H.** Bar code equipment has been available for retail use since 1970.
- **J.** Bar codes themselves have advanced as well.

11.
- **A.** NO CHANGE
- **B.** there are
- **C.** where
- **D.** DELETE the underlined portion.

12.
- **F.** NO CHANGE
- **G.** had been placed on bees trying to track
- **H.** placed on bees, which would track
- **J.** were placed on bees to track

13.
- **A.** NO CHANGE
- **B.** exceeding Woodland and Silver's expectations about bar codes has almost certainly been done.
- **C.** bar codes have almost certainly exceeded even Woodland and Silver's expectations.
- **D.** it is almost certain that we have exceeded even Woodland and Silver's expectations.

Questions 14 and 15 ask about the preceding passage as a whole.

14. For the sake of the logic and coherence of the essay, Paragraph 3 should be placed:

- **F.** where it is now.
- **G.** before Paragraph 1.
- **H.** after Paragraph 1.
- **J.** after Paragraph 5.

15. Suppose the writer's primary purpose had been to describe how a specific technological advancement changed business practices. Would this essay accomplish that purpose?

- **A.** Yes, because it offers an overview of current bar code technology and indicates the variety of ways in which bar codes are used by specific businesses.
- **B.** Yes, because it explains how bar codes and scanners made it easier for stores to keep track of their inventories.
- **C.** No, because it focuses primarily on the development of bar codes and only briefly mentions how businesses have implemented the use of bar codes.
- **D.** No, because it focuses on why businesses needed new technology but does not explain how bar codes were able to serve that need.

PASSAGE II

Glowing on an Adventure

As I pulled my camera out of my backpack, I felt a tap on my arm.

"No photographs," whispered the woman next to me, pointing [16] up to the cave ceiling. "The flash will make them stop glowing," she said, whispering. [17]

She was referring to the thousands of glowworms that clung to the limestone ceiling and, with their radiant bodies, flooded the cave in aquamarine light. While [18] I was traveling on [19] canoe on a group tour through the renowned Glowworm Grotto of New Zealand's Waitomo Caves. Were it not for the twinkling light of these *Arachnocampa luminosa*, a species unique to New Zealand and abundant in these caves, this meandering subterranean passageway would feel as though it were downright ensconced in shadows. [20]

I sheepishly tucked the camera away and focused again on the glowworms. Collectively, they resembled the cosmos, a sea of stars in a clear night sky. Beautiful—yet what made them glow?

"Bioluminescence," the woman said, peculiarly sensing my curiosity. [21] A badge was [22] pinned to her shirt indicated she was a biochemist, here, I guessed, to research the organism.

16. **F.** NO CHANGE
G. me, and then pointing
H. me and she pointed
J. me, she pointed

17. **A.** NO CHANGE
B. glowing," she said as she pointed up to the ceiling.
C. glowing," she said in a hushed, whispering voice.
D. glowing."

18. **F.** NO CHANGE
G. Although
H. Since
J. DELETE the underlined portion.

19. **A.** NO CHANGE
B. with
C. by
D. in

20. **F.** NO CHANGE
G. end up pretty hard to see.
H. have not a lot of light.
J. be utterly dark.

21. At this point, the writer wants to emphasize the idea that the narrator found the woman's comment peculiar. Which of the following best accomplishes that goal?

A. I figured she had been to the caves before.
B. Surprised, I hesitantly turned toward her.
C. She had a notepad in her hand.
D. I happened to agree.

22. **F.** NO CHANGE
G. had been
H. it was
J. DELETE the underlined portion.

She explained that to attract prey, glowworms (not really worms at all, but the larval stage of a fungus gnat) emit light through their translucent skin; via a [23] cellular chemical reaction. The cells produce luciferin, a chemical pigment that reacts with oxygen to produce light that shines through the organism's tail-end intestine.

From its mouth, she showed me, all glowworms dangle [24] shimmering silken threads glossed in beads of mucus. Cave-dwelling insects are trapped in these threads, then reeled in like fish on a line, and finally lured by the light. [25] The light responds to environmental factors. The sound of splashing water, however, [26] might signal that prey is nearby, causing them [27] to brighten. [28]

23. **A.** NO CHANGE
B. skin, and via
C. skin. Via
D. skin via

24. **F.** NO CHANGE
G. all of the glowworms are dangling
H. each of the glowworms dangle
J. each glowworm dangles

25. **A.** NO CHANGE
B. lured by the light, then trapped in these threads, and finally reeled in like fish on a line.
C. reeled in like fish on a line, then trapped in these threads, and finally lured by the light.
D. trapped in these threads, then lured by the light, and finally reeled in like fish on a line.

26. **F.** NO CHANGE
G. on the other hand,
H. for example,
J. above all,

27. **A.** NO CHANGE
B. the light
C. these
D. DELETE the underlined portion.

28. Which of the following choices, if added here, would best conclude the paragraph and refer back to the conversation at the beginning of the essay?

F. Insects are likely attracted to the light because the sky-like appearance of the glowworms fools the insects into believing they are outdoors.
G. She told me that the cave is usually quiet, with only occasional noises, such as tour boats passing through the water.
H. A camera flash, she reminded me, may also spell danger, and the glowworms' light is doused.
J. The light is also brighter in a hungry larva than in those that have just eaten.

Our trip neared its end. I spotted a dragonfly in the cave. I knew its fate, it would be ensnared, just as I had been by the brilliance of these luminescent glowworms.

29. The writer is considering revising the underlined portion to the following:

soaring toward the light.

Should the writer make this revision?

A. Yes, because the revised phrase more specifically describes the dragonfly's actions to help support the narrator's claim that she knew what its fate would be.
B. Yes, because the revised phrase adds information that explains why the light of the glowworms was suddenly dim.
C. No, because the original phrase more clearly establishes that the trip is ending and that the narrator sees the dragonfly as they exit the cave.
D. No, because the original phrase builds on the suspense established in the narrative regarding the fate of the dragonfly.

30. **F.** NO CHANGE
G. fate; and
H. fate:
J. fate

PASSAGE III

A Rose by the Name Antique

With shears in hand, I clip a thin branch from the rosebush in my backyard garden. I place this clipping into the basket next to me and crouch under this again. I snip a few more branches and then rise to head to the greenhouse. There, I will deposit these clippings in rich soil; roots will take hold, buds will sprout, and a new plant will find a home in my garden.

My roses are not your average hybrid-tea roses (those long-stemmed, special occasion roses with well-formed buds). Mine are *antique* roses, old, or heirloom varieties, that have existed in gardens worldwide for centuries.

31. **A.** NO CHANGE
B. basket next, to me
C. basket, next to me
D. basket next to me,

32. **F.** NO CHANGE
G. the rosebush
H. one
J. it

33. Which choice most closely maintains the sentence pattern the writer establishes after the semicolon?

A. NO CHANGE
B. I will see new buds that have been sprouting,
C. followed by the buds, which have sprouted,
D. then come the sprouting buds after that,

34. **F.** NO CHANGE
G. roses, old or heirloom, varieties,
H. roses old, or heirloom varieties
J. roses, old or heirloom varieties

Compared to vibrant hybrid-tea colors, antique rose colors
35

35. **A.** NO CHANGE
B. vibrant hybrid-tea, colors,
C. vibrant, hybrid-tea colors
D. vibrant hybrid-tea colors

tend to be silenced. Their stems are also shorter, and their
36
buds are a bit droopier. Their fragrance, however, is unmatched. And unlike the hybrid-tea whose long stems

36. **F.** NO CHANGE
G. reduced.
H. muted.
J. lower.

make into a rosebush that is rather scraggly looking,
37

37. **A.** NO CHANGE
B. about
C. like
D. for

antique rosebushes can be grown in a variety of colors,
38
handsomely landscaping gardens.

38. The writer wants to add a detail here that best completes the contrast to hybrid-tea roses in the first part of the sentence. Which choice best accomplishes that goal?

F. NO CHANGE
G. are lush and shapely,
H. can grow quite large,
J. tend to be less thorny,

The plant thrives best when it is exposed to six hours
39
of direct sunlight daily. The plant can withstand extreme
39

39. Which choice best introduces the main focus of the paragraph?

A. NO CHANGE
B. The varieties of antique roses are numerous, the most popular of which are the silken peach *Mutabilis* and the crimson *Louis Phillippe.*
C. Aside from the rose's beauty, what gardeners like me most appreciate is that antiques are incredibly durable and low maintenance.
D. While I am fond of bush varieties, I am also drawn to climbing varieties that can be placed against walls, fences, or trellises.

temperatures and survive nearly anywhere. It's also easier
40

40. **F.** NO CHANGE
G. They're
H. Their
J. Its

to grow antiques. Cultivating hybrid-teas having involved
41
a process of grafting two species of rose together, but the grafted area remains weak and susceptible to viruses. Antiques, on the other hand, are less prone to disease because they are grown simply by placing cuttings from a parent plant into nutrient-rich soil. They require far less
42
pruning, fertilizing, and nurturing than their hybrid-tea

41. **A.** NO CHANGE
B. which involves
C. involves
D. involving

42. **F.** NO CHANGE
G. Antiques, requiring
H. Antiques require
J. Requiring

counterparts, antiques can reportedly survive without any care from human hands, a fact that surprises many. [43]

[1] I dig small holes in a pot of soil, place each clipping a half inch deep, and pack down the soil around them. [2] Back in my greenhouse, I strip the clippings of all leaves and branches. [3] Then I wait: the roots will take hold and, eventually, buds will sprout. [44]

43. The writer wants to add a detail here that emphasizes the antique rose's ability to survive without human care. Which choice best accomplishes that goal?

A. NO CHANGE
B. blooming year after year even at abandoned sites.
C. making them more popular among gardeners.
D. often blooming between midspring and fall.

44. Which sequence of sentences makes this paragraph most logical?

F. NO CHANGE
G. 2, 1, 3
H. 3, 1, 2
J. 1, 3, 2

Question 45 asks about the preceding passage as a whole.

45. Suppose the writer's primary purpose had been to describe the process of planting a particular flower. Would this essay accomplish that purpose?

A. Yes, because the essay discusses the steps involved in growing and maintaining antique rosebushes.
B. Yes, because the writer explains the specific conditions needed to plant antique roses and how long it takes for new buds to sprout.
C. No, because the essay is more focused on comparing the qualities and cultivation of antique and hybrid-tea roses.
D. No, because while the writer mentions growing antique roses in his garden, the essay is more focused on the history of antiques in gardens worldwide.

PASSAGE IV

Jeremy Frey, Weaving Heritage Into Modern Art

[1]

The winning piece was a basket, it was [46] eighteen inches tall with a curved, vaselike silhouette. [A] It was made of ash wood finely woven into bold stripes of black and white that ran from its crown to its base. [B]

46. **F.** NO CHANGE
G. this work of art reached
H. the object stood
J. DELETE the underlined portion.

In the ninety-year history of the Santa Fe Indian Market—the largest Indian art festival in the nation—[47] the 2011 event marked the first time a basket won best of show. The creator of the piece, thirty-three-year-old Passamaquoddy Indian Jeremy Frey from Princeton, Maine, [48] the basket sold at auction for $16,000.

[2]

[C] Frey describes his baskets as "cutting-edge traditional." [D] He primarily weaves a classic material, wood from the brown ash tree, [49] but, unlike most contemporary basketmakers, he harvests, cuts, pounds, dries, and dyes the wood himself. [50] Then creating highly elaborate versions of the sturdy utility baskets that have been used by [51] generations of Passamaquoddy fishermen from Maine. He honors tradition, but he highlights artistic design. For example, his baskets feature [52] complex weaving on areas that are often hidden and therefore typically not embellished. Many traditional baskets have basic, woven lids.

47. **A.** NO CHANGE
B. Market the largest Indian art festival—in the nation—
C. Market, the largest Indian art festival, in the nation
D. Market, the largest Indian art festival in the nation

48. **F.** NO CHANGE
G. looked on as the
H. as his
J. his

49. **A.** NO CHANGE
B. but, unlike most, contemporary basketmakers
C. but unlike, most contemporary basketmakers,
D. but, unlike most contemporary basketmakers

50. **F.** NO CHANGE
G. Going on to create
H. Frey creates
J. Creating

51. If the writer were to delete the underlined portion, the essay would primarily lose:
A. an indication that Frey honors Passamaquoddy cultural heritage by creating baskets that look nearly identical to traditional pieces.
B. a mention of a physical characteristic of the earliest baskets used by Passamaquoddy fishermen.
C. a detail that connects Frey's basketry work to long-standing Passamaquoddy traditions.
D. a point revealing that Frey's baskets are used by Passamaquoddy fishermen today.

52. Which choice provides the clearest and most specific information about which parts of Frey's baskets are being referred to in the sentence and about Frey's manner of weaving those parts?
F. NO CHANGE
G. a remarkable level of detail on certain sections, the
H. intricately woven interiors and bottoms,
J. characteristic interiors and bottoms,

Frey's porcupine quill lids are often decorated
53

with art inlaid on birch bark; as far as lids go,
54
I wouldn't say that's basic. And while braids of
54

grass are customarily woven into ash baskets
55

to make them better, Frey incorporates braided
56
cedar bark to create striking new textures.

[3]

Now that he's a nationally recognized artist of who
57
has rejuvenated the art of basketry, Frey feels his role is to inspire. He's on the board of the Maine Indian Basketmakers Alliance, a group that works to help preserve it by reaching out to young members of Native
58
communities in the state. His other goal is to continue to

stand out. The woven grass bracelets he saw on a recent
59
trip to Hawaii have influenced how he shapes the bases of some of his newer baskets, as he finds yet another way to make traditional Passamaquoddy weaving something spectacularly his own.

53. Which placement of the underlined portion makes clear that the art that decorates the lid, not the lid itself, is made of porcupine quill?

A. Where it is now
B. After the word *are*
C. After the word *often*
D. After the word *with*

54. **F.** NO CHANGE
G. bark, which is not exactly formulating a lid through a conventional ideology.
H. bark; this is just part of his really artistic way.
J. bark.

55. **A.** NO CHANGE
B. has been
C. is seen
D. is

56. Which choice provides the clearest and most specific reason that grass is woven into ash baskets?

F. NO CHANGE
G. for the sake of the objects,
H. for a useful purpose,
J. to strengthen them,

57. **A.** NO CHANGE
B. being whom
C. whom
D. who

58. **F.** NO CHANGE
G. this art
H. that
J. DELETE the underlined portion.

59. **A.** NO CHANGE
B. distinguish himself from other weavers so as a weaver he is set apart from them.
C. remain to be someone who gets noticed.
D. keep on being fully distinct.

Question 60 asks about the preceding passage as a whole.

60. The writer is considering adding the following sentence to the essay:

> The black stripes were woven flat, sharply setting off the white stripes, which were woven to form raised columns of perfectly even points that seemed to cascade down the piece.

If the writer were to add this sentence, it would most logically be placed at:

F. Point A in Paragraph 1.
G. Point B in Paragraph 1.
H. Point C in Paragraph 2.
J. Point D in Paragraph 2.

PASSAGE V

The Flow of Time

Nine hundred years ago, Emperor Zhezong of China, [61]
ordered the design and construction of a clock

built to keep time more accurately than other clocks. [62]

This would be no simple timepiece and because [63]

Chinese dynasties continued [64] to astrology, they relied
on complicated clocks that not only kept time but also
helped track stars, planets, the sun, and the moon. An

eminent scientist and bureaucrat named Su Song lead [65]
Zhezong's ambitious project.

Using his expertise in calendrical science, [66]

Su Song created a spectacular timepiece housed within [67]
an ornate forty-foot-tall tower. At the tower's top sat an

armillary sphere, or [68] a nest of metal rings representing
celestial reference points such as the horizon and
the sun's path—that rotated in sync with the
earth, enabling precise astronomical observations.
Inside the tower, a sphere depicting the sky
revolved to display the stars that were overhead.

61. **A.** NO CHANGE
B. ago, Emperor Zhezong, of China
C. ago, Emperor Zhezong of China
D. ago Emperor Zhezong of China,

62. **F.** NO CHANGE
G. to keep time more accurately than clocks that had previously come before it.
H. more accurate at keeping time correctly than any other clock of the time.
J. more accurate than any other.

63. **A.** NO CHANGE
B. timepiece. Because
C. timepiece, because
D. timepiece because

64. **F.** NO CHANGE
G. adhered
H. linked
J. fixed

65. **A.** NO CHANGE
B. imminent scientist and bureaucrat named Su Song lead
C. imminent scientist and bureaucrat named Su Song led
D. eminent scientist and bureaucrat named Su Song led

66. Given that all the choices are accurate, which one best indicates that Su Song relied on engineering achievements from earlier times?
F. NO CHANGE
G. Building on centuries of Chinese clock-making knowledge,
H. While authoring his treatise on astronomical clockwork,
J. After first crafting a working small-scale wooden model,

67. **A.** NO CHANGE
B. secured between
C. encased around
D. nestled among

68. **F.** NO CHANGE
G. sphere—
H. sphere:
J. sphere,

Besides, below the star sphere, the tower's open sides exposed a detailed model of a five-story pagoda. Automated figurines would appear in the pagoda's doorways and ring bells to announce hours, sunsets, seasons, and other chronological events.

69. **A.** NO CHANGE
B. Sooner or later,
C. Lastly,
D. Thus,

70. Which of the following alternatives to the underlined portion would NOT be acceptable?
F. bells, which served to announce
G. bells, they announced
H. bells that announced
J. bells, announcing

The clock's inner workings were equally remarkable. Hidden in the tower, a waterwheel eleven feet in diameter powered the entire clock. Therefore, water would pour at a constant rate into one of the wheel's thirty-six buckets. When the bucket was full, the water's weight pulled it down, rotating the waterwheel. Then a stop mechanism halted the wheel and positioned the next bucket for filling.

71. **A.** NO CHANGE
B. reveals themselves as being
C. was shown to be
D. has proved

72. **F.** NO CHANGE
G. In other words, water
H. For example, water
J. Water

Chinese clockmakers had long used waterwheels, but Su Song's stop mechanism, which regulated the inertia of the waterwheel, represented significant innovation.

73. **A.** NO CHANGE
B. nevertheless,
C. regardless,
D. DELETE the underlined portion.

Unfortunately, after Su Song's clock ran for thirty years, invaders stole it. Later the clock vanished altogether. It would be a few hundred years until with the refinement of mechanical clocks in Europe other clocks approached the complexity of Su Song's masterpiece.

74. **F.** NO CHANGE
G. until—with the refinement of mechanical clocks in Europe—
H. until with the refinement (of mechanical clocks in Europe)
J. until, with the refinement, of mechanical clocks in Europe

75. **A.** NO CHANGE
B. eventually became able to draw anywhere near to the complexity
C. grew to attain such a high degree as that
D. could even fathom coming within reach

END OF TEST 1

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

MATHEMATICS TEST

60 Minutes—60 Questions

DIRECTIONS: Solve each problem, choose the correct answer, and then fill in the corresponding oval on your answer document.

Do not linger over problems that take too much time. Solve as many as you can; then return to the others in the time you have left for this test.

You are permitted to use a calculator on this test. You may use your calculator for any problems you choose, but some of the problems may best be done without using a calculator.

Note: Unless otherwise stated, all of the following should be assumed.

1. Illustrative figures are NOT necessarily drawn to scale.
2. Geometric figures lie in a plane.
3. The word *line* indicates a straight line.
4. The word *average* indicates arithmetic mean.

---

1. The numbers 1 through 15 were each written on individual pieces of paper, 1 number per piece. Then the 15 pieces of paper were put in a jar. One piece of paper will be drawn from the jar at random. What is the probability of drawing a piece of paper with a number less than 9 written on it?

A. $\frac{1}{9}$

B. $\frac{1}{15}$

C. $\frac{6}{15}$

D. $\frac{7}{15}$

E. $\frac{8}{15}$

2. Which of the following expressions is equivalent to $-4x^3 - 12x^3 + 9x^2$?

F. x^8
G. $-7x^8$
H. $-8x^3 + 9x^2$
J. $-16x^3 + 9x^2$
K. $-16x^6 + 9x^2$

3. When $x = 2$, $10 + 3\big(12 \div (3x)\big) =$?

A. 12
B. 16
C. 26
D. 34
E. 104

4. $|6 - 4| - |3 - 8| =$?

F. −7
G. −3
H. 3
J. 7
K. 21

5. The expression $(4c - 3d)(3c + d)$ is equivalent to:

A. $12c^2 - 13cd - 3d^2$
B. $12c^2 - 13cd + 3d^2$
C. $12c^2 - 5cd - 3d^2$
D. $12c^2 - 5cd + 3d^2$
E. $12c^2 - 3d^2$

6. Of the 180 students in a college course, $\frac{1}{4}$ of the students earned an A for the course, $\frac{1}{3}$ of the students earned a B for the course, and the rest of the students earned a C for the course. How many of the students earned a C for the course?

F. 75
G. 90
H. 105
J. 120
K. 135

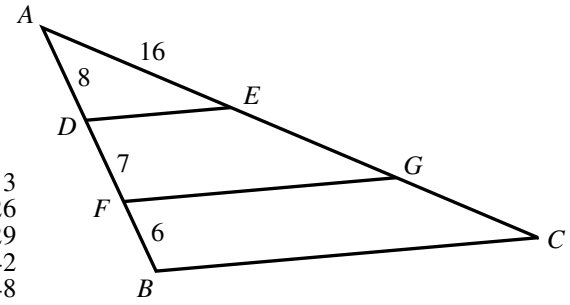
7. The number of fish, f, in Skipper's Pond at the beginning of each year can be modeled by the equation $f(x) = 3(2^x)$, where x represents the number of years after the beginning of the year 2000. For example, $x = 0$ represents the beginning of the year 2000, $x = 1$ represents the beginning of the year 2001, and so forth. According to the model, how many fish were in Skipper's Pond at the beginning of the year 2006 ?

A. 96
B. 192
C. 384
D. 1,458
E. 46,656

8. Manish drove from Chicago to Baton Rouge. At 8:00 a.m., he was 510 km from Baton Rouge. At 1:00 p.m., he was 105 km from Baton Rouge. Which of the following values is closest to Manish's average speed, in kilometers per hour, from 8:00 a.m. to 1:00 p.m. ?

F. 58
G. 68
H. 81
J. 94
K. 102

9. In the figure shown below, E and G lie on $\overline{AC}$, D and F lie on $\overline{AB}$, $\overline{DE}$ and $\overline{FG}$ are parallel to $\overline{BC}$, and the given lengths are in feet. What is the length of $\overline{AC}$, in feet?



A. 13
B. 26
C. 29
D. 42
E. 48

10. Katerina runs 15 miles in $2\frac{1}{2}$ hours. What is the average number of *minutes* it takes her to run 1 mile?

F. 6
G. 10
H. $12\frac{1}{2}$
J. $16\frac{2}{3}$
K. $17\frac{1}{2}$

11. A bag contains 8 red marbles, 9 yellow marbles, and 7 green marbles. How many additional red marbles must be added to the 24 marbles already in the bag so that the probability of randomly drawing a red marble is $\frac{3}{5}$?

A. 11
B. 16
C. 20
D. 24
E. 32

12. In the standard (x,y) coordinate plane, the point (2,1) is the midpoint of $\overline{CD}$. Point C has coordinates (6,8). What are the coordinates of point D ?

F. $\left(-2,-\frac{7}{2}\right)$
G. $(-2,-6)$
H. $\left(4,\ \frac{9}{2}\right)$
J. (10, 10)
K. (10, 15)

13. At his job, the first 40 hours of each week that Thomas works is *regular time*, and any additional time that he works is *overtime*. Thomas gets paid \$15 per hour during regular time. During overtime Thomas gets paid 1.5 times as much as he gets paid during regular time. Thomas works 46 hours in 1 week and gets \$117 in deductions taken out of his pay for this week. After the deductions are taken out, how much of Thomas's pay for this week remains?

A. \$492
B. \$573
C. \$609
D. \$618
E. \$735

14. At Sweet Stuff Fresh Produce the price of a bag of grapes depends on the total number of bags purchased at 1 time, as shown in the table below. In 2 trips to Sweet Stuff this week, Janelle purchased 3 bags of grapes on Monday and 4 bags of grapes on Wednesday. How much money would Janelle have saved if she had instead purchased 7 bags of grapes in 1 trip on Monday?

Number of bags	Price per bag
1–3	\$3.00
4–6	\$2.80
7–9	\$2.60
10 or more	\$2.50

F. \$0.20
G. \$1.00
H. \$1.40
J. \$2.00
K. \$2.50

15. What is 3% of 4.14×10^4 ?

A. 1,242
B. 1,380
C. 12,420
D. 13,800
E. 124,200

16. What value of x satisfies the equation $-3(4x - 5) = 2(1 - 5x)$?

F. $-\frac{17}{2}$

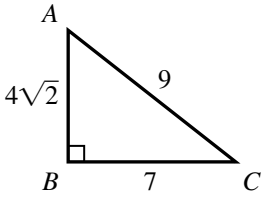
G. $-\frac{17}{22}$

H. -1

J. $\frac{3}{17}$

K. $\frac{13}{2}$

17. In right triangle $\triangle ABC$ shown below, the given lengths are in millimeters. What is sin A ?



A. $\frac{4\sqrt{2}}{9}$

B. $\frac{4\sqrt{2}}{7}$

C. $\frac{7\sqrt{2}}{8}$

D. $\frac{7}{9}$

E. $\frac{9}{7}$

18. $\left(\frac{27}{64}\right)^{-\frac{2}{3}} = ?$

F. $-\frac{9}{16}$

G. $-\frac{9}{32}$

H. $\frac{9}{32}$

J. $\frac{16}{9}$

K. $\frac{32}{9}$

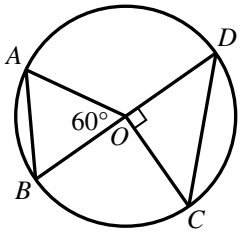
19. Loto begins at his back door and walks 8 yards east, 6 yards north, 12 yards east, and 5 yards north to the barn door. About how many yards less would he walk if he could walk directly from the back door to the barn door?

A. 8
B. 19
C. 23
D. 26
E. 31

20. For a given set of data, the standard score, z, corresponding to the raw score, x, is given by $z = \frac{x - \mu}{\sigma}$, where μ is the mean of the set and σ is the standard deviation. If, for a set of scores, $\mu = 78$ and $\sigma = 6$, which of the following is the raw score, x, corresponding to $z = 2$?

F. 90
G. 84
H. 80
J. 76
K. 66

21. In the figure below, A, B, C, and D lie on the circle centered at O.



Which of the following does NOT appear in the figure?

A. Acute triangle
B. Equilateral triangle
C. Isosceles triangle
D. Right triangle
E. Scalene triangle

22. What is the slope of a line, in the standard (x,y) coordinate plane, that is parallel to $x + 5y = 9$?

F. -5

G. $-\frac{1}{5}$

H. $\frac{1}{5}$

J. $\frac{9}{5}$

K. 9

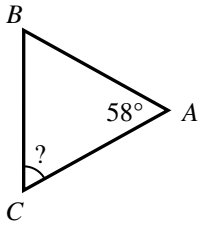
23. Given $y = \frac{x}{x - 1}$ and $x > 1$, which of the following is a possible value of y ?

A. -1.9
B. -0.9
C. 0.0
D. 0.9
E. 1.9

24. The set of all positive integers that are divisible by both 15 and 35 is infinite. What is the least positive integer in this set?

F. 5
G. 50
H. 105
J. 210
K. 525

25. In $\triangle ABC$ shown below, the measure of $\angle A$ is 58°, and $\overline{AB} \cong \overline{AC}$. What is the measure of $\angle C$?



A. 32°
B. 42°
C. 58°
D. 61°
E. 62°

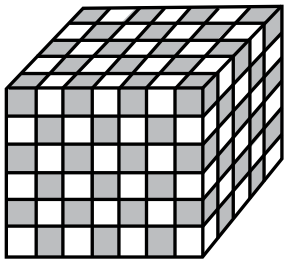
26. About 1.48×10^8 square kilometers of Earth's surface is land; the rest, about 3.63×10^8 square kilometers, is water. If a returning space capsule lands at a random point on Earth's surface, which of the following is the best estimate of the probability that the space capsule will land in water?

F. 80%
G. 71%
H. 65%
J. 41%
K. 29%

27. On the first 7 statistics tests of the semester, Jamal scored 61, 76, 79, 80, 80, 84, and 91. The mean, median, and mode of his scores were 79, 80, and 80, respectively. On the 8th statistics test, Jamal scored 90. How do the mean, median, and mode of all 8 of his scores compare to the mean, median, and mode of his first 7 scores?

	Mean	Median	Mode
A.	equal	greater	greater
B.	greater	greater	greater
C.	greater	greater	equal
D.	greater	equal	greater
E.	greater	equal	equal

28. The solid rectangular prism shown below was built by alternating congruent black cubes and white cubes such that 2 cubes of the same color have at most 1 edge touching. What is the total number of *white* cubes that were used to build the prism?



F. 45
G. 102
H. 105
J. 140
K. 210

29. One side of square *ABCD* has a length of 12 meters. A certain rectangle whose area is equal to the area of *ABCD* has a width of 8 meters. What is the length, in meters, of the rectangle?

A. 12
B. 16
C. 18
D. 20
E. 24

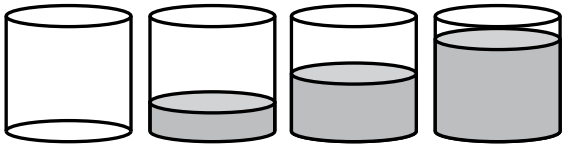
30. The average of a list of 4 numbers is 92.0. A new list of 4 numbers has the same first 3 numbers as the original list, but the fourth number in the original list is 40, and the fourth number in the new list is 48. What is the average of this new list of numbers?

F. 81.0
G. 92.0
H. 94.0
J. 94.4
K. 96.6

31. The vector **i** represents 1 mile per hour east, and the vector **j** represents 1 mile per hour north. Maria is jogging south at 12 miles per hour. One of the following vectors represents Maria's velocity, in miles per hour. Which one?

A. $-12\mathbf{i}$
B. $-12\mathbf{j}$
C. $12\mathbf{i}$
D. $12\mathbf{j}$
E. $12\mathbf{i} + 12\mathbf{j}$

32. Four identical glasses are shown below. One glass is empty, and the other 3 glasses are $\frac{1}{4}$ full, $\frac{1}{2}$ full, and $\frac{4}{5}$ full of water, respectively. If the water were redistributed equally among the 4 glasses, what fractional part of each glass would be filled?



F. $\frac{2}{11}$

G. $\frac{8}{11}$

H. $\frac{3}{22}$

J. $\frac{31}{60}$

K. $\frac{31}{80}$

33. Aurelio is purchasing carpet tiles to cover an area of his living room floor that is $8\frac{1}{3}$ feet wide by 10 feet long. Each carpet tile is a square 20 inches wide by 20 inches long. What is the minimum number of carpet tiles that Aurelio must purchase to cover this area of his living room floor?

A. 5
B. 11
C. 21
D. 30
E. 84

34. In the standard (x,y) coordinate plane, a circle with its center at (8,5) and a radius of 9 coordinate units has which of the following equations?

F. $(x-8)^2+(y-5)^2=81$
G. $(x-8)^2+(y-5)^2=9$
H. $(x+8)^2+(y+5)^2=81$
J. $(x+8)^2+(y+5)^2=9$
K. $(x+5)^2+(y+8)^2=81$

Use the following information to answer questions 35–38.

Many humans carry the gene Yq77. The Yq test determines, with 100% accuracy, whether a human carries Yq77. If a Yq test result is positive, the human carries the Yq77 gene. If a Yq test result is negative, the human does NOT carry Yq77. Sam designed a less expensive test for Yq77 called the Sam77 test. It produces some incorrect results. To determine the accuracy of the Sam77 test, both tests were administered to 1,000 volunteers. The results from this administration are summarized in the table below.

	Positive Yq test	Negative Yq test
Positive Sam77 test	590	10
Negative Sam77 test	25	375

35. It cost \$2,500 to administer each Yq test and \$50 to administer each Sam77 test. What was the total cost to administer both tests to all the volunteers?

A. \$1,537,500
B. \$1,556,750
C. \$1,568,250
D. \$2,500,000
E. \$2,550,000

36. What percent of the volunteers actually carry Yq77 ?

F. 57.5%
G. 60.0%
H. 60.5%
J. 61.5%
K. 62.5%

37. For how many volunteers did the Sam77 test give an incorrect result?

A. 10
B. 25
C. 35
D. 385
E. 400

38. One of the volunteers whose Sam77 test result was positive will be chosen at random. To the nearest 0.001, what is the probability the chosen volunteer does NOT possess Yq77 ?

F. 0.017
G. 0.026
H. 0.035
J. 0.041
K. 0.063

39. Given matrices $X = [-1\ 0]$ and $Y = \begin{bmatrix} -2 \\ -1 \end{bmatrix}$, which of the following matrices is XY ?

A. $[-4]$
B. $[-3]$
C. $[-2]$
D. $[\ 2]$
E. $[\ 3]$

40. Regardless of how the graph is oriented in the standard (x,y) coordinate plane, NO graph in one of the following categories has a vertical line of symmetry. Which one?

F. Line
G. Square
H. Pentagon
J. Parallelogram
K. Scalene triangle

41. The equation $24x^2 + 2x = 15$ has 2 solutions. What is the greater of the 2 solutions?

A. $\frac{3}{4}$
B. $\frac{4}{3}$
C. $\frac{5}{6}$
D. $\frac{7}{6}$
E. $\frac{11}{15}$

42. Which of the following expressions is equal to $(\sin 60°)(\cos 30°) + (\cos 60°)(\sin 30°)$?

F. $\cos(60° - 30°)$
G. $\cos(60° + 30°)$
H. $\sin(60° - 30°)$
J. $\sin(60° + 30°)$
K. $\sin\left(\frac{60° + 30°}{2}\right)$

43. What is the area, in square units, of a circle that has a circumference 12π units long?

A. 6π
B. 12π
C. 24π
D. 36π
E. 144π

44. A barrel contains 25 liters of a solvent mixture that is 40% solvent and 60% water. Lee will add pure solvent to the barrel, without removing any of the mixture currently in the barrel, so that the new mixture will contain 50% solvent and 50% water. How many liters of pure solvent should Lee add to create this new mixture?

F. 2.5
G. 5
H. 10
J. 12.5
K. 15

45. For all $x \neq \pm y$, $\frac{x}{x+y} + \frac{y}{x-y} = ?$

A. $\frac{1}{x-y}$
B. $\frac{x+y}{x-y}$
C. $\frac{x+y}{2x}$
D. $x^2 + y^2$
E. $\frac{x^2+y^2}{x^2-y^2}$

46. Mary, James, and Carlos sold $\frac{1}{4}$-page advertisements for the school yearbook. Mary sold twice as many as Carlos did, and James sold 3 times as many as Mary did. What fraction of these advertisements did Carlos sell?

F. $\frac{1}{9}$
G. $\frac{1}{7}$
H. $\frac{1}{6}$
J. $\frac{1}{5}$
K. $\frac{1}{3}$

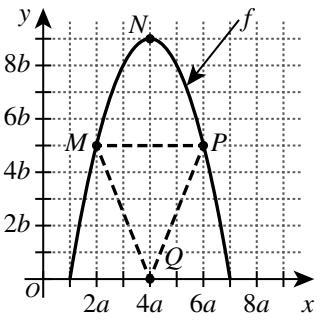
47. In a window display at a flower shop, there are 3 spots for 1 plant each. To fill these 3 spots, Emily has 6 plants to select from, each of a different type. Selecting from the 6 plants, Emily can make how many possible display arrangements with 1 plant in each spot?

(Note: The positions of the unselected plants do not matter.)

A. 3
B. 6
C. 15
D. 120
E. 216

Use the following information to answer questions 48–50.

The quadratic function f and $\triangle MPQ$ are graphed in the standard (x,y) coordinate plane below. Points $M(2a, 5b)$, $N(4a, 9b)$, and $P(6a, 5b)$ are on f. Point $Q(4a, 0)$ is NOT on f.



48. In terms of a and b, what is the area, in square coordinate units, of $\triangle MPQ$?

F. $8ab$
G. $10ab$
H. $12ab$
J. $15ab$
K. $20ab$

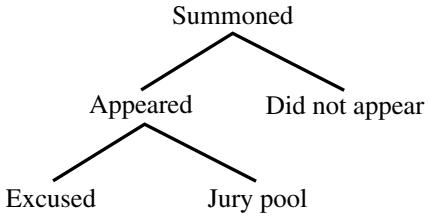
49. Point M will remain fixed, and point Q will move to the right along the x-axis. As Q continues to move to the right, which of the following statements describes what will happen to the slope of $\overline{MQ}$?

A. It will decrease and eventually be negative.
B. It will decrease but never be negative.
C. It will stay the same.
D. It will increase but never be positive.
E. It will increase and eventually be positive.

50. One of the following values is equal to $f(5a)$. Which one?

F. $3a$
G. $5a$
H. $5b$
J. $8a$
K. $8b$

51. Twelve jurors are needed for an upcoming trial. The diagram below illustrates a part of the process of jury selection. The 12 jurors will be selected from a jury pool of about 60 people. The court records show a trend that only 40% of the people who are summoned for jury duty actually appear and that of the people who appear, $\frac{1}{3}$ are excused. If this same trend continues, how many people should be summoned to have as close as possible to 60 people in the jury pool?



A. 45
B. 90
C. 150
D. 225
E. 800

52. What is the 275th digit after the decimal point in the repeating decimal $0.\overline{6295}$?

F. 0
G. 2
H. 5
J. 6
K. 9

53. Given that $f(x) = x^2 - 4$ and $g(x) = x + 3$, what are all the values of x for which $f(g(x)) = 0$?

A. -5 and -1
B. -3, -2, and 2
C. -1 and 1
D. 1 and 5
E. $-\sqrt{5}$ and $\sqrt{5}$

54. Given that p is a positive number, n is a negative number, and $|p| > |n|$, which of the following expressions has the greatest value?

F. $\left|\frac{p-n}{p}\right|$
G. $\left|\frac{p-n}{n}\right|$
H. $\left|\frac{p+n}{p-n}\right|$
J. $\left|\frac{p+n}{p}\right|$
K. $\left|\frac{p+n}{n}\right|$

55. If $i = \sqrt{-1}$, then $\frac{i + i^2 + i^3}{i^3 + i^4 + i^5} = ?$

A. -3

B. -1

C. $\frac{1}{2}$

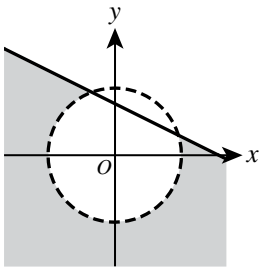
D. 1

E. 3

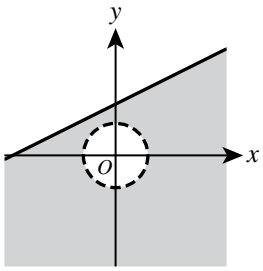
56. In one of the following graphs in the standard (x,y) coordinate plane, the solution set to the system of inequalities below is shown shaded. Which one?

$$\begin{cases} x + 2y \le 6 \\ 3x^2 > 12 - 3y^2 \end{cases}$$

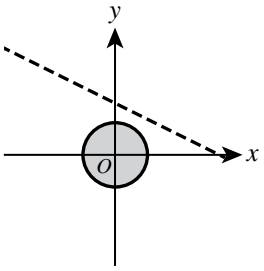
F.



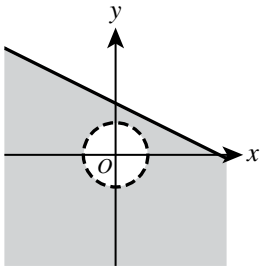
J.



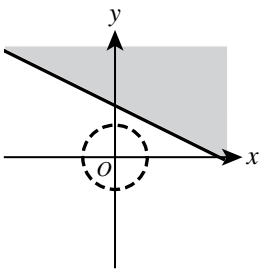
G.



K.



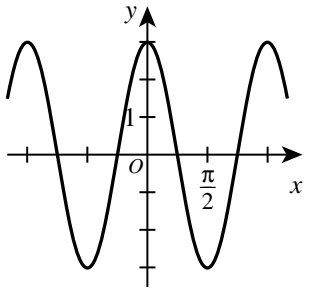
H.



57. Let a, b, c, and d be real numbers. Given that $ac = 1$, $\frac{b + c}{d}$ is undefined, and $abc = d$, which of the following *must* be true?

A. $a = 0$ or $c = 0$
B. $a = 1$ and $c = 1$
C. $a = -c$
D. $b = 0$
E. $b + c = 0$

58. A cosine function is shown in the standard (x,y) coordinate plane below.



One of the following equations represents this function. Which one?

F. $y = 2\cos\left(\frac{x}{3}\right)$

G. $y = 2\cos(3x)$

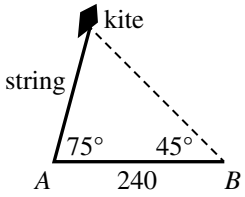
H. $y = 3\cos\left(\frac{x}{3}\right)$

J. $y = 3\cos\left(\frac{x}{2}\right)$

K. $y = 3\cos(2x)$

59. The figure below shows a flying kite. At a certain moment, the kite string forms an angle of elevation of 75° from point A on the ground. At the same moment, the angle of elevation of the kite at point B, 240 ft from A on level ground, is 45°. What is the length, in feet, of the string?

A. $60\sqrt{3}$
B. $80\sqrt{6}$
C. 144
D. 180
E. 240



60. If a publisher charges \$15 for the first copy of a book that is ordered and \$12 for each additional copy, which of the following expressions represents the cost of y books?

F. $12y + 3$
G. $12y + 15$
H. $15y - 3$
J. $15y + 3$
K. $15y + 12$

END OF TEST 2

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO THE PREVIOUS TEST.

READING TEST

35 Minutes—40 Questions

DIRECTIONS: There are several passages in this test. Each passage is accompanied by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

Passage I

LITERARY NARRATIVE: Passage A is adapted from the memoir *The Piano Shop on the Left Bank* by Thad Carhart (©2001 by T.E. Carhart). Passage B is adapted from the article "Me and My Violin" by Arnold Steinhardt (©2014 by Listen: Life with Classical Music).

Passage A by Thad Carhart

Even when Luc was busy and could not talk he always made me welcome and allowed me to wander around the inner sanctum of the back room on my own. When things were quieter, he seemed glad of the company and would tell me about the pianos that had just arrived. Our talks made real for me one of his fundamental beliefs, that each and every piano had completely individual characteristics, even if of the same manufacturer and age.

Sometimes he knew all the details, had even met the owners and talked about their instrument with them and knew intimately how they had treated it. Other times he knew nothing beyond what he could see, feel, or hear. Most often pianos came to him from auctions and charity sales, their history anonymous. But even then, like an expert in artifacts, he could deduce a great deal: whether a piano had been played much or little, whether it had been in an environment with the proper level of humidity (one of his cardinal rules), whether there had been children in the household, even whether it had recently been transported by ship. ("The worst thing you can possibly do to a piano," he told me more than once.) At these moments he was part detective, part archaeologist, part social critic.

His attitude about how people treated their pianos seemed to mirror his philosophy of life. While regretting the depredations worked by children on keyboards and strings, he regarded them as tolerable because the piano was at least used and, as he put it, *"au sein de la famille"* ("at the heart of the family"). It was more than just any piece of furniture, but it was that, too, and if drinks were spilled and stains bit into shiny finishes, it was the price one paid for initiating the young to a joy that should stem from familiarity rather than reverence.

Those who preserved their piano as an altar upon which the art of music was to be worshipped irritated Luc, but he was deeply respectful of serious musicians who used and depended upon their instrument for their livelihood.

Passage B by Arnold Steinhardt

Marc Lifschey, one of the greatest oboists of his era, told me that after retiring as a performer and teacher, he sold his oboe. On the face of it, giving up an instrument you no longer use seems perfectly reasonable, but nevertheless I was taken aback. Marc was not merely an excellent oboist; he was a great artist. Still, Marc didn't do it alone. He and his oboe did it together. Even in retirement, wouldn't Marc have some sort of lasting relationship with his oboe that transcended performing on it? Wouldn't he want to keep it if for no other reason than as a reminder of the magnificent music the two of them had made together?

Joseph Roisman, the distinguished first violinist of the Budapest String Quartet, seemed to be content to give up his beloved Lorenzo Storioni when he agreed to sell it to me after the Quartet retired. But when I finally met with him, he had second thoughts. "Steinhardt," he said to me plaintively, "I'll sell the violin to you some day, but for now I'm enjoying playing chamber music with my friends every Friday night." And that is exactly what he did until his death a year or two later.

Lifschey and Roisman dealt with retirement in different ways, but their stories made me wonder about not only what I'll do with my violin if and when I retire, but also about the very nature of a musician's day-to-day, year-to-year relationship with his instrument.

I began playing violin when I was six years old, and now I'm seventy-six. It has been an integral part of my life for the last seven decades. Does that make the violin my very close friend? Well, yes. Sometimes. The violin obviously can't speak with words, but when I ask something of it, the instrument can respond with an astonishing range of substance and emotion. This is friendship on a most exalted level.

There are other moments, however, when the violin stubbornly refuses to do my bidding—when it only reluctantly plays in tune, or makes the sound I want, or delivers the music's essence for which I strive. Then I have to cajole, bargain or adjust to its every

whim. Some friend; more like an adversary, you might say.

Or is the violin my partner? A woman once went backstage to congratulate the great violinist Jascha Heifetz after a concert. "What a wonderful sound your violin has, Mr. Heifetz!" she exclaimed. Heifetz leaned over his violin that lay in its open case, listened intently for a moment, and said, "Funny, I don't hear a thing." My violin also lies mute in its case without me—but, on the other hand, I stand mute on the concert stage without it.

1. In Passage A, the parenthetical information in line 19 and lines 21–23 mainly serves to:

- **A.** specify how Luc identified certain aspects of a piano's history.
- **B.** portray Luc as overly judgmental about piano transportation.
- **C.** describe the types of rules that visitors to Luc's shop were required to follow.
- **D.** indicate some of Luc's firm beliefs about piano care.

2. Based on the assertion in Passage A that Luc's "attitude about how people treated their pianos seemed to mirror his philosophy of life" (lines 25–26), which of the following statements would most nearly describe Luc's philosophy of life?

- **F.** It's better to live a full and imperfect life than not participate because something might go wrong.
- **G.** Life is a fragile gift that must be cherished and kept safe at all times.
- **H.** Living well is like playing the piano well; it requires dedication and practice.
- **J.** It's important not to take life's opportunities for granted because they may not come a second time.

3. As it is used in line 32, the phrase *bit into* most nearly means:

- **A.** pinched.
- **B.** ingested.
- **C.** marred.
- **D.** severed.

4. In the third paragraph of Passage B (lines 61–65), the author most clearly shifts from:

- **F.** making an argument against musicians selling their instruments to using evidence from his life to support that argument.
- **G.** introducing musicians he admires to explaining why he hopes people admire him as a musician.
- **H.** examining his own emotions about his violin to explaining why musicians must develop a partnership with their instruments.
- **J.** discussing the connection between other musicians and their instruments to pondering his own connection with his violin.

5. In Passage B, the statement that Lifschey "was not merely an excellent oboist; he was a great artist" (lines 44–45) can best be described as:

- **A.** a fact supported by details about Lifschey's career.
- **B.** a fact confirmed by experts quoted in the passage.
- **C.** an opinion that the author attributes to Lifschey's colleagues and students.
- **D.** an opinion that the author asserts but does not explain.

6. In Passage B, it can most reasonably be inferred that Heifetz's response to the woman who congratulates him is intended to point out that:

- **F.** the woman hears Heifetz's violin differently than Heifetz does.
- **G.** the woman isn't qualified to judge the quality of Heifetz's violin.
- **H.** Heifetz enjoyed the woman's humorous comment.
- **J.** Heifetz's violin doesn't make sounds by itself.

7. In Passage B, the author most directly indicates that the violin is sometimes an adversary by stating that it:

- **A.** lies mute in its case.
- **B.** makes him adjust to its whims.
- **C.** responds with a range of emotion.
- **D.** can't speak with words.

8. Compared to Passage A, Passage B is more directly focused on the:

- **F.** damage a musician can do to an instrument.
- **G.** characteristics of an instrument that give clues to its history.
- **H.** interdependence between musician and instrument.
- **J.** benefits of making instruments available to young children.

9. In contrast to the way the pianos are described in Passage A, the passage author's violin in Passage B is described as:

- **A.** exhibiting unique characteristics.
- **B.** having an active personality of its own.
- **C.** sustaining damage from careless children.
- **D.** being important to daily life.

10. Which of the following assertions about instruments is most strongly supported by details provided in both Passage A and Passage B?

- **F.** Familiarity with your instrument is an important part of the joy of playing music.
- **G.** Instruments should be revered and never treated like furniture.
- **H.** Selling your instrument shows disrespect for the music you have made together.
- **J.** Maintaining proper humidity levels is essential to preserving an instrument.

Passage II

INFORMATIONAL: This passage is adapted from the article "Notes from a Wedding" by Lauren Wilcox Puchowski (©2010 by Lauren Wilcox Puchowski).

It was never Kenney Holmes's intention to become a wedding singer. The grandson of West Indian immigrants, Holmes was raised in Gordon Heights, on Long Island, in what he calls "a small black community founded by like-minded thinkers," families of immigrants and Southern blacks who, as Holmes says, "didn't come here to fool around" and who handed down to their children their own keen sense of ambition.

"We grew up in that kind of atmosphere," he says, "of positive thinking, of getting educated, whether or not you had a degree."

Like any American boy in the 1950s and '60s, he was fascinated with popular music: He listened to the area's one radio station, which "mostly played Sinatra"; sometimes in the evenings, with a coat hanger stuck into the top of his portable radio, he could pick up a faint signal from WWRL, a rhythm and blues station in New York City. When he was a teenager, his brother brought home a guitar. "I was 16, it was a Sunday night," he says. "I sat down and played 'I Can't Get No Satisfaction.' I was addicted."

While he was not a virtuoso, he was, he discovered, good at making money at it. He learned three songs—"Satisfaction" by the Rolling Stones, "And I Love Her" by the Beatles, and "Shotgun" by Junior Walker and the All Stars—and formed a band. "We went out and sold it," he says. "We could play those three songs all night. We got pretty popular out on the island, playing battle of the bands, fire halls, high school proms, for $10 a night."

Still, a career as a musician was not what he, or his family, had had in mind. Over the next few years, he says: "I did everything I could not to be a guitar player. I went to college not to be a guitar player." Thinking he would be a psychiatrist, he took pre-med classes but didn't complete a degree. Along the way, he continued playing nightclubs and parties.

In his mid-20s, he visited his brother in Washington. Washington looked, to Holmes, like a good place to be an ambitious, career-minded black man, but it also had a thriving music scene in nightclubs and hotel lounges, and the next 15 years played out as a sort of tussle between his creative pursuits and his more business-driven impulses. Trying to work his way up in the music scene, he played five and six nights a week in nightclubs and wrote his own music. He started a recording studio called Sound Ideas, which trawled local talent for the makings of a hit song, but he found the pickings slim.

The club scene, after a long while, began to wear on him, as well. Unwilling to resign himself to the life of a starving artist, when an agent approached him in the early '90s about specializing in wedding and private parties, Holmes decided to try it.

It was a revelation. "I could make in one night what I used to make in five," he says. And "it changed the culture of what I was doing."

Holmes was well-suited for the role of event bandleader. His production skills helped him control his band's sound, and his familiarity with country, big-band and classical music made him popular with audiences who wanted, as he says, "a tango or a Viennese waltz," as well as Wilson Pickett.

Because business ebbs and flows with the seasons and the economy, Holmes has always kept a variety of sidelines, including a job driving a limousine for nine years to put his oldest daughter through a private high school and college. These days, at gigs, he hands out a stack of million-dollar "bills" printed with his image and his current enterprises: bandleader, commercial mortgage broker, hard money lender.

Holmes uses as many as eight musicians and two singers for weddings. He accepts turnover as a fact of running a band, but his current core lineup has, in the mercurial world of part-time performers, been fairly steady. Sam Brawner, the drummer, and Atiba Taylor, the sax player, have played with him for three and four years, respectively, and Bruce Robinson, the keyboardist, has played with him for 15.

This is perhaps partly because Holmes insists on making music. During performances, he lets his musicians take the lead and uses specialized, stripped-down tracks, called digital sequences, to set the tempo and fill in musical parts when necessary, ultimately preferring the messy alchemy of live music to something more canned. The musicians say that this is in contrast to other bandleaders they've worked for, who often rely heavily on recordings and use musicians more as visual props. Holmes's respect for the music endears him to his musicians. "These guys play from the heart," says Robinson. "They're not just trying to get through the gig."

11. The main purpose of the passage is to:

- **A.** explain why Holmes's musical tastes gradually changed over time.
- **B.** describe how Holmes's hectic professional life affects his personal life.
- **C.** highlight the different instruments Holmes mastered in becoming a famous musician.
- **D.** document how Holmes eventually became an enterprising bandleader.

12. One theme of the passage is that:

- **F.** one's previous experiences and pursuits can be useful in achieving success.
- **G.** talent is the most important factor in achieving success in both business and music.
- **H.** recognizing one's limitations is necessary in overcoming one's failures.
- **J.** pursuing one's dreams should take precedence over more practical matters.

13. Which of the following events referred to in the passage occurred last chronologically?

- **A.** Taylor joined Holmes's band.
- **B.** Brawner joined Holmes's band.
- **C.** Holmes started driving a limousine.
- **D.** Holmes started Sound Ideas.

14. Based on the passage, the residents of Gordon Heights in the 1950s and 1960s would best be described as:

- **F.** artistic and sophisticated.
- **G.** driven and optimistic.
- **H.** friendly and easygoing.
- **J.** generous and dependable.

15. The main purpose of the third paragraph (lines 13–22) is to:

- **A.** indicate why Holmes preferred rhythm and blues to Sinatra songs.
- **B.** establish that Holmes's parents disapproved of his interest in music.
- **C.** reveal that Holmes was considered a musical prodigy.
- **D.** describe what inspired Holmes to start playing music.

16. The main idea of the fourth paragraph (lines 23–31) is that:

- **F.** Holmes was better at playing music than he was at promoting his band.
- **G.** Holmes's band was able to earn money despite having a limited repertoire.
- **H.** Holmes's band became a national phenomenon despite the band members' lack of musical talent.
- **J.** Holmes would have had more success early on if he had taken the time to learn more songs.

17. Based on the passage, the main reason Holmes eventually preferred playing music at weddings and private parties to playing music in clubs was that:

- **A.** he could play a wider variety of music at weddings and private parties.
- **B.** audiences at weddings and private parties were easier to please.
- **C.** weddings and private parties were more profitable.
- **D.** weddings and private parties required less travel.

18. The main idea of the eleventh paragraph (lines 73–80) is that:

- **F.** Holmes often has to alter his musical style based on which band members are available to play a gig.
- **G.** Holmes typically needs more band members to play at weddings than he needs to play at private parties.
- **H.** Holmes's core lineup of band members has been relatively consistent for a business with a high turnover rate.
- **J.** Holmes's core lineup of band members is constantly changing because Holmes expects his musicians to travel long distances.

19. It can most reasonably be inferred from the passage that Holmes's band members like playing music with Holmes in part because, in contrast to other band leaders, Holmes:

- **A.** is familiar with big band, classical, and country music.
- **B.** allows band members to showcase their talents during gigs.
- **C.** played music in the Washington club scene for fifteen years.
- **D.** uses sophisticated elements like digital sequences during gigs.4

20. In the passage, the phrase *something more canned* (lines 86–87) most nearly refers to:

- **F.** sound effects.
- **G.** music videos.
- **H.** improvised music.
- **J.** recorded music.

Passage III

INFORMATIONAL: This passage is adapted from the article "Photography Changes How Cultural Groups Are Represented and Perceived" by Edwin Schupman (©2012 by The Smithsonian Institution).

The author of the passage is a citizen of the Muscogee (Creek) Nation of Oklahoma.

Using photographs as educational resources presents particular challenges and must be done with care. There is always more than face value in any photo, and historical photos of American Indians are no exception. Photography's rise in the late nineteenth century coincided with great change in American Indian communities—an era that capped over three hundred years of diseases, wars, cultural disruption, and land dispossession. As Indian people struggled to adapt to catastrophic changes to their old ways of living, photographers took thousands of studio portraits and made what they believed to be neutral ethnographic images of the "vanishing Indian." As Indian cultures bent under pressure to assimilate into mainstream America, photographers routinely captured images that compared the new "civilized" Indian to the tradition-bound "savages." Indian delegations that traveled to Washington, D.C., to defend tribal treaty rights were photographed in studios and in front of federal buildings. Photographers also accompanied government expeditions to the West where they documented traditional cultures, leading the way for tourists and commercial photographers who followed, carrying their cameras and preconceptions into Native American communities. These efforts generated a legacy of photographic images of American Indian people that can serve today as rich educational resources. But if used carelessly, they can also fuel romanticized and stereotypical perceptions of American Indians.

Consider some of the many photographs of Goyathlay, the Apache man who Mexicans named "Geronimo." He and other Chiricahua Apaches fought a protracted war from 1863 to 1886 against the United States for the right to live in their traditional homelands rather than on reservations.

The Chiricahua Apaches' fight for freedom captured the American imagination in the late nineteenth century. "Geronimo," especially, became a legendary figure and a media phenomenon whose legacy has lasted into the twenty-first century. He became synonymous with courage, daring, and savage ruthlessness. World War II paratroopers shouted his name as they jumped from airplanes into combat. Movies, television shows, comic books, popular songs, posters, T-shirts, and American cities have borne his image and name. One photo that shows Goyathlay and three other Chiricahuas in their camp just prior to surrendering to U.S. forces in 1886 documents a critical and difficult day for the people who had fought so diligently for their freedom.

In another well-known studio portrait, circa 1890, Goyathlay poses with a rifle. To late-nineteenth-century Americans, Geronimo was a dangerous enemy, yet at the same time a curiosity and romantic symbol of the "Wild West." This photo personifies the renegade image but, strangely, it was taken about two to four years after Goyathlay surrendered—while he was a prisoner of war. Why, then, was this photo taken? What meaning did it convey at the time? What must have been in Goyathlay's mind? What does the photo mean today? Is it loaded with historical truths or is it as empty as the prisoner's bullet chamber?

A few years later, Goyathlay was photographed again, this time in a more pastoral pose and place—holding a melon in a garden with his wife and three of their children. What was the meaning behind this photo? Did people of the time see it as a simple family photo, or did it personify the government's policy toward Indians at the time—subduing feared and hated warriors, "re-educating" them, and teaching them to farm in order to guide them toward a "better" way of life? Ironically, the Apaches had long farmed as part of the traditional life they fought so tenaciously to protect.

The educational potential of photographs is enormous. However, photographs are not objective; they can easily tell as many lies as truths. As much as any written document, they have to be read with care in order to be understood accurately in unbiased and non-stereotypical terms. Every photo of people contains history, culture, and context. To do justice to the subjects and their stories, it is crucial to fill in the information gaps. In addition to conducting background research, try putting yourself inside these photos—stand next to Goyathlay, his peers, his wife, and their children, and imagine their lives—you might begin to understand the world from their points of view. Framed with factual information and viewed empathetically, each photograph can reach its richest potential as a significant educational opportunity and resource.

21. Which of the following rhetorical techniques does the author repeatedly use in the passage as a means to engage the reader?

- **A.** Forthright attacks on what he labels as readers' misunderstanding of basic historical fact
- **B.** Open-ended questions and appeals directed to readers
- **C.** Direct quotations from past readers of his work that capture their responses to his ideas
- **D.** Descriptions of his own experiences as a citizen of the Muscogee (Creek) Nation of Oklahoma

22. It can most reasonably be inferred that the author's statements about the educational use of photographs apply to photographs taken during what time period?

F. Any time period since photographs were first taken
G. In the nineteenth century exclusively
H. Any time period prior to the digital age, but not beyond
J. Only in the ten years after photographers first joined government expeditions to the West

23. Which of the following words is most nearly given a negative connotation in the passage?

A. Educational (line 1)
B. Old (line 10)
C. Romanticized (line 28)
D. Traditional (line 34)

24. Which of the following actions referred to in the passage most clearly characterizes a hypothetical event rather than an actual event?

F. "Traveled to" (line 17)
G. "Defend" (line 18)
H. "Farmed" (line 72)
J. "Stand next to" (line 83)

25. Particular photographs of Goyathlay are referred to and described by the author to support his claim that:

A. accurately understanding a photograph depends on knowing the circumstances in which a photograph was taken.
B. photographs can be used to date events in the life of a legendary figure like Goyathlay.
C. anyone can control his or her public image by becoming more involved in the field of photography.
D. the merits of a photograph from the nineteenth century depend on who took the photograph.

26. The author most strongly suggests that one reason commercial photographers began to photograph Native American communities was that commercial photographers were:

F. instructed to do so by the US government.
G. devoted to creating educational resources about Native American communities.
H. committed to overcoming their preconceived ideas about the West.
J. influenced to do so by the photographers who had joined government expeditions to the West.

27. In the passage, the author notes that a strange aspect of the photo of Goyathlay with a rifle is that the photo was taken:

A. by an unknown photographer.
B. when Goyathlay was a prisoner of war.
C. with Goyathlay's permission.
D. by a US government photographer.

28. The author directly refers to which of the following aspects of the photograph of Goyathlay in a garden as being ironic?

F. Goyathlay was not a gardener but instead was in the midst of trying to stop the US government's attack on his people.
G. Goyathlay's people had long practiced farming, but the photo seemed to suggest that Goyathlay had learned farming from others.
H. People do not automatically think of Goyathlay as a man of peace.
J. For years it was assumed to be a photograph of someone other than Goyathlay.

29. The author indicates that for the sake of an unbiased interpretation, compared to reading written documents with care, reading photographs with care is:

A. significantly more important.
B. slightly more important.
C. just as important.
D. slightly less important.

30. In line 86, the word *framed* is used figuratively to describe:

F. the way background research can support the proper viewing of a photograph.
G. a common means of preserving a photograph.
H. a technique in which a photograph is displayed with factual information surrounding it.
J. the manner in which many photographs of Goyathlay are displayed in museums.

Passage IV

INFORMATIONAL: This passage is adapted from *Summer World: A Season of Bounty* by Bernd Heinrich (©2009 by Bernd Heinrich).

Adaptations of plants to deserts include dormancy and a variety of structural and behavioral adaptations. The majority of desert plants depend on a strategy that capitalizes on small size. They are annuals that spring up from dry, dormant, heat-resistant seeds. Some of these seeds may wait up to half a century before they are activated. The plants' challenge is to be quick enough to respond to rain so that they can produce their seeds before the earth dries up again, while not jumping the gun to start growth until there is sufficient water for them to grow to maturity for seed production. Some achieve this balance on a tightrope by "measuring" rainfall. They have chemicals in their seeds that inhibit germination, and a minimum amount of rain is required before these are leached out. Others have seed coats that must be mechanically scarred to permit sufficient wetting for germination, and the scarring happens only when they are subjected to flash floods in the riverbeds where they grow. A plant in the Negev Desert releases its seed from a tough capsule only under the influence of water through a mechanism that resembles a Roman ballistic machine. Its two outer sepals generate sideways tension that can fling two seeds out of the fruit, but the two seeds are held inside by a lock mechanism at the top. However, when the sepals are sufficiently wetted, then the tension increases to such an extent that the lock mechanism snaps, and the capsule "explodes" and releases the seeds.

In moist regions where it rains predictably (though not necessarily in abundance), we help agricultural plants to capture the precipitation by scarring the soil to facilitate the infiltration of the water into it, and hence into the roots. Least runoff and maximum water absorption are achieved by plowing the soil. However, such a strategy would not work in a true desert such as the Negev. A different program is required there because rain is infrequent and plowing would facilitate only the evaporation of scarce water from the soil. The solution applied by the peoples who inhabited the Negev in past centuries was a practice they called "runoff farming." Farmers had mastered harnessing the flash floods that rush down into the gullies by catching the runoffs—not only by making terraces but also by building large cisterns into which the water was directed to be held for later use. Remnants of these constructions still exist.

Water-storage mechanisms have been invented by other organisms living in deserts, but mainly through modifications of body plan. Many plants, especially cacti and euphorbia, have the ability to swell their roots or stems with water stores. Possibly the most familiar is the saguaro cactus, *Carnegiea gigantea*, of the Sonoran desert in the American southwest. It has a shallow root system that extends in all directions to distances of about its height, fifty feet. In one rainstorm the root system can soak up 200 gallons of water, which are transferred into its tall trunk. This trunk is pleated like an accordion and can swell to store tons of water that can last the plant for a year. The cactus has no leaves, but the stem is green and can photosynthesize and produce nutrients as well as store water. The saguaro's survival strategy requires it to grow extremely slowly. But it lives a century or more.

Some desert animals similarly store water. The frog *Cyclorana platycephala*, from the northern Australian desert, fills up and greatly expands its urinary bladder to use as a water bag before burying itself in the soil, where it spends most of the year waiting for the next rain. While in the ground it sloughs off skin and forms around itself a nearly waterproof cocoon that resembles a plastic bag and reduces evaporative water loss.

Desert ants of a variety of species (of at least seven different genera) in American as well as Australian deserts collectively called "honeypot ants" have evolved a solution that combines water storage with energy storage. Ants typically feed each other; and some of the larger worker ants may take up more liquid than the others, and others may bring more. Those that take the fluid may gorge themselves until they distend their abdomens up to the size of a grape, by which time they are unable to move from the spot. They then hang in groups of dozens to hundreds from the ceiling of a chamber in the ant nest, where they are then the specialized so-called repletes that later regurgitate fluid when the colony members are no longer bringing the fluid in but rather needing it.

31. The fourth paragraph (lines 63–71) marks a shift in the focus of the passage from:

- **A.** plants that store water above ground to plants that store water below ground.
- **B.** animals that don't go dormant to animals that do go dormant.
- **C.** desert-dwelling plants to desert-dwelling animals.
- **D.** inhabitants of the Negev Desert to inhabitants of northern Australian deserts.

32. Based on the passage, the author's use of the word "measuring" (line 12) most nearly describes the way that some desert plants:

- **F.** have roots that are extremely sensitive to moisture levels in the soil.
- **G.** have methods of delaying seed germination until a certain amount of water is present.
- **H.** are visibly more vigorous after a rainfall.
- **J.** can calculate how many inches of rain have fallen in recent days.

33. Which of the following statements best summarizes the process by which the frog *Cyclorana platycephala* survives in the desert?

A. The frog stores water in its body, buries itself, and conserves water until emerging at the next rain.
B. The frog buries itself, waits for rain, absorbs rainwater through its skin, and emerges.
C. The frog forms a nearly waterproof cocoon around itself, buries itself, and waits to emerge until it needs water.
D. The frog buries itself, absorbs water through its skin, and goes dormant until springtime.

34. Based on the passage, which of the following plants and animals employ a communal strategy to survive in the desert?

F. The saguaro cactus only
G. The saguaro cactus and the frog *Cyclorana platycephala* only
H. The frog *Cyclorana platycephala* and honeypot ants only
J. Honeypot ants only

35. The passage most strongly suggests that compared to the frog *Cyclorana platycephala*, the honeypot ants are unique in that they:

A. can store water inside their bodies.
B. live in Australian deserts.
C. combine water storage with energy storage.
D. go dormant during dry times.

36. Which of the following provides the best paraphrase of lines 7–11?

F. Annual plants survive in deserts by making seeds swiftly when conditions are right.
G. Annual plants in deserts make seeds during dry conditions so the seeds will be ready when rain arrives.
H. Dry conditions require the seeds of desert plants to start germination prior to the arrival of rain.
J. The seeds of annual plants in deserts are designed to wait years for the right conditions for growth.

37. Based on the passage, it can most reasonably be inferred that the scarring some seeds require before germination is accomplished through:

A. intense drying experienced between rainfalls.
B. internal tension from the seed capsule's sepals.
C. chemicals in the seeds.
D. abrasion sustained during flash floods.

38. As it is used in line 26, the word *extent* most nearly means:

F. length.
G. degree.
H. reach.
J. boundary.

39. According to the passage, which of the following actions did people in the Negev Desert take in order to farm there?

A. Plowing the soil
B. Widening gullies
C. Constructing terraces
D. Constructing aqueducts

40. Based on the passage, the pleats in the body of the saguaro cactus:

F. increase the efficiency of photosynthesis.
G. allow the cactus to expand for storing water.
H. reduce evaporative water loss.
J. regulate the cactus's growth.

END OF TEST 3

STOP! DO NOT TURN THE PAGE UNTIL TOLD TO DO SO.

DO NOT RETURN TO A PREVIOUS TEST.

SCIENCE TEST

35 Minutes—40 Questions

DIRECTIONS: There are several passages in this test. Each passage is followed by several questions. After reading a passage, choose the best answer to each question and fill in the corresponding oval on your answer document. You may refer to the passages as often as necessary.

You are NOT permitted to use a calculator on this test.

Passage I

In a particular *playa* (relatively flat, dry desert basin) evidence shows that some large rocks have moved along the surface, leaving shallow trails in the clay sediment, some up to several hundred meters long. Three scientists provided explanations for how these rocks moved.

Scientist 1

In the spring, snowmelt from surrounding mountains runs downhill and collects in the playa. At night, cold temperatures cause this water to freeze around the rocks. When temperatures rise again, the ice begins to melt, leaving a layer of mud on the surface and ice "rafts" around the rocks. The buoyancy of the ice rafts floats the rocks on top of the mud such that even light winds can then push the rocks along the surface. Evidence of this lifting is seen in that the trails left by rocks are both shallow and only about 2/3 as wide as the rocks themselves. Due to the combination of ice, mud, and light winds, the rocks are able to move several hundred meters in a few days.

Scientist 2

Snowmelt from surrounding mountains does collect in the playa during the spring. However, the temperature in the playa does not get cold enough for ice to form. When the playa's surface gets wet, the top layer of clay transforms into a slick, muddy film. In addition, dormant algae present in the dry clay begin to grow rapidly when the clay becomes wet. The presence of mud and algae reduces friction between the rocks and the clay. Even so, relatively strong winds are required to push the rocks along the wet surface, forming trails. Due to the combination of mud, algae, and strong winds, the rocks are able to move several hundred meters in a few hours.

Scientist 3

Water does collect in the playa, producing mud and ice. However, neither mud nor ice is responsible for the rocks' movements. The playa is located along a fault line between tectonic plates. Minor vertical shifts in the plates cause the rocks to move downhill, leaving trails. Due to the combination of tectonic plate movement and strong winds, the rocks are able to move only a few meters over several years.

1. According to Scientist 2, friction between the rocks and the clay is reduced by which of the following?

A. Ice only
B. Algae only
C. Ice and mud only
D. Mud and algae only

2. Suppose a researcher observed that wind speeds greater than 80 miles per hour are needed to move the rocks in the playa. This observation is consistent with which of the scientists' explanations?

F. Scientists 1 and 2 only
G. Scientists 1 and 3 only
H. Scientists 2 and 3 only
J. Scientists 1, 2, and 3

3. Suppose that no seismic activity was recorded in the playa where the trails left by the rocks are found. This finding would *weaken* which of the scientists' explanations?

A. Scientist 1 only
B. Scientist 3 only
C. Scientist 1 and Scientist 2 only
D. Scientist 2 and Scientist 3 only

4. Suppose it were discovered that a particular rock formed a 200 m long trail in 72 hr. Would this discovery support Scientist 1's explanation?

F. Yes; Scientist 1 indicated the rocks can move several hundred meters in a few hours.
G. Yes; Scientist 1 indicated the rocks can move several hundred meters in a few days.
H. No; Scientist 1 indicated the rocks can move several hundred meters in a few hours.
J. No; Scientist 1 indicated the rocks can move several hundred meters in a few days.

5. Suppose that during one year there was no measurable movement of any rocks in the playa during the spring. Scientists 1 and 2 would most likely both agree that this was due to the absence of which of the following factors?

A. Algae
B. Snowmelt
C. Strong winds
D. Subzero temperatures

6. Suppose that air temperature in the playa varies between 4°C and 47°C. Would this information support the explanation of Scientist 2 ?

F. Yes, because ice cannot form in that temperature range.
G. Yes, because ice can form in that temperature range.
H. No, because ice cannot form in that temperature range.
J. No, because ice can form in that temperature range.

7. Based on Scientist 1's explanation, a rock trail that is 33 cm wide was most likely made by a rock with approximately what width?

A. 10 cm
B. 25 cm
C. 50 cm
D. 65 cm

Passage II

When certain substances are added to diet cola, CO_2 gas is produced, generating a foam. Two experiments were done to study this process.

In each trial, an apparatus like that shown in Figure 1 was used as follows: A jar was nearly filled with H_2O and fitted with a 2-holed lid. One end of a tube (Tube B) was inserted through one of the holes and submerged. The other end of Tube B was placed in an empty graduated cylinder. Another tube (Tube A) was inserted through the other hole in the lid. A certain solid substance was inserted into the other end of Tube A, and the substance was secured by a clamp. Tube A was then attached to a freshly opened bottle containing 355 mL of diet cola. The clamp was removed, releasing the substance into the diet cola. The foam that was produced traveled into the jar, and liquid was transferred into the cylinder. The mass of CO_2 produced was calculated based on the volume of liquid that was measured in the cylinder after foaming had ceased.

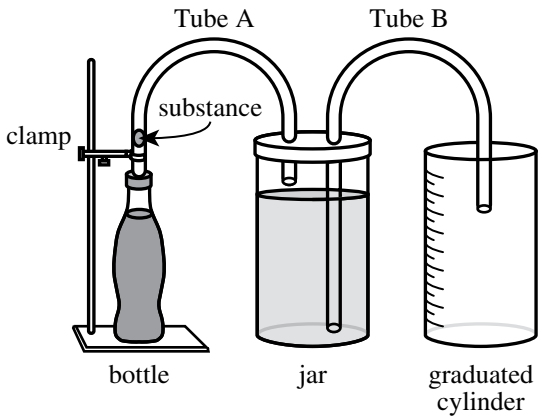


Figure 1

Experiment 1

In each of Trials 1–4, a different 1 of 4 substances of equal mass—a piece of chalk, a sugar cube, a fruit-flavored piece of candy, or a mint-flavored piece of candy—was added to a bottle of diet cola at 3°C. See Table 1.

Table 1

Trial	Substance	Volume of liquid in cylinder (mL)	Mass of CO_2 produced (g)
1	chalk	699	1.36
2	sugar cube	570	1.11
3	fruit candy	525	1.02
4	mint candy	631	1.23

Experiment 2

In each of Trials 5–8, Trial 4 from Experiment 1 was repeated, except that the temperature of the diet cola was different in each trial. See Table 2.

Table 2

Trial	Temperature (°C)	Volume of liquid in cylinder (mL)	Mass of CO_2 produced (g)
5	10	598	1.13
6	25	539	0.969
7	45	501	0.844
8	60	476	0.766

Tables 1 and 2 adapted from Christopher J. Huber and Aaron M. Massari, "Quantifying the Soda Geyser." ©2014 by Division of Chemical Education, Inc., American Chemical Society.

8. If another trial had been performed in Experiment 2 and 450 mL of liquid had been measured in the cylinder, the temperature of the diet cola in this trial would most likely have been:

F. less than 25°C.
G. between 25°C and 45°C.
H. between 45°C and 60°C.
J. greater than 60°C.

9. Suppose Trial 6 had been repeated, but the bottle of diet cola had been opened and then left undisturbed at 25°C for 12 hours *before* it was attached to the apparatus. Would the mass of CO_2 produced in this trial likely be greater than 0.969 g or less than 0.969 g ?

A. Greater, because over the 12 hours, the concentration of CO_2 in the diet cola would have decreased.
B. Greater, because over the 12 hours, the concentration of CO_2 in the diet cola would have increased.
C. Less, because over the 12 hours, the concentration of CO_2 in the diet cola would have decreased.
D. Less, because over the 12 hours, the concentration of CO_2 in the diet cola would have increased.

10. One *millimole* (mmol) of CO_2 has a mass of 0.044 g. How many trials resulted in the production of at least 1 mmol of CO_2 ?

F. 1
G. 4
H. 5
J. 8

11. According to Figure 1, which of Tube A and Tube B, if either, had at least one end submerged in a liquid before the clamp was removed?

A. Tube A only
B. Tube B only
C. Both Tube A and Tube B
D. Neither Tube A nor Tube B

12. Is the relationship between the volume of liquid in the cylinder at the end of the experiment and the mass of CO_2 produced a direct relationship or an inverse relationship?

F. Direct; as the volume of liquid that was measured in the cylinder increased, the mass of CO_2 produced increased.
G. Direct; as the volume of liquid that was measured in the cylinder increased, the mass of CO_2 produced decreased.
H. Inverse; as the volume of liquid that was measured in the cylinder increased, the mass of CO_2 produced increased.
J. Inverse; as the volume of liquid that was measured in the cylinder increased, the mass of CO_2 produced decreased.

13. Consider these steps that were performed in each trial.

1. Removing clamp
2. Measuring liquid in cylinder
3. Inserting a solid substance into Tube A
4. Attaching Tube A to a bottle of diet cola

According to the procedure, these steps were performed in what sequence?

A. 3, 1, 2, 4
B. 3, 4, 1, 2
C. 4, 2, 3, 1
D. 4, 3, 1, 2

14. Assume that *room temperature* is 25°C. In how many trials was the diet cola tested at a temperature *lower* than room temperature?

F. 1
G. 2
H. 5
J. 8

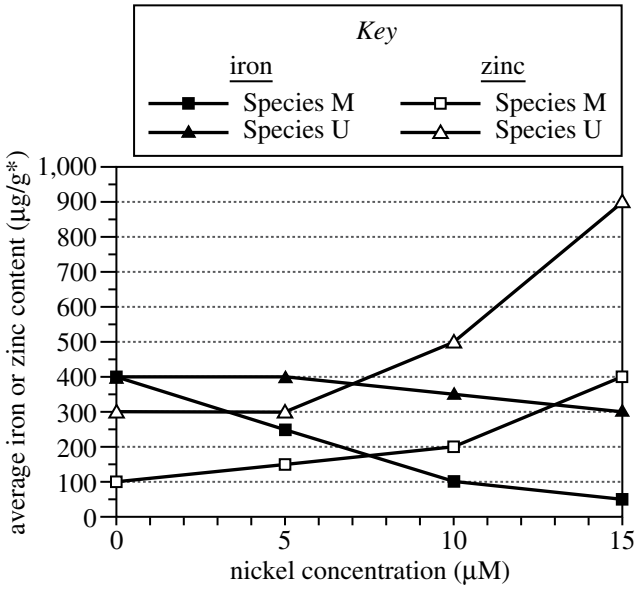
Passage III

Scientists studied the effects of pH and of nickel concentration on plant growth and on the uptake of iron and zinc by plants. Recently germinated seedlings of Species M and Species U were fed 1 of 12 nutrient solutions (Solutions 1–12) for 8 days and then were harvested. Solutions 1–12 differed only in pH and/or nickel concentration. Table 1 shows, for each species, the average dry mass of the plants that were fed each nutrient solution. Figure 1 shows, for each species, the average iron content and the average zinc content of the plants that were fed Solutions 1–4.

Table 1

Solution	pH	Nickel concentration (μM*)	Average dry mass (g) of plants of Species: M	U
1	7	0	33.9	10.7
2	7	5	28.8	10.7
3	7	10	23.8	9.6
4	7	15	18.7	8.5
5	6	0	33.9	9.2
6	6	5	28.8	9.2
7	6	10	23.8	8.1
8	6	15	18.7	7.0
9	5	0	27.8	7.7
10	5	5	22.7	7.7
11	5	10	17.6	6.6
12	5	15	12.4	5.4

*μM = micromoles per liter



*μg/g = micrograms of iron or zinc per gram of plant dry mass

Figure 1

15. According to Figure 1, as the nickel concentration in the nutrient solutions increased, the average iron content of Species M plants:

A. increased only.
B. decreased only.
C. increased, then decreased.
D. decreased, then increased.

16. According to Table 1, the Species U plants that were fed the solution that had a pH of 6 and a nickel concentration of 10 μM had an average dry mass of:

F. 7.0 g.
G. 8.1 g.
H. 9.2 g.
J. 23.8 g.

17. According to Table 1, Species M plants that were fed a nutrient solution with which of the following combinations of pH and nickel concentration had the greatest average dry mass?

	pH	nickel concentration
A.	6	0 μM
B.	6	5 μM
C.	5	0 μM
D.	5	5 μM

18. According to Table 1 and Figure 1, the Species M plants that were fed Solution 3 had an average zinc content of:

F. 100 μg/g.
G. 150 μg/g.
H. 200 μg/g.
J. 400 μg/g.

19. According to Table 1 and Figure 1, for the Species M plants that were fed Solutions 1–4, what was the order of the nutrient solutions, from the solution that resulted in the lowest average iron content to the solution that resulted in the highest average iron content?

A. 1, 2, 3, 4
B. 1, 4, 3, 2
C. 4, 2, 1, 3
D. 4, 3, 2, 1

20. According to Table 1, compared to the average dry mass of Species U plants that were fed Solution 3, the average dry mass of Species M plants that were fed Solution 6 was approximately:

F. $\frac{1}{3}$ as great.
G. $\frac{1}{2}$ as great.
H. 2 times as great.
J. 3 times as great.

Passage IV

Ammonia (NH_3) can be produced according to the chemical equation

$$N_2 + 3H_2 \rightleftharpoons 2NH_3$$

The *equilibrium arrow* ($\rightleftharpoons$) indicates that this reaction proceeds in both directions until it is at *equilibrium*, so that both the forward reaction (production of NH_3) and the backward reaction (production of N_2 and H_2) occur at the same rate. Equilibrium can be shifted forward or backward by changing the temperature, pressure, or concentration of reactants or products.

Two experiments were done using the following apparatus to produce NH_3.

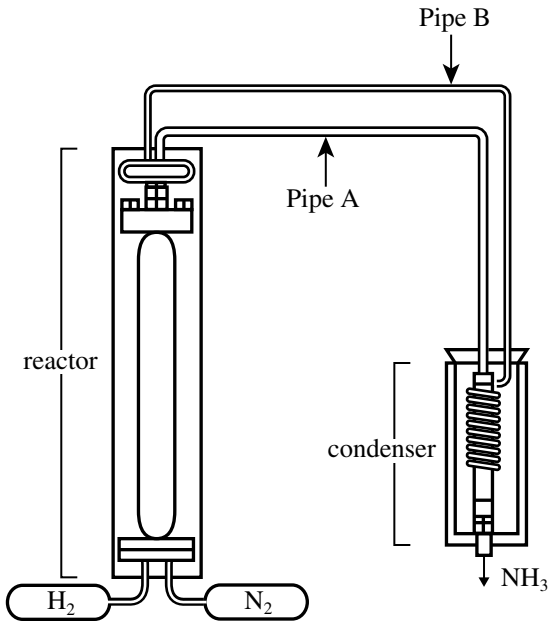


diagram of apparatus

In each trial, Steps 1–4 occurred:

1. A fresh catalyst (Catalyst W, X, Y, or Z), 160 kg of H_2, and 745 kg of N_2 were placed in the reactor.
2. The H_2 and N_2 reacted at a constant temperature and a constant pressure until equilibrium was established.
3. A mixture of NH_3 and any unreacted H_2 and N_2 flowed through Pipe A to a −50°C condenser at 1 atmosphere (atm) of pressure.
4. NH_3 condensed and exited the apparatus. (H_2 and N_2 do not condense at −50°C.) Any unreacted H_2 and N_2 flowed into Pipe B, returning to the reactor.

Steps 2–4 reoccurred in cycles until no more H_2 and N_2 returned from the condenser.

Experiment 1

A set of 9 trials was conducted with each of the 4 catalysts. For each set, the pressure was 150 atm; within each set, the temperature was different for each trial. Figure 1 shows, for each trial, the number of cycles of Steps 2–4.

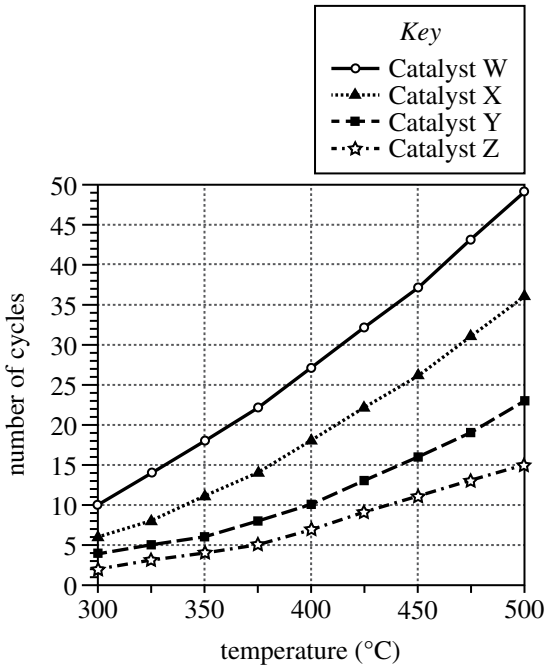


Figure 1

Experiment 2

Four sets of 9 trials each were conducted with Catalyst Z. For each set, the temperature was different; within each set, the pressure was different for each trial. Figure 2 shows, for each trial, the amount of NH_3 produced in the *first* cycle of Steps 2–4.

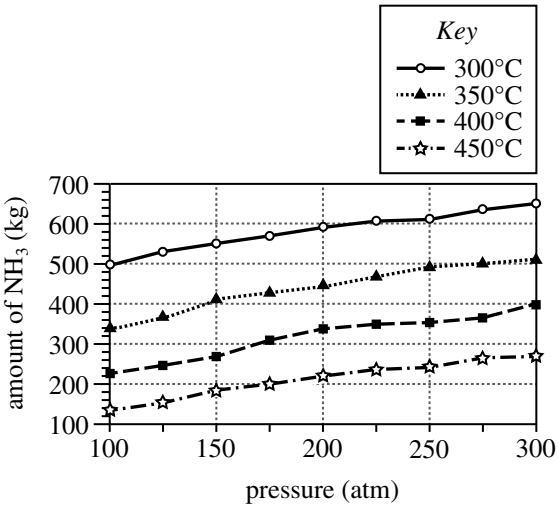


Figure 2

Diagram and figures adapted from Jayant M. Modak, "Haber Process for Ammonia Synthesis." ©2002 by Indian Academy of Sciences.

21. According to the results of Experiment 1, for any given catalyst, as the temperature was increased, the number of cycles needed to complete the reaction:

A. increased only.
B. decreased only.
C. increased, then decreased.
D. decreased, then increased.

22. In Experiment 1, 26 cycles were needed to complete the reaction at 450°C when which catalyst was used?

F. Catalyst W
G. Catalyst X
H. Catalyst Y
J. Catalyst Z

23. The movement of H_2 and N_2 through the apparatus as Steps 1–4 occurred is best represented by which of the following expressions?

A. Reactor → condenser → Pipe A → Pipe B
B. Condenser → reactor → Pipe A → Pipe B
C. Reactor → Pipe A → condenser → Pipe B
D. Condenser → Pipe A → reactor → Pipe B

24. Consider the results of Experiment 1 for 375°C. All the H_2 and N_2 were consumed in less than 20 cycles when which catalysts were used?

F. Catalysts W and X only
G. Catalysts Y and Z only
H. Catalysts W, X, and Y only
J. Catalysts X, Y, and Z only

25. If a trial had been performed in Experiment 2 at 425°C and 225 atm, the amount of NH_3 produced would most likely have been:

A. less than 230 kg.
B. between 230 kg and 320 kg.
C. between 320 kg and 410 kg.
D. greater than 410 kg.

26. At 1 atm of pressure, the melting point of NH_3 is –77°C and the boiling point of NH_3 is –33°C. Based on this information and the description of the apparatus, when the NH_3 exited the condenser, was it more likely a solid or a liquid?

F. Solid, because the temperature of the condenser was lower than the melting point of NH_3 and the boiling point of NH_3.
G. Solid, because the temperature of the condenser was between the melting point of NH_3 and the boiling point of NH_3.
H. Liquid, because the temperature of the condenser was higher than the melting point of NH_3 and the boiling point of NH_3.
J. Liquid, because the temperature of the condenser was between the melting point of NH_3 and the boiling point of NH_3.

27. Consider the trial in Experiment 2 that produced 550 kg of NH_3. Based on Figure 1, the number of cycles that were needed to complete the reaction in this trial was most likely:

A. less than 5.
B. between 5 and 10.
C. between 10 and 15.
D. greater than 15.

Passage V

As a sound wave travels through a medium, the wave becomes *attenuated* (loses energy). The attenuation coefficient, α, is the rate at which the wave's *intensity level* (a measure of sound volume) decreases with distance as a result of this energy loss; the greater the value of α, the greater the decrease in intensity level with distance. Figure 1 shows, for waves of 3 different frequencies (in hertz, Hz), how α (in decibels per kilometer, dB/km) varies with temperature in air at 10% relative humidity.

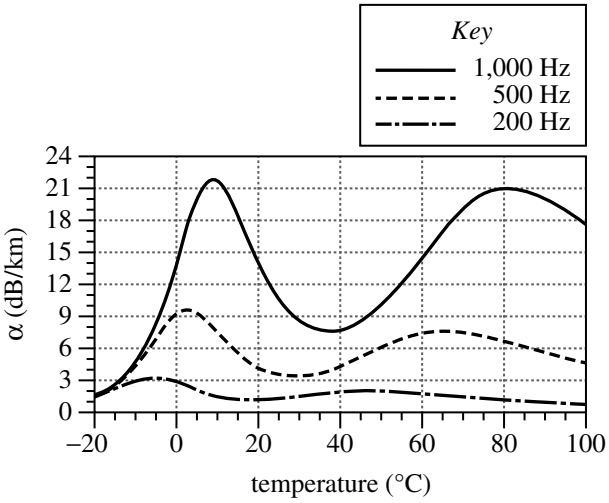


Figure 1

Figure 2 shows, for waves of 3 different frequencies, how α varies with relative humidity in air at 20°C.

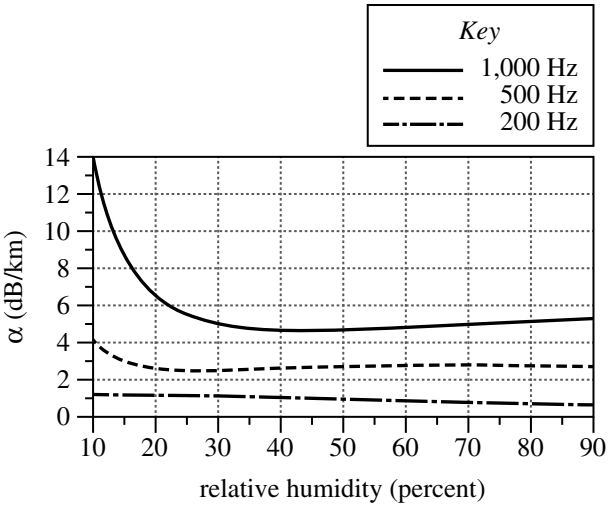


Figure 2

Figures adapted from Richard Lord, "Calculation of Absorption of Sound by the Atmosphere." ©2004 National Physical Laboratory.

28. What is the approximate maximum α shown in Figure 1 for a 200 Hz sound wave in air at 10% relative humidity, and at approximately what temperature does that maximum occur?

	α (dB/km)	temperature (°C)
F.	3.0	−5
G.	3.0	35
H.	9.5	−5
J.	9.5	35

29. Based on Figure 2, the attenuation coefficient for a 1,000 Hz sound wave in air at 20°C reaches a *minimum* value at a relative humidity closest to which of the following?

A. 25%
B. 45%
C. 65%
D. 85%

30. For the range of temperatures and the range of relative humidities shown in Figures 1 and 2, respectively, is α for a 200 Hz sound wave more strongly affected by changes in temperature or by changes in relative humidity?

F. Temperature, because the maximum variation in α is about 0.5 dB/km in Figure 1 but about 2.5 dB/km in Figure 2.
G. Temperature, because the maximum variation in α is about 2.5 dB/km in Figure 1 but about 0.5 dB/km in Figure 2.
H. Relative humidity, because the maximum variation in α is about 0.5 dB/km in Figure 1 but about 2.5 dB/km in Figure 2.
J. Relative humidity, because the maximum variation in α is about 2.5 dB/km in Figure 1 but about 0.5 dB/km in Figure 2.

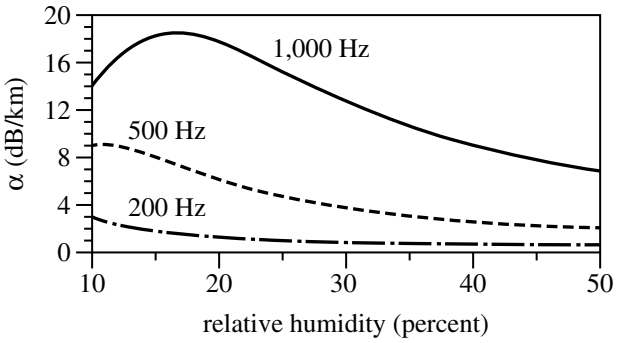
31. Consider a 1,000 Hz sound wave in air at 10% relative humidity. At how many of the temperatures shown in Figure 1 does α for this wave have a value of 18 dB/km ?

A. 2
B. 3
C. 4
D. 5

32. Suppose that 2 sound waves—a 150 Hz wave and a 1,100 Hz wave—are simultaneously emitted from a speaker into air at 20°C and 45% relative humidity. Based on Figure 2, as the waves travel away from the speaker, the intensity level of which wave will more likely decrease at the greater rate due to attenuation?

F. The 150 Hz wave, because the value of α is lesser for the 150 Hz wave than for the 1,100 Hz wave.
G. The 150 Hz wave, because the value of α is greater for the 150 Hz wave than for the 1,100 Hz wave.
H. The 1,100 Hz wave, because the value of α is lesser for the 1,100 Hz wave than for the 150 Hz wave.
J. The 1,100 Hz wave, because the value of α is greater for the 1,100 Hz wave than for the 150 Hz wave.

33. The graph below shows, for sound waves of 3 different frequencies, how α varies with relative humidity in air at a particular temperature.



Based on Figure 1, the particular air temperature is most likely which of the following?

A. −20°C
B. 0°C
C. 20°C
D. 100°C

Passage VI

Three studies compared the effects of 5 sweeteners (Sweeteners Q–U) on food consumption by rats and on the concentrations of *leptin* and *ghrelin* (hormones that regulate appetite) in the blood of rats. Sweeteners Q–U differ only in the percent by mass of fructose and of glucose (see Table 1).

Table 1

Sweetener	Percent by mass of: fructose	glucose
Q	0	100
R	42	58
S	50	50
T	55	45
U	100	0

Study 1

Each of 5 groups (Groups 1–5) of rats was assigned a solution having a 100 g/L concentration of 1 of the 5 sweeteners. Each rat was placed in a separate cage and provided unlimited access to the assigned sweetener solution and to solid food for 56 days. Table 2 shows, for each group, the amounts of sweetener solution and solid food consumed per rat per day. On Day 56, blood was collected from each rat for analysis in Studies 2 and 3.

Table 2

Group	Sweetener	Amount consumed per rat per day: sweetener solution (mL)	solid food (g)
1	Q	73	9
2	R	55	14
3	S	52	16
4	T	48	18
5	U	29	23

Table 2 adapted from Heather R. Light et al., "The Type of Caloric Sweetener Added to Water Influences Weight Gain, Fat Mass, and Reproduction in Growing Sprague-Dawley Female Rats." ©2009 by the Society for Experimental Biology and Medicine.

Study 2

A 1 mL blood sample from each rat was placed in a separate test tube containing 0.2 mL of *Indicator N* (which reacts with leptin to form a blue dye). The concentration of blue dye in each tube was directly proportional to the leptin concentration in the blood sample. Table 3 shows the leptin concentration per sample for each group.

Table 3

Group	Sweetener	Leptin concentration per sample (pM*)
1	Q	804
2	R	622
3	S	553
4	T	475
5	U	251

*picomolar

Study 3

Study 2 was repeated, except that *Indicator P* (which reacts with ghrelin to form a yellow dye) was used instead of Indicator N. The concentration of yellow dye in each tube was directly proportional to the ghrelin concentration in the blood sample (see Table 4).

Table 4

Group	Sweetener	Ghrelin concentration per sample (pM)
1	Q	852
2	R	1,125
3	S	1,279
4	T	1,450
5	U	1,758

Tables 3 and 4 adapted from Andreas Lindqvist, Annemie Baelemans, and Charlotte Erlanson-Albertsson, "Effects of Sucrose, Glucose and Fructose on Peripheral and Central Appetite Signals." ©2008 by Elsevier B.V.

34. In Study 1, as the ratio of fructose to glucose in the sweetener solutions increased, the amount of sweetener solution consumed per rat per day:

F. increased only.
G. decreased only.
H. increased and then decreased.
J. decreased and then increased.

35. In Study 1, the amount of sweetener solution consumed daily by each rat could be measured because which of the following steps had been taken?

A. The rats' access to solid food had been restricted.
B. The rats' access to solid food had not been restricted.
C. The rats had been placed in the same cage.
D. The rats had been placed in separate cages.

36. Suppose that a sweetener composed of 46% fructose and 54% glucose by mass had been tested in Study 1. Based on Table 1 and the results of Study 3, the ghrelin concentration per sample would most likely have been:

F. less than 852 pM.
G. between 852 pM and 1,125 pM.
H. between 1,125 pM and 1,279 pM.
J. greater than 1,279 pM.

37. Consider the claim "The group of rats that consumed the lowest amount of solid food per rat per day was also the group that had the lowest concentration of leptin per sample." Do the results of Studies 1 and 2 support this claim?

A. Yes; the rats in Group 1 consumed the lowest amount of solid food per rat per day and also had the lowest concentration of leptin per sample.
B. Yes; the rats in Group 5 consumed the lowest amount of solid food per rat per day and also had the lowest concentration of leptin per sample.
C. No; the rats in Group 1 consumed the lowest amount of solid food per rat per day, but the rats in Group 5 had the lowest concentration of leptin per sample.
D. No; the rats in Group 5 consumed the lowest amount of solid food per rat per day, but the rats in Group 1 had the lowest concentration of leptin per sample.

38. Which of the following groups of rats should have been included in Study 1 to serve as a control for the effect of consuming a sweetener solution on the consumption of solid food by rats? A group of rats that had access:

F. only to water.
G. only to solid food.
H. only to water and solid food.
J. to neither water nor solid food.

39. Consider the sweetener that resulted in a solid food consumption of 16 g per rat per day in Study 1. Based on Table 1, how many grams of fructose would be present in 200 g of this sweetener?

A. 50 g
B. 100 g
C. 150 g
D. 200 g

40. The experimental designs of Studies 2 and 3 were identical with respect to which of the factors listed below, if either?

I. The chemical indicator that was used
II. The hormone with which the chemical indicator reacted

F. I only
G. II only
H. Both I and II
J. Neither I nor II

END OF TEST 4

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Examen de redacción de práctica

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Form 21BM20

The ACT® WRITING TEST BOOKLET

You must take the multiple-choice tests before you take the writing test.

Directions

This is a test of your writing skills. You will have **forty** (40) minutes to read the prompt, plan your response, and write an essay in English. Before you begin working, read all material in this test booklet carefully to understand exactly what you are being asked to do.

You will write your essay on the lined pages in the **answer document** provided. Your writing on those pages will be scored. You may use the unlined pages in this test booklet to plan your essay. Your work on these pages will not be scored.

Your essay will be evaluated based on the evidence it provides of your ability to:

- clearly state your own perspective on a complex issue and analyze the relationship between your perspective and at least one other perspective
- develop and support your ideas with reasoning and examples
- organize your ideas clearly and logically
- communicate your ideas effectively in standard written English

Lay your pencil down immediately when time is called.

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Extracurricular Activities and Codes of Conduct

For many students, extracurricular activities are a meaningful part of the high school experience. These activities allow students to develop their skills in areas such as sports, music, and drama while building relationships with peers and gaining experience performing or competing. But at many schools, students who participate in extracurricular activities are subject to special codes of conduct. These codes often establish high standards for academic performance and behavior, and students must meet the standards to stay eligible for their activities. Should students who participate in extracurricular activities be subject to special codes of conduct?

Read and carefully consider these perspectives. Each suggests a particular way of thinking about the question above.

Perspective One

All school rules and standards must apply equally to every student. It is unfair to hold students who play sports or music to higher standards than students who do not.

Perspective Two

Participation in school activities is a privilege, not a right. It is fair to ask students to earn this privilege by studying hard and behaving themselves.

Perspective Three

School programs should be open to all students. Not all students can meet high standards, which means not all students can participate in extracurricular activities.

Essay Task

Write a unified, coherent essay in which you address the question of whether students who participate in extracurricular activities should be subject to special codes of conduct. In your essay, be sure to:

- clearly state your own perspective and analyze the relationship between your perspective and at least one other perspective
- develop and support your ideas with reasoning and examples
- organize your ideas clearly and logically
- communicate your ideas effectively in standard written English

Your perspective may be in full agreement with any of those given, in partial agreement, or completely different.

Planning Your Essay

Your work on these prewriting pages will not be scored.

Use the space below and on the back cover to generate ideas and plan your essay. You may wish to consider the following as you think critically about the task:

Strengths and weaknesses of different perspectives on the issue

- What insights do they offer, and what do they fail to consider?
- Why might they be persuasive to others, or why might they fail to persuade?

Your own knowledge, experience, and values

- What is your perspective on this issue, and what are its strengths and weaknesses?
- How will you support your perspective in your essay?

Nota

- Para tu ensayo de práctica, necesitarás papel para notas a fin de planificar tu ensayo y cuatro hojas de papel con rayas para tu respuesta.
- El día del examen, si tomarás el examen impreso, recibirás un cuadernillo del examen con espacio para planificar tu ensayo y un documento de respuestas con cuatro páginas con rayas para escribir tu respuesta.
- Lee la información y las instrucciones en las páginas 68–69 sobre la manera de calificar tu examen de redacción de práctica.

The ACT® with Writing *2023–2024 Answer Document*

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October	8	
November	9	
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Correct mark:

Do NOT use these *incorrect* or *bad* marks.

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Mark is too light:

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FORM

Print your 3-character **Test Form** in the boxes above and fill in the corresponding oval at the right.

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PRE

TEST 1: ENGLISH

1 A B C D	14 F G H J	27 A B C D	40 F G H J	53 A B C D	66 F G H J
2 F G H J	15 A B C D	28 F G H J	41 A B C D	54 F G H J	67 A B C D
3 A B C D	16 F G H J	29 A B C D	42 F G H J	55 A B C D	68 F G H J
4 F G H J	17 A B C D	30 F G H J	43 A B C D	56 F G H J	69 A B C D
5 A B C D	18 F G H J	31 A B C D	44 F G H J	57 A B C D	70 F G H J
6 F G H J	19 A B C D	32 F G H J	45 A B C D	58 F G H J	71 A B C D
7 A B C D	20 F G H J	33 A B C D	46 F G H J	59 A B C D	72 F G H J
8 F G H J	21 A B C D	34 F G H J	47 A B C D	60 F G H J	73 A B C D
9 A B C D	22 F G H J	35 A B C D	48 F G H J	61 A B C D	74 F G H J
10 F G H J	23 A B C D	36 F G H J	49 A B C D	62 F G H J	75 A B C D
11 A B C D	24 F G H J	37 A B C D	50 F G H J	63 A B C D	
12 F G H J	25 A B C D	38 F G H J	51 A B C D	64 F G H J	
13 A B C D	26 F G H J	39 A B C D	52 F G H J	65 A B C D	

TEST 2: MATHEMATICS

1 A B C D E	11 A B C D E	21 A B C D E	31 A B C D E	41 A B C D E	51 A B C D E
2 F G H J K	12 F G H J K	22 F G H J K	32 F G H J K	42 F G H J K	52 F G H J K
3 A B C D E	13 A B C D E	23 A B C D E	33 A B C D E	43 A B C D E	53 A B C D E
4 F G H J K	14 F G H J K	24 F G H J K	34 F G H J K	44 F G H J K	54 F G H J K
5 A B C D E	15 A B C D E	25 A B C D E	35 A B C D E	45 A B C D E	55 A B C D E
6 F G H J K	16 F G H J K	26 F G H J K	36 F G H J K	46 F G H J K	56 F G H J K
7 A B C D E	17 A B C D E	27 A B C D E	37 A B C D E	47 A B C D E	57 A B C D E
8 F G H J K	18 F G H J K	28 F G H J K	38 F G H J K	48 F G H J K	58 F G H J K
9 A B C D E	19 A B C D E	29 A B C D E	39 A B C D E	49 A B C D E	59 A B C D E
10 F G H J K	20 F G H J K	30 F G H J K	40 F G H J K	50 F G H J K	60 F G H J K

TEST 3: READING

1 A B C D	8 F G H J	15 A B C D	22 F G H J	29 A B C D	36 F G H J
2 F G H J	9 A B C D	16 F G H J	23 A B C D	30 F G H J	37 A B C D
3 A B C D	10 F G H J	17 A B C D	24 F G H J	31 A B C D	38 F G H J
4 F G H J	11 A B C D	18 F G H J	25 A B C D	32 F G H J	39 A B C D
5 A B C D	12 F G H J	19 A B C D	26 F G H J	33 A B C D	40 F G H J
6 F G H J	13 A B C D	20 F G H J	27 A B C D	34 F G H J	
7 A B C D	14 F G H J	21 A B C D	28 F G H J	35 A B C D	

TEST 4: SCIENCE

1 A B C D	8 F G H J	15 A B C D	22 F G H J	29 A B C D	36 F G H J
2 F G H J	9 A B C D	16 F G H J	23 A B C D	30 F G H J	37 A B C D
3 A B C D	10 F G H J	17 A B C D	24 F G H J	31 A B C D	38 F G H J
4 F G H J	11 A B C D	18 F G H J	25 A B C D	32 F G H J	39 A B C D
5 A B C D	12 F G H J	19 A B C D	26 F G H J	33 A B C D	40 F G H J
6 F G H J	13 A B C D	20 F G H J	27 A B C D	34 F G H J	
7 A B C D	14 F G H J	21 A B C D	28 F G H J	35 A B C D	

Print your name in the spaces below (one letter per space).

Last Name | First Name | MI

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1	A	A
2	B	B
3	C	C
4	D	D
5	E	E
6	F	F
7	G	G
8	H	H
9	J	J
0	Z	Z

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Calificación de tus exámenes

Cómo calificar los exámenes de opción múltiple

Sigue las instrucciones que aparecen a continuación y en las siguientes páginas para calificar tus exámenes de opción múltiple de práctica y para revisar tu desempeño.

Calificaciones sin procesar

El número de preguntas que contestaste correctamente en cada examen y en cada categoría del reporte es tu **calificación sin procesar**. Como hay muchas formas del examen ACT, cada una con preguntas diferentes, algunas formas serán ligeramente más fáciles (y otras ligeramente más difíciles) que otras. Por ejemplo, una calificación sin procesar de 67 en una forma del examen de inglés puede ser tan difícil de obtener como una calificación sin procesar de 70 en otra forma del mismo examen.

Para calcular tus calificaciones sin procesar, revisa tus respuestas con la clave de calificación de las páginas 64 a 59. Cuenta el número de respuestas correctas para cada uno de los cuatro exámenes y diecisiete categorías del reporte, e ingresa el número en los espacios en blanco que se proporcionan en esas páginas. Estos números son tus calificaciones sin procesar de los exámenes y en las categorías del reporte.

Calificaciones a escala

Para ajustar las pequeñas diferencias que ocurren entre las diferentes formas del examen ACT, las calificaciones sin procesar de los exámenes se convierten a **calificaciones a escala.** Las calificaciones a escala se imprimen en los reportes que se te envían a ti y a las universidades y agencias de becas de tu preferencia.

Cuando tus calificaciones sin procesar se convierten en calificaciones a escala, es posible comparar tus calificaciones con las de aquellos examinados que tomaron formas de exámenes diferentes. Por ejemplo, una calificación a escala de 26 en el examen de inglés tiene el mismo significado independientemente de la forma del examen ACT en la que se basó.

Para determinar las calificaciones a escala correspondientes a tus calificaciones sin procesar en el examen de práctica, consulta la Tabla 1 en la página 67, que explica los procedimientos utilizados para obtener las calificaciones a escala a partir de las calificaciones sin procesar. Esta tabla muestra las conversiones de calificaciones sin procesar a calificaciones a escala para cada examen. Como cada forma del examen ACT es única, cada una de ellas tiene tablas de conversión algo diferentes. Por consecuencia, esta tabla solo proporciona aproximaciones de las conversiones de las calificaciones sin procesar a calificaciones a escala que aplicarían si se tomara otra forma del examen ACT. Por lo tanto, las calificaciones a escala que se obtienen en los exámenes de práctica no coinciden con precisión con las calificaciones a escala que se obtienen en una administración real del examen ACT.

Cálculo de la calificación global

La **calificación global** es el promedio de las cuatro calificaciones a escala de inglés, matemáticas, lectura y ciencias. Si dejaste alguno de estos exámenes en blanco, no se calcula una calificación global. Si tomas el examen ACT con redacción, tus resultados de redacción **no** afectan tu calificación global.

Comparación de tus calificaciones

En **www.act.org/the-act/scores** puedes encontrar información para comparar tus calificaciones de los exámenes de opción múltiple de práctica con las calificaciones de graduados recientes de la escuela secundaria que tomaron el examen ACT.

Tus calificaciones y porcentajes iguales o menores son solo **estimados** de las calificaciones que obtendrás en un examen ACT. Las calificaciones son solo un indicador de tu nivel de aprovechamiento. Considera tus calificaciones del examen en relación con tus calificaciones escolares, tu desempeño en actividades extracurriculares y tus intereses profesionales.

Normas de ACT de preparación para la universidad y una carrera profesional

Las Normas de ACT de preparación para la universidad y una carrera profesional describen las clases de habilidades, estrategias y entendimiento que necesitarás para hacer una transición exitosa de la escuela secundaria a la universidad. Para inglés, matemáticas, lectura y ciencias, las normas se proporcionan en seis rangos de calificaciones que reflejan la progresión y complejidad de las aptitudes en cada una de las áreas académicas medidas por los exámenes ACT. Para redacción, se proporcionan normas para cinco intervalos de calificación. Puedes encontrar las Normas de ACT de preparación para la universidad y una carrera profesional, así como calificaciones de referencia para cada examen en **www.act.org**.

Revisión de tu desempeño en los exámenes de opción múltiple

Ten en cuenta lo siguiente mientras revisas tus calificaciones:

- ¿Te faltó tiempo? Vuelve a leer la información de este documento respecto a distribuir tu tiempo. Tal vez necesites ajustar cómo usas tu tiempo para contestar las preguntas.
- ¿Pasaste demasiado tiempo tratando de entender las instrucciones para los exámenes? Las instrucciones para los exámenes de práctica son las mismas que aparecerán en tu cuadernillo del examen el día del examen. Es importante que las entiendas antes del día del examen volviendo a revisarlas.
- Revisa las preguntas que no contestaste correctamente. ¿Seleccionaste una respuesta que era una respuesta incompleta o que no contestó directamente la pregunta que se hacía? Trata de determinar qué pasaste por alto cuando contestaste las preguntas en las que no acertaste.
- ¿Te confundió un tipo particular de pregunta? ¿Las preguntas que no contestaste correctamente pertenecen a un área particular de categoría del reporte? Al revisar tus respuestas, revisa si un tipo particular de pregunta o un área particular de categoría del reporte fue más difícil para ti.

Clave de calificaciones para los exámenes ACT de práctica

Usa la clave de calificaciones para cada examen y califica tu documento de respuestas de los exámenes de opción múltiple. Marca un “1" en el espacio en blanco por cada pregunta que hayas contestado correctamente. Suma los números de cada área de categoría del reporte y anota el número total correcto de cada una de estas áreas en los espacios en blanco que se proporcionan. Además anota el número total correcto de cada examen en los espacios en blanco que se proporcionan. El número total correcto para cada examen es la suma del número correcto de cada área de categoría del reporte.

Examen 1: Inglés—Clave de calificación

2176CPRE

Clave	Categoría del reporte*		
	POW	KLA	CSE
1. C			___
2. J	___		
3. A		___	
4. F	___		
5. C		___	
6. J			___
7. B		___	
8. G	___		
9. A			___
10. J	___		
11. B			___
12. J			___
13. C			___
14. F	___		
15. C	___		
16. F			___
17. D		___	
18. J			___
19. C			___
20. J		___	
21. B	___		
22. J			___
23. D			___
24. J			___
25. B	___		
26. H	___		
27. B			___
28. H	___		
29. A	___		
30. H			___
31. A			___
32. G			___
33. A		___	
34. J			___
35. A			___
36. H		___	
37. D			___
38. G	___		

Clave	Categoría del reporte*		
	POW	KLA	CSE
39. C	___		
40. F			___
41. C			___
42. J			___
43. B	___		
44. G	___		
45. C	___		
46. J			___
47. A			___
48. G			___
49. A			___
50. H			___
51. C	___		
52. H	___		
53. D			___
54. J		___	
55. A			___
56. J	___		
57. D			___
58. G			___
59. A		___	
60. G	___		
61. C			___
62. J		___	
63. B			___
64. G		___	
65. D			___
66. G	___		
67. A			___
68. G			___
69. C	___		
70. G			___
71. A			___
72. J	___		
73. A			___
74. G			___
75. A		___	

***Categorías del reporte**
POW = Producción de redacción
KLA = Conocimiento de la lengua
CSE = Convenciones del inglés estándar

Número correcto (calificación sin procesar) para:

Producción de redacción (POW) _____ (23)

Conocimiento de la lengua (KLA) _____ (12)

Convenciones del Inglés estándar (CSE)_____ (40)

Número total correcto para el examen de Inglés (POW + KLA + CSE) _____ (75)

Examen 2: Matemáticas—Clave de calificación *2176CPRE*

Clave	Categoría del reporte*						
	PHM						
	N	A	F	G	S	IES	MDL
1. E							
2. J							
3. B							
4. G							
5. C							
6. F							
7. B							
8. H							
9. D							
10. G							
11. B							
12. G							
13. D							
14. J							
15. A							
16. K							
17. D							
18. J							
19. A							
20. F							
21. E							
22. G							
23. E							
24. H							
25. D							
26. G							
27. E							
28. H							
29. C							
30. H							

Clave	Categoría del reporte*						
	PHM						
	N	A	F	G	S	IES	MDL
31. B							
32. K							
33. D							
34. F							
35. E							
36. J							
37. C							
38. F							
39. D							
40. K							
41. A							
42. J							
43. D							
44. G							
45. E							
46. F							
47. D							
48. G							
49. D							
50. K							
51. D							
52. K							
53. A							
54. G							
55. B							
56. K							
57. D							
58. K							
59. B							
60. F							

Combine los totales de estas columnas y póngalos en el espacio en blanco para PHM en el recuadro a continuación.

***Categorías del reporte**

PHM = Preparación para matemáticas de nivel superior
- N = Número y cantidad
- A = Álgebra
- F = Funciones
- G = Geometría
- S = Estadística y probabilidad

IES = Integración de aptitudes esenciales
MDL = Modelado

Número correcto (calificación sin procesar) para:

Preparación para matemáticas de nivel superior (N + A + F + G + S) _____ (35)

Integración de aptitudes esenciales (IES) _____ (25)

Número total correcto para el examen de matemáticas (PHM + IES) _____ (60)

Modelado (MDL) _____ (24)
(No se incluye en el número total correcto para la calificación sin procesar del examen de matemáticas)

Examen 3: Lectura—Clave de calificación

2176CPPRE

Clave	Categoría del reporte* KID	CS	IKI
1. D		___	
2. F	___		
3. C		___	
4. J		___	
5. D			___
6. J	___		
7. B	___		
8. H			___
9. B			___
10. F			___
11. D		___	
12. F	___		
13. B	___		
14. G	___		
15. D		___	
16. G	___		
17. C	___		
18. H	___		
19. B	___		
20. J		___	

Clave	Categoría del reporte* KID	CS	IKI
21. B		___	
22. F	___		
23. C		___	
24. J		___	
25. A			___
26. J	___		
27. B	___		
28. G	___		
29. C	___		
30. F		___	
31. C		___	
32. G	___		
33. A	___		
34. J	___		
35. C	___		
36. F	___		
37. D	___		
38. G		___	
39. C	___		
40. G	___		

***Categorías del reporte**
KID = Ideas y detalles clave
CS = Elaboración y estructura
IKI = Integración de conocimiento e ideas

Número correcto (calificación sin procesar) para:

Ideas y detalles clave (KID) _____ (23)

Elaboración y estructura (CS) _____ (12)

Integración de conocimiento e ideas (IKI) _____ (5)

Número total correcto para el examen de lectura (KID + CS + IKI) _____ (40)

Examen 4: Ciencias—Clave de calificación

2176CPPRE

Clave	Categoría del reporte* IOD	SIN	EMI
1. D			___
2. H			___
3. B			___
4. G			___
5. B			___
6. F			___
7. C			___
8. J		___	
9. C		___	
10. J	___		
11. B		___	
12. F	___		
13. B		___	
14. H		___	
15. B	___		
16. G	___		
17. A	___		
18. H	___		
19. D	___		
20. J	___		

Clave	Categoría del reporte* IOD	SIN	EMI
21. A	___		
22. G	___		
23. C		___	
24. J	___		
25. B		___	
26. J		___	
27. A			___
28. F	___		
29. B	___		
30. G			___
31. C	___		
32. J	___		
33. B	___		
34. G	___		
35. D		___	
36. H		___	
37. C			___
38. H		___	
39. B	___		
40. J		___	

***Categorías del reporte**
IOD = Interpretación de datos
SIN = Investigación científica
EMI = Evaluación de modelos, Inferencias y resultados experimentales

Número correcto (calificación sin procesar) para:

Interpretación de datos (IOD) _____ (18)

Investigación científica (SIN) _____ (12)

Evaluación de modelos, inferencias y resultados experimentales (EMI) _____ (10)

Número total correcto para el examen de ciencias (IOD + SIN + EMI) _____ (40)

Tabla 1

Explicación de los procedimientos usados para obtener las calificaciones a escala a partir de las calificaciones sin procesar

En cada uno de los cuatro exámenes de opción múltiple en los que marcaste respuestas, el número total de respuestas correctas da una calificación sin procesar. Utiliza la tabla que aparece abajo para convertir tus calificaciones sin procesar en calificaciones a escala. Para cada examen, en la tabla que aparece abajo localiza y encierra en un círculo tu calificación sin procesar o el intervalo de calificaciones sin procesar que la incluye. Luego, pasa transversalmente a cualquiera de las columnas que se encuentran fuera de la tabla y encierra en un círculo la calificación a escala que corresponde a tu calificación sin procesar. Al ir determinando tus calificaciones a escala, anótalas en los espacios en blanco que se encuentran a la derecha. La calificación a escala más alta posible es 36. La calificación a escala más baja posible para cualquier examen en que hayas marcado respuestas es 1.

A continuación, calcula la calificación global promediando las cuatro calificaciones a escala. Para hacerlo, suma tus cuatro calificaciones a escala y divide el total entre 4. Si el número resultante termina en fracción, redondéalo al número entero más cercano. (Redondea hacia abajo cualquier fracción menor a la mitad y hacia arriba cualquier fracción que sea la mitad o más). Anota este número en el espacio en blanco. Ésta es tu calificación global. La calificación global más alta posible es 36. La calificación global más baja posible es 1.

Examen ACT 2176CPRE Tu calificación a escala

Inglés _____

Matemáticas _____

Lectura _____

Ciencias _____

Suma de califcaciones _____

Calificación global (suma ÷ 4) _____

NOTA: Si dejaste un examen completamente en blanco y no marcaste ninguna respuesta, no listes una calificación a escala para ese examen. Si dejaste cualquier examen completamente en blanco, no calcules una calificación global.

Para calcular tu calificación de redacción, usa la rúbrica de las páginas 68 y 69.

Calificación a escala	Calificaciones sin procesar				Calificación a escala
	Examen 1 Inglés	Examen 2 Matemáticas	Examen 3 Lectura	Examen 4 Ciencias	
36	74-75	58-60	39-40	38-40	36
35	70-71	56-57	38	37	35
34	68-69	54-55	37	36	34
33	6	53	35-36	35	33
32	66	51-52	34	34	32
31	65	49-50	33	–	31
30	64	48	–	33	30
29	62-63	46-47	32	32	29
28	61	44-45	31	31	28
27	60	41-43	30	–	27
26	58-59	39-40	29	30	26
25	56-57	37-38	28	28-29	25
24	53-55	35-36	27	26-27	24
23	51-52	33-34	26	25	23
22	48-50	31-32	24-25	23-24	22
21	45-47	30	23	22	21
20	42-44	28-29	21-22	20-21	20
19	40-41	26-27	20	19	19
18	38-39	24-25	19	17-18	18
17	36-37	21-23	17-18	15-16	17
16	33-35	17-20	16	13-14	16
15	30-32	13-16	14-15	12	15
14	27-29	10-12	12-13	11	14
13	25-26	8-9	11	10	13
12	23-24	6-7	9-10	9	12
11	19-22	5	7-8	8	11
10	16-18	4	6	7	10
9	13-15	–	5	6	9
8	11-12	3	–	5	8
7	9-10	–	4	4	7
6	7-8	2	3	3	6
5	9	–	–	–	5
4	4-5	1	2	2	4
3	3	–	–	1	3
2	2	–	1	–	2
1	0-1	0	0	0	1

2176CPRE

Cómo calificar el examen de redacción

Es difícil ser objetivo sobre el trabajo que hace uno mismo. Sin embargo, te beneficiará que leas críticamente tu propia escritura, ya que al hacerlo te desarrollarás como escritor y como lector. También puede ser útil que le des tu ensayo de práctica a otro lector: un compañero de clase, uno de tus padres o un maestro. Para calificar tu ensayo, tú y tu(s) lector(es) deben revisar las pautas y los ensayos de ejemplo de **www.actstudent.org** y usar la rúbrica de calificación que aparece a continuación para asignar a tu ensayo de práctica una calificación de 1 (baja) a 6 (alta) en cada uno de los cuatro dominios de redacción (Ideas y análisis, Desarrollo y sustentación, Organización, Uso del lenguaje).

Rúbrica de calificación (a continuación)

La rúbrica representa las normas que se utilizarán para evaluar tu ensayo. Los lectores utilizarán esta rúbrica para asignarle a tu ensayo cuatro calificaciones, una por cada dominio de redacción. Para calificar tu ensayo, determina cuál punto de calificación, en cada dominio, describe mejor las características de tu composición. Debido a que cada dominio recibe su propia calificación, las cuatro calificaciones que asignes no necesitan ser idénticas. Por ejemplo, podrías observar que tu ensayo es mejor en organización que en desarrollo de ideas. En este caso, podrías determinar que tu ensayo debe recibir una calificación más alta en Organización que en Desarrollo y sustentación.

Rúbrica de calificación del examen de redacción de ACT

	Ideas y análisis	***Desarrollo y sustentación***	***Organización***	***Uso del lenguaje***
Calificación 6: **Las respuestas en este nivel de calificación demuestran habilidad eficaz en la redacción de un ensayo argumentativo.**	El escritor genera un argumento que interactúa críticamente con múltiples perspectivas sobre el tema en cuestión. La tesis del argumento refleja matices y precisión en raciocinio y propósito. El argumento establece y emplea un contexto perspicaz para el análisis del tema y sus perspectivas. El análisis examina implicaciones, complejidades y tensiones, y/o valores y suposiciones subyacentes.	El desarrollo de las ideas y la sustentación de las aseveraciones profundizan la perspicacia y amplían el contexto. Una línea integrada de razonamiento e ilustración hábil transmiten de manera eficaz la importancia del argumento. Las calificaciones y las complicaciones enriquecen y refuerzan las ideas y el análisis de las mismas.	La respuesta muestra una estrategia organizacional hábil. La respuesta está unificada por una idea o propósito principal, y una progresión lógica de las ideas aumenta la eficacia del argumento del escritor. Las transiciones entre los párrafos y dentro de los mismos fortalecen las relaciones entre las ideas.	El uso del lenguaje realza el argumento. La elección de vocabulario es hábil y precisa. Las estructuras sintácticas son consistentemente variadas y claras. Las elecciones estilísticas y de registro, incluyendo voz y tono, son estratégicas y eficaces. Aunque pueden existir algunos errores menores de gramática, uso y mecánica, estos no obstaculizan la comprensión.
Calificación 5: **Las respuestas en este nivel de calificación demuestran habilidad bien desarrollada en la redacción de un ensayo argumentativo.**	El escritor genera un argumento que interactúa productivamente con múltiples perspectivas sobre el tema en cuestión. La tesis del argumento refleja precisión en raciocinio y propósito. El argumento establece y emplea un contexto bien pensado para el análisis del tema y sus perspectivas. El análisis aborda implicaciones, complejidades y tensiones, y/o valores y suposiciones subyacentes.	El desarrollo de las ideas y la sustentación de las aseveraciones profundizan el entendimiento. Una línea en su mayor parte integrada de razonamiento e ilustración bien dirigida transmiten de manera eficaz la importancia del argumento. Las calificaciones y las complicaciones enriquecen las ideas y el análisis de las mismas.	La respuesta muestra una estrategia organizacional productiva. En su mayor parte, la respuesta está unificada por una idea o propósito principal, y un secuenciamiento lógico de las ideas aumenta la eficacia del argumento. Las transiciones entre los párrafos y dentro de los mismos aclaran consistentemente las relaciones entre las ideas.	El uso del lenguaje apoya el argumento. La elección de vocabulario es precisa. Las estructuras sintácticas son claras y presentan variación frecuente. Las elecciones estilísticas y de registro, incluyendo voz y tono, son dirigidas y productivas. Aunque pueden existir errores menores de gramática, uso y mecánica, estos no obstaculizan la comprensión.
Calificación 4: **Las respuestas en este nivel de calificación demuestran habilidad adecuada en la redacción de un ensayo argumentativo.**	El escritor genera un argumento que interactúa con múltiples perspectivas sobre el tema en cuestión. La tesis del argumento refleja claridad en raciocinio y propósito. El argumento establece y emplea un contexto relevante para el análisis del tema y sus perspectivas. El análisis reconoce implicaciones, complejidades y tensiones, y/o valores y suposiciones subyacentes.	El desarrollo de las ideas y la sustentación de las aseveraciones aclaran el significado y el propósito. Las líneas de razonamiento claro e ilustración transmiten de manera adecuada la importancia del argumento. Las calificaciones y las complicaciones extienden las ideas y el análisis de las mismas.	La respuesta muestra una estrategia organizacional clara. La forma general de la respuesta refleja una idea o propósito principal emergente. Las ideas están lógicamente agrupadas y secuenciadas. Las transiciones entre los párrafos y dentro de los mismos aclaran consistentemente las relaciones entre las ideas.	El uso del lenguaje transmite el argumento con claridad. La elección de vocabulario es adecuada y en ocasiones precisa. Las estructuras sintácticas son claras y demuestran cierta variedad. Las elecciones estilísticas y de registro, incluyendo voz y tono, son apropiadas para el propósito retórico. Aunque existen errores de gramática, uso y mecánica, en raras ocasiones obstaculizan la comprensión.

Rúbrica de calificación del examen de redacción de ACT

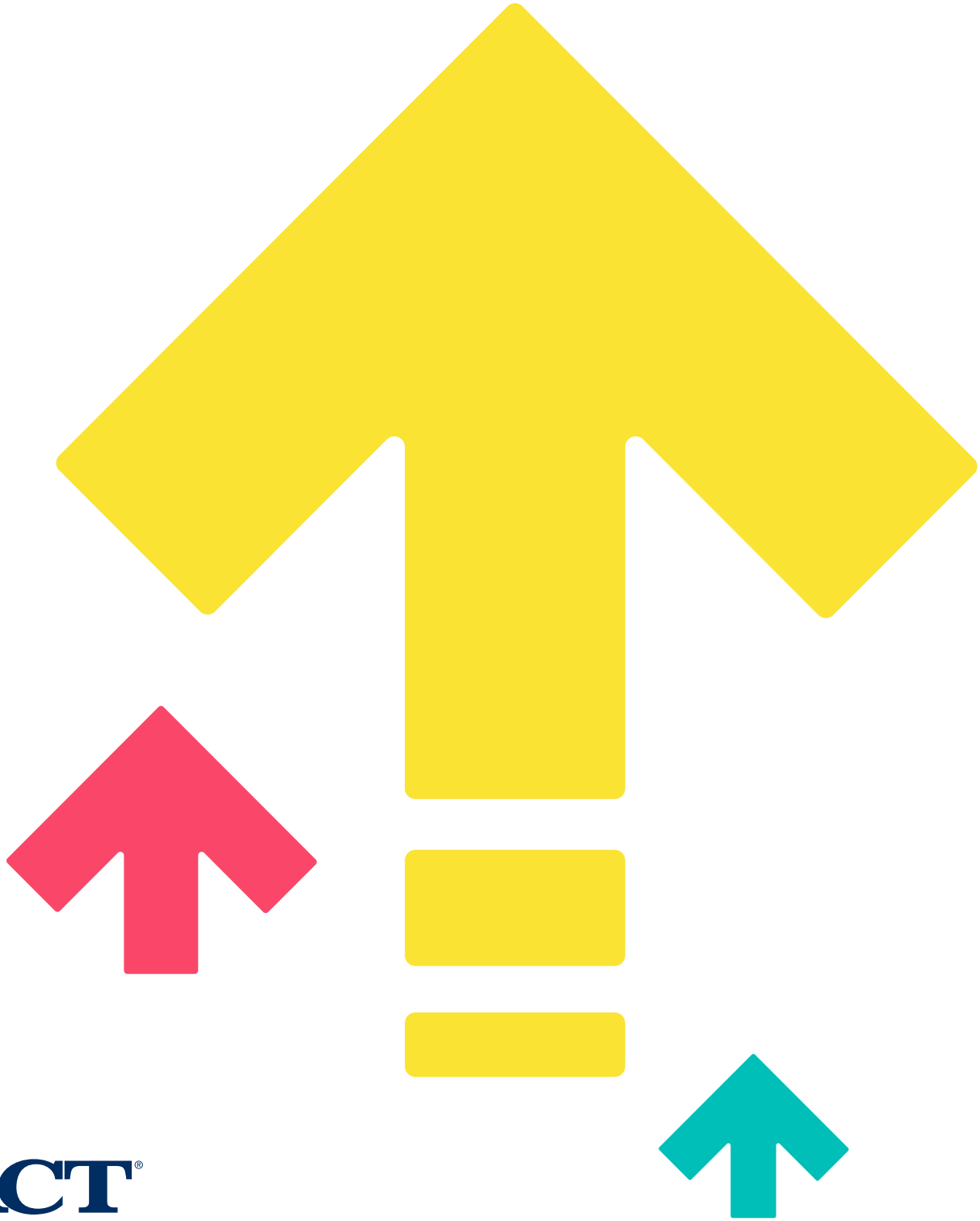
	Ideas y análisis	*Desarrollo y sustentación*	*Organización*	*Uso del lenguaje*
Calificación 3: **Las respuestas en este nivel de calificación demuestran cierta habilidad en la redacción de un ensayo argumentativo.**	El escritor genera un argumento que responde a múltiples perspectivas sobre el tema en cuestión. La tesis del argumento refleja cierta claridad en raciocinio y propósito. El argumento establece un contexto limitado o tangencial para el análisis del tema y sus perspectivas. El análisis es simplista o algo confuso.	El desarrollo de ideas y la sustentación de aseveraciones son relevantes en su mayor parte pero son demasiado generales o simplistas. El razonamiento y la ilustración aclaran en gran medida el argumento, pero pueden ser algo repetitivos o imprecisos.	La respuesta muestra una estructura organizacional básica. La respuesta en su mayor parte es coherente y la mayoría de las ideas están lógicamente agrupadas. Las transiciones entre los párrafos y dentro de los mismos en ocasiones aclaran las relaciones entre las ideas.	El uso del lenguaje es básico y únicamente claro hasta cierto punto. La elección de vocabulario es general y ocasionalmente imprecisa. Las estructuras sintácticas son usualmente claras pero muestran poca variedad. Las elecciones estilísticas y de registro, incluyendo voz y tono, no son siempre apropiadas para el propósito retórico. Pueden existir errores de gramática, uso y mecánica que causan distracción, pero generalmente no obstaculizan la comprensión.
Calificación 2: **Las respuestas en este nivel de calificación demuestran habilidad débil o inconsistente en la redacción de un ensayo argumentativo.**	El escritor genera un argumento que responde débilmente a múltiples perspectivas sobre el tema en cuestión. La tesis del argumento, si es evidente, refleja poca claridad en raciocinio y propósito. Los intentos de análisis son incompletos, en su mayor parte irrelevantes o consisten principalmente de una reformulación del tema y sus perspectivas.	El desarrollo de las ideas y la sustentación de las aseveraciones son débiles, confusos o desarticulados. El razonamiento y la ilustración son inadecuados, ilógicos o circulares y no aclaran plenamente el argumento.	La respuesta muestra una estructura organizacional rudimentaria. El agrupamiento de ideas es inconsistente y a menudo no es claro. Las transiciones entre los párrafos y dentro de los mismos son confusas o están deficientemente formadas.	El uso del lenguaje es inconsistente y a menudo no es claro. La elección de vocabulario es rudimentaria y frecuentemente imprecisa. Las estructuras sintácticas en ocasiones no son claras. Las elecciones estilísticas y de registro, incluyendo voz y tono, son inconsistentes y no son siempre apropiadas para el propósito retórico. Existen errores de gramática, uso y mecánica que en ocasiones obstaculizan la comprensión.
Calificación 1: **Las respuestas en este nivel de calificación demuestran habilidad baja o inexistente en la redacción de un ensayo argumentativo.**	El escritor no logra generar un argumento que responda de manera inteligible a la tarea. Las intenciones del escritor son difíciles de discernir. Los intentos de análisis son confusos o irrelevantes.	Las ideas no están desarrolladas y las aseveraciones no están sustentadas. El razonamiento y la ilustración son confusos, incoherentes o inexistentes en gran medida.	La respuesta no muestra una estructura organizacional. Hay poca agrupación de ideas. Cuando están presentes, los dispositivos de transición no logran conectar las ideas.	El uso del lenguaje no logra demostrar habilidad para responder a la tarea. La elección de vocabulario es imprecisa y a menudo difícil de comprender. Las estructuras sintácticas a menudo no son claras. Las elecciones estilísticas y de registro son difíciles de identificar. Existen abundantes errores de gramática, uso y mecánica que a menudo obstaculizan la comprensión.

Cálculo de tu calificación de Redacción

Sigue estos pasos para calcular tu calificación de Redacción (rango de calificación de 2 a 12).

Pasos de cálculo de la calificación	**Dominio**	**Calificación de la rúbrica**	**Calificación del dominio**
1. Determina la calificación de la rúbrica para cada dominio 2. Multiplica la calificación de la rúbrica por 2 para obtener la calificación del dominio	Ideas y análisis	____	x 2 = _____
	Desarrollo y sustentación	____	x 2 = _____
	Organización	____	x 2 = _____
	Uso del lenguaje y convenciones	____	x 2 = _____
3. Encuentra la suma de todas las calificaciones de los dominios (rango de 8 a 48)	Suma de las calificaciones de los dominios		_____
4. Divide la suma entre 4 (rango de 2 a 12)*	**Calificación de Redacción**		_____

*Redondea el valor al número entero más cercano. Redondea hacia abajo cualquier fracción menor a la mitad y hacia arriba cualquier fracción que sea la mitad o más.



ACT está comprometido a representar la diversidad de la sociedad en todos sus aspectos, lo cual incluye raza, grupo étnico y género. Las preguntas, pasajes y las instrucciones para el examen de redacción se eligen para reflejar una variedad de culturas y están escritas de modo que no representen una desventaja para ningún grupo particular de examinados. ACT usa revisiones extensas y procedimientos de estadística para asegurar la equidad de los materiales del examen.

ACT realiza investigaciones y actualiza los exámenes periódicamente para proporcionar contenido de examen que refleje la instrucción del salón de clases y continúa siendo un pronosticador relevante de la preparación para la universidad y una carrera profesional. Puede haber diferencias sutiles entre el examen ACT de práctica en este cuadernillo y el examen que los estudiantes tomen el día del examen.

ACT respalda el *Código de Prácticas Justas de Aplicación de Exámenes en Educación* y el *Código de Responsabilidades Profesionales en Medición Educativa*, que guían el comportamiento de quienes participan en los exámenes educativos. ACT tiene el compromiso de asegurar que cada uno de sus programas de exámenes cumpla con las pautas de cada código. Se pueden encontrar copias de estos Códigos a través de las siguientes organizaciones:

- Código de Prácticas Justas de Aplicación de Exámenes en Educación: Asociación Americana de Psicología (**https://www.apa.org/science/programs/testing/fair-testing.pdf**)
- Código de Responsabilidades Profesionales en Medición Educativa: Consejo Nacional de Medición en Educación (**https://www.ncme.org/resources-publications/professional-learning/library**)