Unit 2: Adding and Subtracting with Decimals

In this unit, you will work with decimals. You will add and subtract decimal numbers, compare decimal numbers, and use place value to determine the numerical value of a number. You will also learn about expanded notation and rounding numbers.

KEY TERMS

Decimal: A number that shows a value that is between whole numbers. It can also be written as a fraction. For example, $\frac{1}{2}$ or 0.5 is a value between the whole numbers 0 and 1. (NBT.7)

Decimal point: This is a marker to indicate the value of each digit in a number. Digits on the left of the decimal point indicate whole units (ones, tens, hundreds, etc.). Digits to the right of the decimal point indicate fractions, or parts, of a unit (tenths, hundredths, thousandths, etc.). (NBT.3)

Place value: The numerical value of a digit in a number based on the digit's location related to the decimal point. A digit in the tenths place of a number is 10 times the value of the same digit in the hundredths place. A digit in the tenths place is $\frac{1}{10}$ the value of the same digit in the ones place. (NBT.1)

- **Tenths place:** This is the first place to the right of the decimal point. A decimal of 0.1 would have a value equivalent to $\frac{1}{10}$.
- **Hundredths place:** This is the second place to the right of the decimal point. A decimal of 0.01 would have a value equivalent to $\frac{1}{100}$.
- **Thousandths place:** This is the third place to the right of the decimal point. A decimal of 0.001 would have a value equivalent to $\frac{1}{1000}$. (NBT.3a)

Expanded notation: Creates an addition expression from a decimal number by writing the value for each place of the number separately. For example, 302.4 can be written as $300 + 2 + \frac{4}{10}$. (NBT.3a)

Compare decimal numbers: Determine the value of two or more decimal numbers and identify the number that has a greater value, if possible.

- **Greater than:** When the decimal number has a greater value than the other number in the comparison, use the symbol $>$.
- **Less than:** When the decimal number has a smaller value than the other number in the comparison, use the symbol $<$.
- **Equal to:** When both numbers in the comparison have the same value, use the symbol $=$. (NBT.3b)

Rounding: Determine the nearest number to a given decimal number by using a model such as a number line. (NBT.4)

Important Tips

- When comparing decimal numbers, look at the place value of each digit. The location of the digit determines its value.
- When adding or subtracting decimal numbers, estimate the value first. Then a place value chart can be used to solve the equation. Each operation should be completed on digits in the same location.
- Addition and subtraction of decimal numbers require paying close attention to the place value of each digit. Operations must be completed on the digit in the same location, such as adding the tenths place in one number with the tenths place in another number. Models such as area models and place value charts can be used as a visual representation of the problem while solving.

Sample Items 5–8

Item 5

Selected-Response

Which number shows the decimal form for this expression?

$$8 \times \left(\frac{1}{10}\right) + 3 \times \left(\frac{1}{100}\right) + 9 \times \left(\frac{1}{1000}\right)$$

A. 0.0839
B. 0.839
C. 8.39
D. 83.9

Item 6

Selected-Response

What is 5.816 rounded to the nearest tenth?

A. 5.8
B. 5.82
C. 5.9
D. 6.00

Item 7

Multi-Part Multi-Select Technology-Enhanced

The mass of a quarter is 5.67 grams, and the mass of a half dollar coin is 11.34 grams.

Part A

Select TWO numbers that, when rounded to the hundredths place, will each make the inequality shown true.

$$5.67 < \_\_\_\_$$

A. 5.609
B. 5.762
C. 5.665
D. 5.098
E. 5.677

Part B

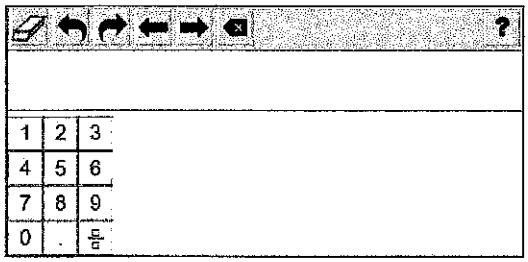
Which number rounded to the nearest tenth is less than 11.34 rounded to the nearest tenth?

A. 11.361
B. 11.283
C. 11.347
D. 11.249

Item 8

Keypad-Input Technology-Enhanced

One inch is 0.0254 meters long. What is 0.0254 rounded to the nearest hundredth?



Use a mouse, touchpad, or touchscreen to enter a response.

Unit 3: Multiplying and Dividing with Decimals

In this unit, you will continue to work with decimals. You will multiply and divide with decimals. You will use estimation and work with models like rectangular arrays and area models.

KEY TERMS

Decimal: A number that shows a value that is between whole numbers. It can also be written as a fraction. For example, $\frac{1}{2}$ or 0.5 is a value between the whole numbers 0 and 1. (NBT.7)

Place value: The numerical value of a digit in a number based on the digit's location related to the decimal point. A digit in the tenths place of a number is 10 times the value of the same digit in the hundredths place. A digit in the tenths place is $\frac{1}{10}$ the value of the same digit in the ones place. (NBT.1)

- **Tenths place:** This is the first place to the right of the decimal point. A decimal of 0.1 would have a value equivalent to $\frac{1}{10}$.
- **Hundredths place:** This is the second place to the right of the decimal point. A decimal of 0.01 would have a value equivalent to $\frac{1}{100}$. (NBT.3a)

Multiplier: The number that is being multiplied by. For example, in $2 \times 0.01 = 0.02$, the multiplier is 2.

Multiplicand: The number that is getting multiplied. For example, in $2 \times 0.01 = 0.02$, the multiplicand is 0.01.

Product: The answer of a multiplication problem. For example, in $2 \times 0.01 = 0.02$, the product is 0.02.

Dividend: The number that is divided. For example, in $2 \div 0.01 = 200$, the dividend is 2.

Divisor: The number that is divided by. For example, in $2 \div 0.01 = 200$, the divisor is 0.01.

Quotient: The answer to a division problem. For example, in $2 \div 0.01 = 200$, the quotient is 200. (NBT.6)

Exponents: Shows the number of times a number is multiplied by itself. For example, $2^4 = 2 \times 2 \times 2 \times 2$.

Power of 10: A multiple of 10. For example, 10^3 is the same as multiplying by 1,000, since $10 \times 10 \times 10 = 1{,}000$. The effect on the number is that it is multiplied 3 times by 10, and the decimal point moves 3 places to the right. When dividing by a power of 10, the decimal point will move to the left. (NBT.2)

Important Tips

- Estimation can be used before computing the product or quotient of an equation. Decimal numbers can be rounded to the nearest whole number to determine a reasonable estimate.
- When multiplying a whole number by a decimal number, the product will have a smaller value than the whole number factor. The equation $2 \times 0.01 = 0.02$ shows that 2 groups of 1 hundredth are equal to 2 hundredths.
- When dividing a whole number by a decimal number, the quotient will have a greater value than the dividend. The equation $2 \div 0.01 = 200$ shows that there are 200 hundredths in the number 2.
- Along with strategies based on place value and the properties of operations, models can be used to multiply and divide decimal numbers. Rectangular arrays and area models can be used to represent equations.

Sample Items 9–11

Item 9

Selected-Response

Hannah multiplies 0.542 by powers of 10.

$$0.542 \times 10^1 = 5.42$$
$$0.542 \times 10^2 = 54.2$$
$$0.542 \times 10^3 = 542$$
$$0.542 \times 10^4 = 5{,}420$$

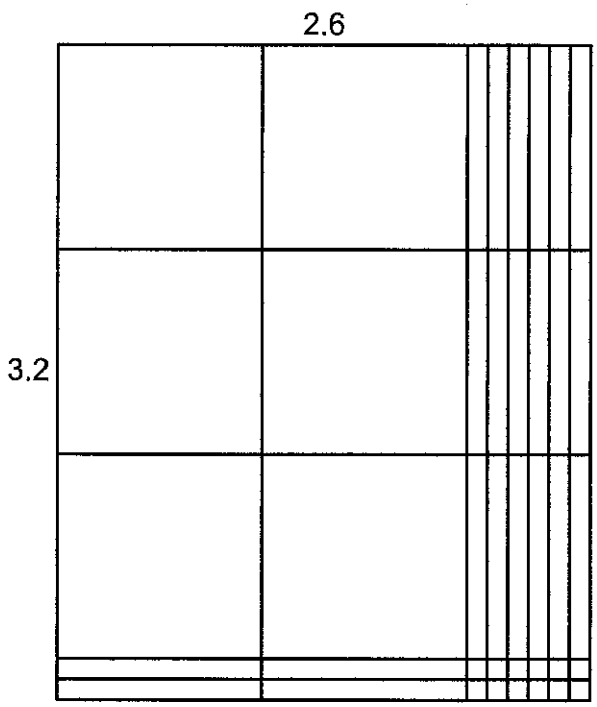
By what power of 10 would Hannah multiply 0.542 to get a product of 5,420,000?

A. 10^5
B. 10^6
C. 10^7
D. 10^8

Item 10

Selected-Response

The area model illustrates the product of 2.6 × 3.2.



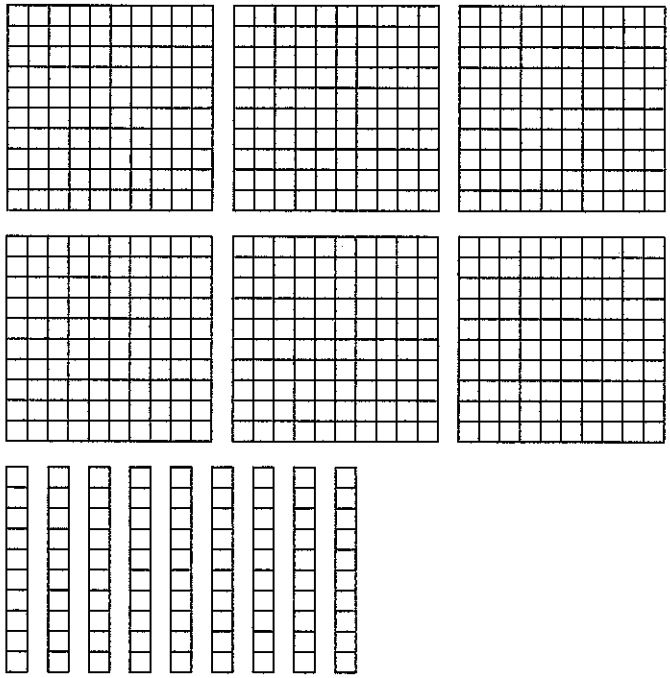
What is the product?

A. 6.232
B. 7.8
C. 8.32
D. 9.6

Item 11

Selected-Response

Ted is using a model to find the quotient of 6.9 ÷ 2.3. He starts by modeling the dividend, 6.9, as shown.



He will now separate the model into equal groups to model the division. How many equal groups of 2.3 should he make?

A. 0.3
B. 3
C. 30
D. 300

Unit 4: Adding, Subtracting, Multiplying, and Dividing Fractions

In this unit, you will work with fractions. You will practice adding, subtracting, multiplying, and dividing fractions. You will work with fractions that have common and uncommon denominators and fractions that are equivalent. You will use fraction models, number lines, and other visual models.

KEY TERMS

Fraction: Represents the division of two numbers. The dividend of the expression becomes the numerator, and the divisor becomes the denominator. (NF.3) The fraction often represents a value between two whole numbers. (NF.2)

Improper fraction: A fraction that is greater than 1. The numerator is greater than the denominator. (NF.1)

Mixed number: Another method for writing an improper fraction, which includes a whole number and a fraction. (NF.1)

Common denominator: When fractions have the same denominator, they can be added or subtracted. (NF.1)

Unlike denominators: Fractions that do not have the same denominator cannot be added or subtracted until the fractions are replaced with equivalent fractions so that they have a common denominator.

Equivalent: Same value. Equivalent fractions have the same value and represent the same point on a number line.

Estimate: A value that is close to the right amount. Estimated fractions are useful in finding a reasonable answer to a problem. For example, if both fractions in an addition problem are greater than $\frac{1}{2}$, then a reasonable sum would be greater than 1. (NF.2)

Benchmark fraction: Common fractions that can be used to estimate fractions. For example, $\frac{1}{2}$ is a commonly used benchmark fraction.

Multiplying fractions: Multiply the numerators of each fraction to find the numerator of the product. Multiply the denominator of each fraction to find the denominator of the product. Whole numbers can be written with a denominator of 1. (NF.4a)

Scaling: Compare the value of one object to the value of another by using a fraction. An example of scaling would be saying, "That rope is $\frac{1}{3}$ as long as this rope." (NF.5)

Unit fraction: This is a fraction with a numerator of 1. (NF.7)

Dividing fractions: Use fraction models, number lines, and other visual models to represent the division of whole numbers and unit fractions. Models can be **partitioned** into **equal parts** based on an equation. (NF.7)

Important Tips

- Fractions in an equation must represent parts of the same whole. When solving an equation, use models that are parts of the same whole by using models that are the same size and shape.
- Multiplication of fractions is used to find the area of a figure with fractional side lengths. The area can also be found by tiling the figure with square units that have fractional side lengths.

Sample Items 12–15

Item 12

Selected-Response

A teacher has a 60-pound bag of sand. She pours all the sand into 8 buckets. She puts an equal amount of sand in each bucket. What is the total amount of sand in each bucket?

A. $\frac{2}{15}$ pound

B. $6\frac{1}{2}$ pounds

C. $7\frac{1}{2}$ pounds

D. $8\frac{1}{2}$ pounds

Item 13

Selected-Response

What is the difference of these fractions?

$$1\frac{5}{8} - \frac{2}{3}$$

A. $\frac{2}{24}$

B. $\frac{16}{24}$

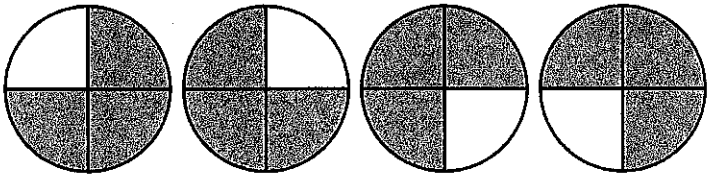
C. $\frac{23}{24}$

D. $\frac{11}{5}$

Item 14

Selected-Response

Four students each draw a circle. They each shade $\frac{3}{4}$ of their circles, as shown.



Which equation shows how much of the circles are shaded altogether?

A. $4 \times \frac{1}{4} = \frac{4}{4} = 1$

B. $4 \times \frac{3}{4} = \frac{7}{4} = 1\frac{3}{4}$

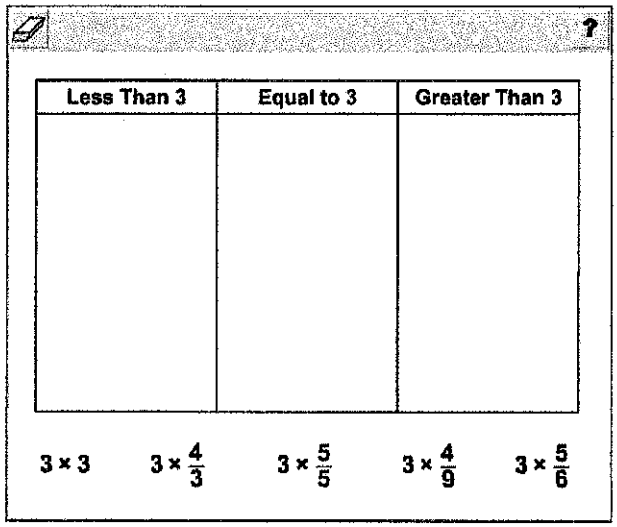
C. $4 \times \frac{3}{4} = \frac{3}{16}$

D. $4 \times \frac{3}{4} = \frac{12}{4} = 3$

Item 15

Drag-and-Drop Technology-Enhanced

Move each expression into the column that BEST describes it.



Use a mouse, touchpad, or touchscreen to move the expressions into the columns. Each expression may be used once.

Unit 5: Two-Dimensional Figures

In this unit, you will work with two-dimensional figures. You will learn about plane figures, two-dimensional figures, and their attributes. You will learn to identify geometric shapes.

KEY TERMS

Two-dimensional figure: This is a **plane figure** that has two dimensions, such as a rectangle that has the dimension of length and width. (G.3)

Attributes of two dimensional figures include the following properties:

- **Angles**
  - **Acute:** This is an angle that measures less than 90°.
  - **Obtuse:** This is an angle that measures greater than 90°.
  - **Right:** This is an angle that measures 90°.
- **Parallel lines:** These are two lines that are always an equal distance apart.
- **Perpendicular lines:** These are two lines that intersect at a 90° angle.
- **Number of sides:** This is how many lines are used to create a figure.
- **Length of sides:** This is a measurement of the length of each line used to create a figure.
- **Congruent:** This is when two figures are the same size and shape.
- **Vertex:** This is the point where two lines of a figure meet. (G.3)

Category: This is a large group of two-dimensional figures that share at least one attribute. For example, all shapes with four sides belong to the category of quadrilateral. (G.3)

Subcategory: This is a smaller group of items within a category. All the items in a subcategory share at least one attribute. (G.3)

Geometric shapes: Two-dimensional shapes that include triangles, rectangles, squares, rhombuses, pentagons, hexagons, trapezoids, quadrilaterals, quarter circles, half circles, and circles.

Polygon: This is a closed geometric shape with multiple straight sides.

Regular polygon: This is a geometric shape with multiple sides that all have equal angles and lengths.

Irregular polygon: This is a geometric shape with multiple sides where the side lengths vary. (G.4)

Important Tips

- A two-dimensional figure can belong in more than one category as well as more than one subcategory.
- Geometric shapes can be placed in a hierarchy, or a set of categories and subcategories, based on their attributes. For example, in the category of quadrilaterals, there is the subcategory of rectangles. Within the subcategory of rectangles, there is the subcategory of squares.

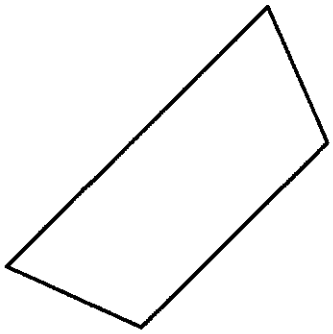
Sample Items 16 and 17

Item 16

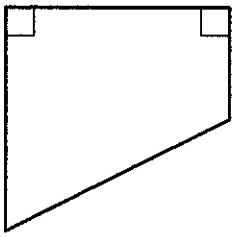
Selected-Response

Which figure has four right angles?

A.

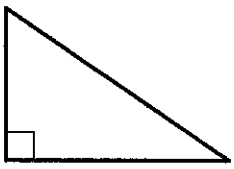


B.



C.

D.



Item 17

Selected-Response

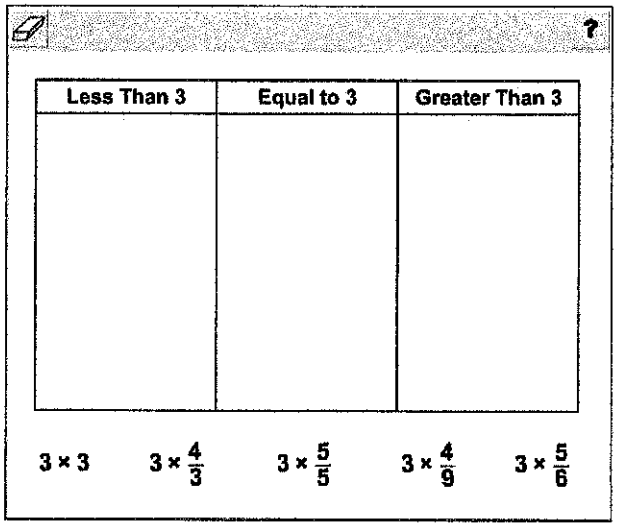
What attributes do a rhombus and a rectangle always have in common?

A. Both figures always have four right angles.
B. Both figures always have four sides of equal length.
C. Both figures always have two pairs of parallel sides.
D. Both figures always have only one pair of parallel sides.

Item 15

Drag-and-Drop Technology-Enhanced

Move each expression into the column that BEST describes it.



Use a mouse, touchpad, or touchscreen to move the expressions into the columns. Each expression may be used once.

Unit 5: Two-Dimensional Figures

In this unit, you will work with two-dimensional figures. You will learn about plane figures, two-dimensional figures, and their attributes. You will learn to identify geometric shapes.

KEY TERMS

Two-dimensional figure: This is a **plane figure** that has two dimensions, such as a rectangle that has the dimension of length and width. (G.3)

Attributes of two dimensional figures include the following properties:

- **Angles**
  - **Acute:** This is an angle that measures less than 90°.
  - **Obtuse:** This is an angle that measures greater than 90°.
  - **Right:** This is an angle that measures 90°.
- **Parallel lines:** These are two lines that are always an equal distance apart.
- **Perpendicular lines:** These are two lines that intersect at a 90° angle.
- **Number of sides:** This is how many lines are used to create a figure.
- **Length of sides:** This is a measurement of the length of each line used to create a figure.
- **Congruent:** This is when two figures are the same size and shape.
- **Vertex:** This is the point where two lines of a figure meet. (G.3)

Category: This is a large group of two-dimensional figures that share at least one attribute. For example, all shapes with four sides belong to the category of quadrilateral. (G.3)

Subcategory: This is a smaller group of items within a category. All the items in a subcategory share at least one attribute. (G.3)

Geometric shapes: Two-dimensional shapes that include triangles, rectangles, squares, rhombuses, pentagons, hexagons, trapezoids, quadrilaterals, quarter circles, half circles, and circles.

Polygon: This is a closed geometric shape with multiple straight sides.

Regular polygon: This is a geometric shape with multiple sides that all have equal angles and lengths.

Irregular polygon: This is a geometric shape with multiple sides where the side lengths vary. (G.4)

Important Tips

- ✍ A two-dimensional figure can belong in more than one category as well as more than one subcategory.
- ✍ Geometric shapes can be placed in a hierarchy, or a set of categories and subcategories, based on their attributes. For example, in the category of quadrilaterals, there is the subcategory of rectangles. Within the subcategory of rectangles, there is the subcategory of squares.

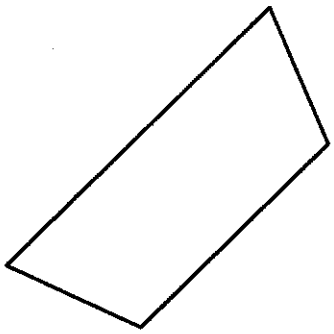
Sample Items 16 and 17

Item 16

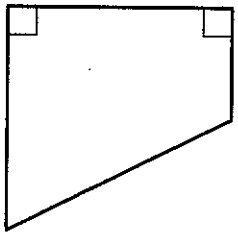
Selected-Response

Which figure has four right angles?

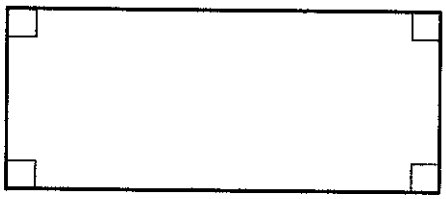
A.



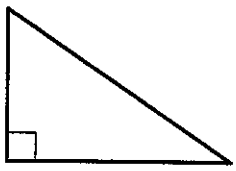
B.



C.



D.



Item 17

Selected-Response

What attributes do a rhombus and a rectangle always have in common?

A. Both figures always have four right angles.
B. Both figures always have four sides of equal length.
C. Both figures always have two pairs of parallel sides.
D. Both figures always have only one pair of parallel sides.

Unit 6: Volume and Measurement

In this unit, you will work with different kinds of measurement: customary, metric, and time. You will convert between measurement units. You will use a line plot to record measurements.

KEY TERMS

Conversion: This is changing between units within the same measurement system. (MD.1)

Customary measurements include the following:

- **Liquid volume:** Measured in cups, pints, quarts, and gallons.
- **Length:** Measured in inches, feet, yards, and miles.
- **Mass:** Measured in ounces, pounds, and tons. (MD.1)

Metric measurements include the following:

- **Liquid volume:** Measured in liters and milliliters.
- **Length:** Measured in centimeters, meters, and kilometers.
- **Mass:** Measured in grams and kilograms. (MD.1)

Time: Measured in seconds, minutes, and hours. (MD.1)

Line plot: Used to record measurements for a group of objects. The measurement values are shown, and a picture or mark is placed above the value for each object being measured. A line plot can include fractional measurements.

Solid figure (three-dimensional figure): A figure that has volume. One example of a solid figure is a right rectangular prism. Each face of the right rectangular prism is a rectangle.

Right rectangular prism: A solid figure with six faces. Each face is a rectangle.

Unit cube: A cube with all side lengths equal to 1 unit. The volume of a unit cube is 1 cubic unit. A solid figure can be packed with unit cubes leaving no gaps and without overlapping cubes. The number of unit cubes packed into the solid figure represents the volume of the figure.

Cubic units: The measurement for volume. These may include cubic centimeters, cubic inches, cubic feet, or other length measurements. (MD.4)

Volume can be determined using two formulas:

- $l \times w \times h$ multiplies the length, width, and height of the figure to find the cubic units of volume.
- $B \times h$ finds the area of the base using the width and length, and then multiplies it by the height of the figure to find the cubic units of volume. (MD.5b)

Important Tips

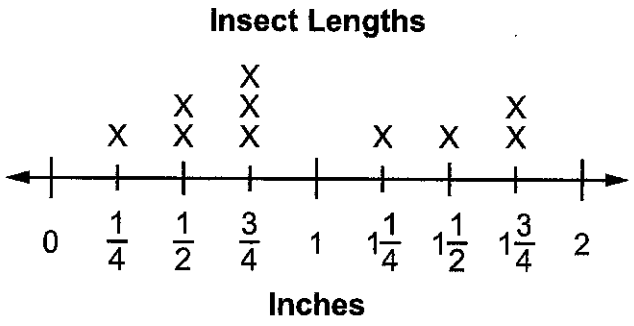
- To convert a measurement, choose another unit used to measure the same dimension within the customary or metric measurement systems.
- Comparing the volume of two figures requires using all three dimensions of length, width, and height. A figure may appear to have a greater volume based on its height, but the size of the base will affect the volume as well.
- Volume is an additive value. This means that a solid figure can be separated into two rectangular prisms. The volume of each rectangular prism can be added together to find the total volume for the solid figure.

Sample Items 18–22

Item 18

Selected-Response

Tina measures the lengths, in inches, of 10 insects. She records the lengths of the insects on this line plot. She adds the lengths of the 3 longest insects.



What is the total length, in inches, of the 3 longest insects?

A. $2\frac{1}{4}$ in.

B. 3 in.

C. $4\frac{1}{2}$ in.

D. 5 in.

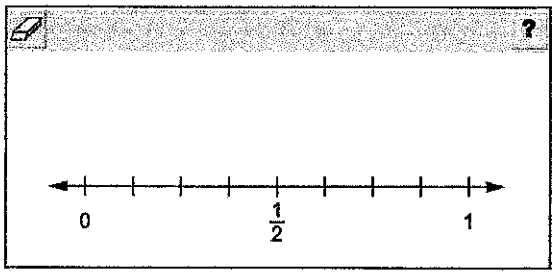
Item 19

Line-Plot Technology-Enhanced

A table of values is shown.

$\frac{5}{8}$	$\frac{5}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{3}{4}$	$\frac{1}{8}$

Complete the line plot to represent the values.



Use a mouse, touchpad, or touchscreen to add Xs to the line plot. At most 3 Xs can be plotted for each value.

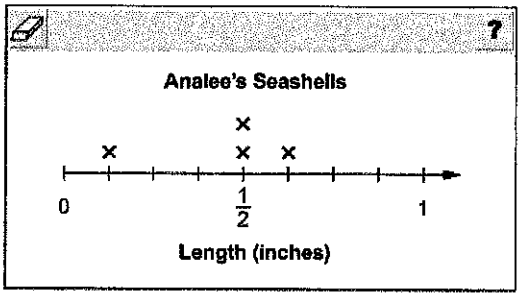
Item 20

Line-Plot Multi-Part Technology-Enhanced

Part A

Part A Analee measured the lengths of six seashells she found at the beach. Each seashell is less than 1 inch in length. The total length of all six seashells is $\frac{26}{8}$ inches. The line plot shows the lengths, in inches, of four of Analee's seashells.

Complete the line plot by adding an X to represent the possible lengths, in inches, of each of Analee's remaining seashells.



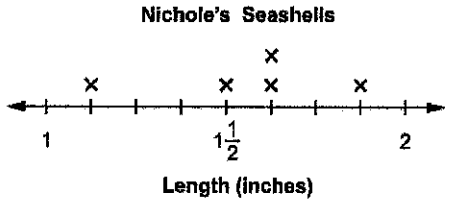
Use a mouse, touchpad, or touchscreen to add Xs to the line plot. At most 2 Xs can be plotted for each length.

Go on to the next page to finish item 20.

Item 20. *Continued.*

Part B

Part B Nichole measured the lengths of five seashells she found at the beach. The length, in inches, of each seashell is shown on the line plot.



What is the difference, in inches, between the longest and shortest seashells Nichole measured?

(a) $\frac{1}{2}$

(b) $\frac{3}{4}$

(c) $\frac{7}{8}$

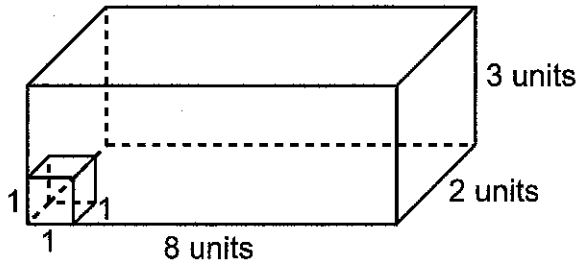
(d) 1

Use a mouse, touchpad, or touchscreen to select a response.

Item 21

Selected-Response

Find the volume of the rectangular prism.
(Volume = length × width × height)



What is the maximum number of unit cubes that will fit inside the rectangular prism?

A. 6
B. 16
C. 24
D. 48

Item 22

Multi-Select Technology-Enhanced

Greg wants to build a shed to hold his gardening tools. The shed must have a volume of at least 500 cubic feet but no more than 600 cubic feet.

Select THREE sets of dimensions that meet Greg's requirements for the volume of a shed.

($V = l \times w \times h$)

A. 6 feet wide, 9 feet long, 10 feet high
B. 7 feet wide, 8 feet long, 9 feet high
C. 10 feet wide, 6 feet long, 8 feet high
D. 9 feet wide, 9 feet long, 8 feet high
E. 8 feet wide, 8 feet long, 8 feet high
F. 9 feet wide, 8 feet long, 6 feet high

Unit 7: Geometry and the Coordinate Plane

In this unit, you will use geometry. You will become familiar with coordinate planes, ordered pairs, quadrants, and points. You will follow rules to create numerical patterns.

KEY TERMS

Numerical patterns: These are sequences of numbers that are created by following a set of rules, such as "add 5." Using the terms created by a rule, form and graph ordered pairs on a coordinate plane. A line can be generated from the pattern. (OA.3)

Ordered pairs: These are sets of numbers that are used to label the locations of points on the coordinate plane. Ordered pairs are written as (x, y). For example, (1, 2) represents an x-value of 1 and a y-value of 2. (OA.3)

Coordinate plane: Created by intersecting two perpendicular number lines at 0. (G.1)

Origin: The point on a coordinate plane where the number lines connect. The coordinates for the origin are (0, 0). (G.1)

***x*-axis:** The horizontal number line in a coordinate plane. (G.1)

***y*-axis:** The vertical number line in a coordinate plane. (G.1)

First quadrant: The portion of a coordinate plane that has values of 0 and greater for the x-axis and the y-axis. (G.1)

Point: This is a location on the coordinate plane that is labeled by the values of the x-coordinate and the y-coordinate. (G.1)

***x*-coordinate:** The value of a point on the x-axis, moving horizontally from the origin. (G.1)

***y*-coordinate:** The value of a point on the y-axis, moving vertically from the origin. For example, the point (2, 3) is 2 units to the right of the origin and 3 units up from the origin. (G.1)

Line: A line connects multiple points on the coordinate plane. (G.1)

Important Tips

- An ordered pair lists the x-coordinate first and then the y-coordinate. When graphing a point using the ordered pair, move across the x-axis using the x-coordinate and then move up the y-axis using the y-coordinate.
- The coordinate plane can be used to represent real-world situations by graphing points and finding the values of the points as the points relate to the situation.

Sample Items 23–29

Item 23

Multi-Select Technology-Enhanced

Select THREE true statements about quadrilaterals.

A. All squares are rectangles, so all squares have four right angles.
B. All rhombuses are squares, so all rhombuses have four equal sides.
C. All rectangles are rhombuses, so all rectangles have four equal sides.
D. All squares are parallelograms, so all squares have two pairs of parallel sides.
E. All rectangles are squares, so all rectangles have sides that are perpendicular.
F. All rhombuses are parallelograms, so all rhombuses have opposite angles with the same measure.

Unit 7: Geometry and the Coordinate Plane

In this unit, you will use geometry. You will become familiar with coordinate planes, ordered pairs, quadrants, and points. You will follow rules to create numerical patterns.

KEY TERMS

Numerical patterns: These are sequences of numbers that are created by following a set of rules, such as "add 5." Using the terms created by a rule, form and graph ordered pairs on a coordinate plane. A line can be generated from the pattern. (OA.3)

Ordered pairs: These are sets of numbers that are used to label the locations of points on the coordinate plane. Ordered pairs are written as (x, y). For example, (1, 2) represents an x-value of 1 and a y-value of 2. (OA.3)

Coordinate plane: Created by intersecting two perpendicular number lines at 0. (G.1)

Origin: The point on a coordinate plane where the number lines connect. The coordinates for the origin are (0, 0). (G.1)

***x*-axis:** The horizontal number line in a coordinate plane. (G.1)

***y*-axis:** The vertical number line in a coordinate plane. (G.1)

First quadrant: The portion of a coordinate plane that has values of 0 and greater for the x-axis and the y-axis. (G.1)

Point: This is a location on the coordinate plane that is labeled by the values of the x-coordinate and the y-coordinate. (G.1)

***x*-coordinate:** The value of a point on the x-axis, moving horizontally from the origin. (G.1)

***y*-coordinate:** The value of a point on the y-axis, moving vertically from the origin. For example, the point (2, 3) is 2 units to the right of the origin and 3 units up from the origin. (G.1)

Line: A line connects multiple points on the coordinate plane. (G.1)

Important Tips

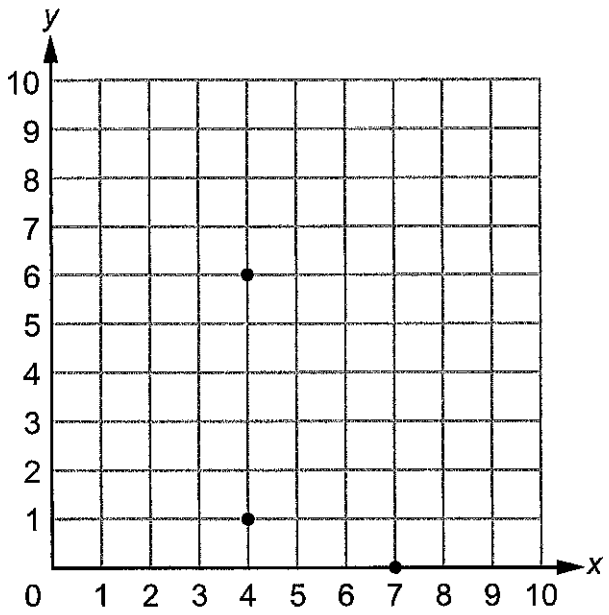
- An ordered pair lists the x-coordinate first and then the y-coordinate. When graphing a point using the ordered pair, move across the x-axis using the x-coordinate and then move up the y-axis using the y-coordinate.
- The coordinate plane can be used to represent real-world situations by graphing points and finding the values of the points as the points relate to the situation.

Item 24

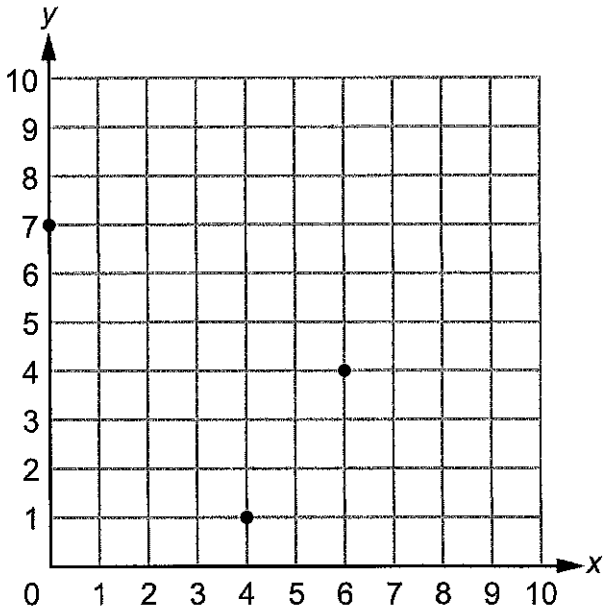
Selected-Response

Which graph shows the points (1, 4), (7, 0), and (4, 6)?

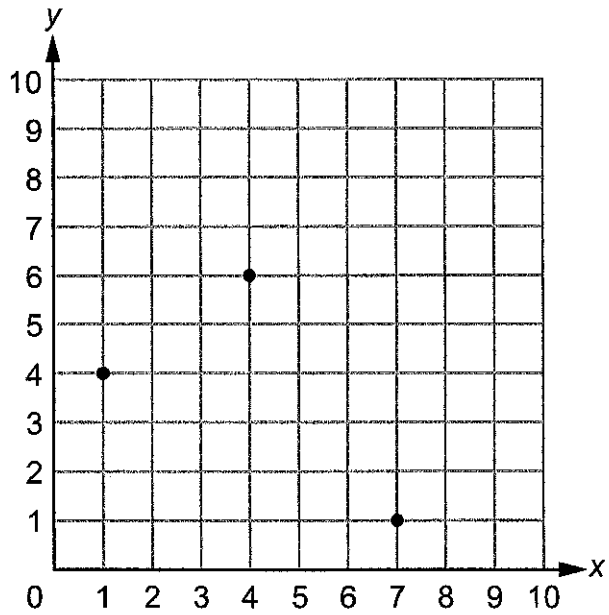
A.



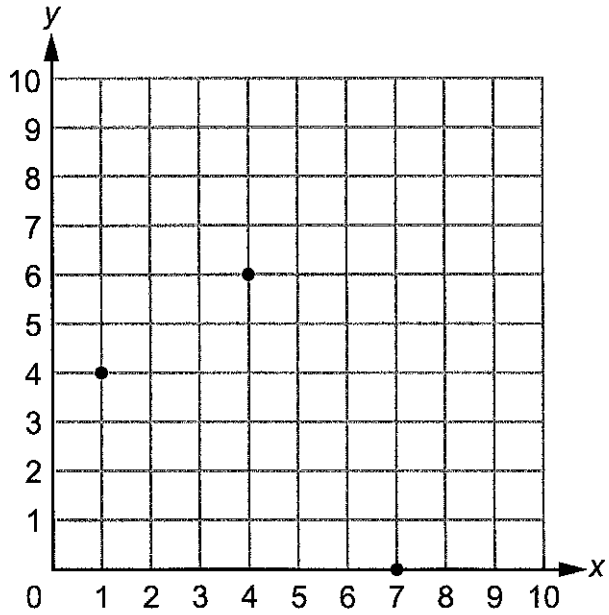
B.



C.



D.



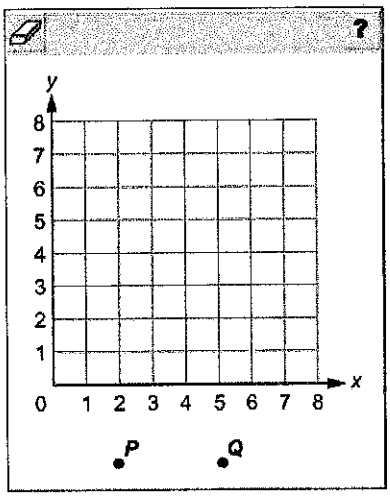
Item 25

Drag-and-Drop Technology-Enhanced

The coordinates of points *P* and *Q* are given.

- ***P*: (3, 4)**
- ***Q*: (5, 0)**

Move each point to the correct location on the coordinate grid.

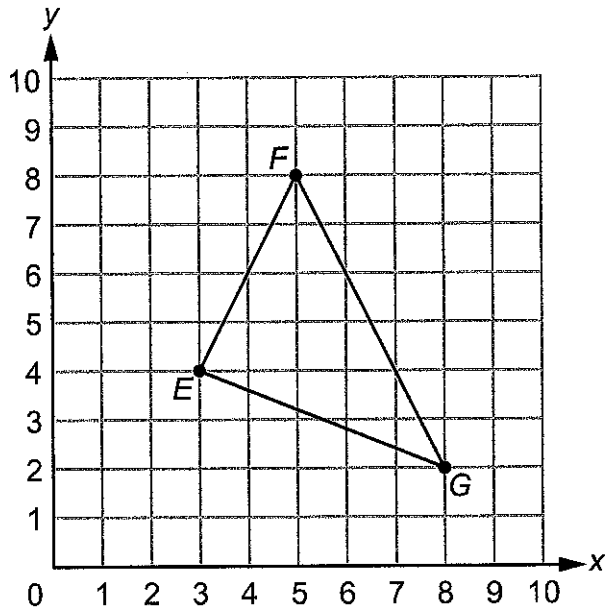


Use a mouse, touchpad, or touchscreen to move the labeled points onto the coordinate grid. Each labeled point may be used once.

Item 26

Selected-Response

Felipe made a triangle on a coordinate grid.



What are the coordinates for point *G*?

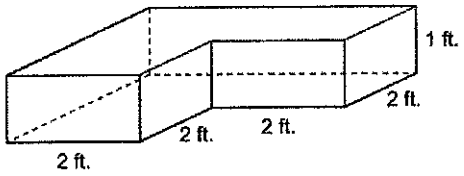
A. (3, 4)
B. (5, 8)
C. (8, 2)
D. (2, 8)

Item 27

Keypad-Input Multi-Part Technology-Enhanced

Part A

Ms. Mailee has a fish tank made up of rectangular prisms as shown.



Part A

What is the volume, in cubic feet, of the fish tank?

(Volume = Length × Width × Height)

1	2	3
4	5	6
7	8	9
0	.	$\frac{n}{d}$

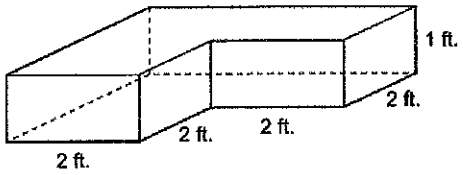
Use a mouse, touchpad, or touchscreen to enter a response.

Go on to the next page to finish item 27.

Item 27. *Continued.*

Part B

Ms. Mailee has a fish tank made up of rectangular prisms as shown.

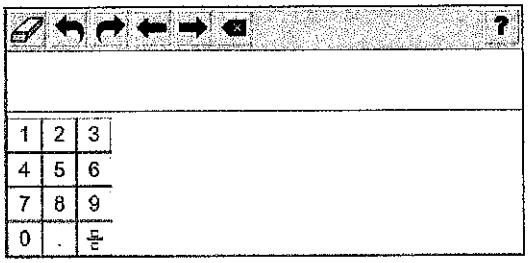


Part B

Ms. Diaz has a taller fish tank with the same base as Ms. Mailee's fish tank. The height of Ms. Diaz's fish tank is 2 feet.

What is the volume, in cubic feet, of Ms. Diaz's fish tank?

(Volume = Length × Width × Height)



Use a mouse, touchpad, or touchscreen to enter a response.

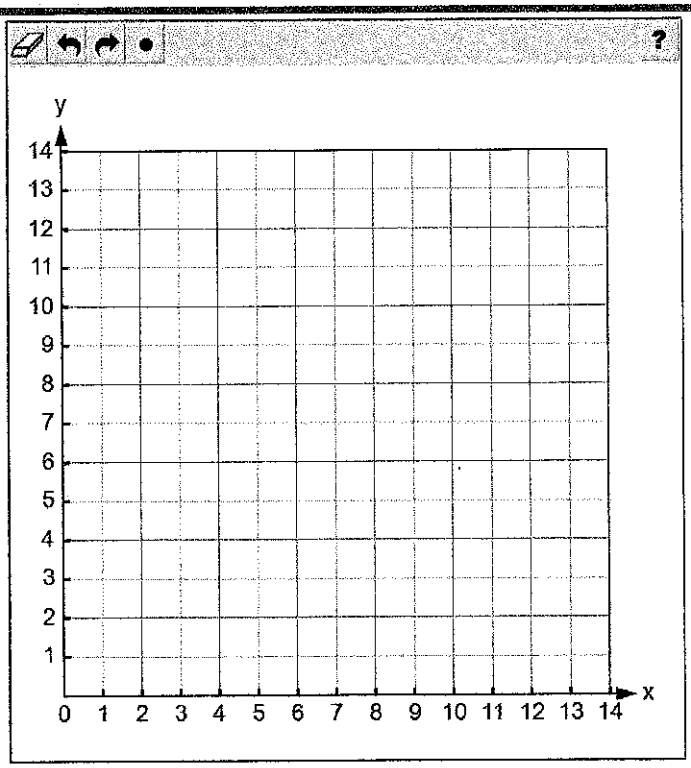
Item 28

Coordinate-Graph Technology-Enhanced

The table shows two patterns. Some values in the table are missing. The corresponding terms in the patterns can be used to form coordinates of points on the coordinate grid.

Plot the TWO points that represent the missing values in the table.

x	*y*
1	13
2	11
3	
4	7
5	5
6	
7	1



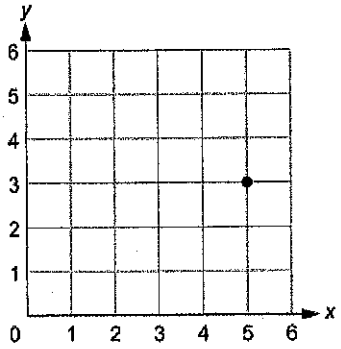
Use a mouse, touchpad, or touchscreen to plot points on the coordinate grid. At most 2 points can be plotted.

Item 29

Drop-Down Technology-Enhanced

Part A

The point on the coordinate grid shown represents the number of hours, x, Felix spent doing chores and the number of hours, y, he spent doing homework last week.



Part A

Use the drop-down menus to correctly interpret the coordinate of the point shown.

Felix spent [ ] hours doing homework and [ ] hours doing chores.

Use a mouse, touchpad, or touchscreen to click the arrow beside each of the two blank boxes. When you click the arrow, a drop-down menu will appear, showing you all the possible options for that blank. Each drop-down menu with its options is shown below.

Felix spent [ ] hours doing homework and [ ] hours doing chores.

3
5

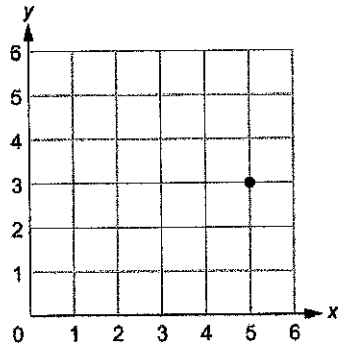
3
5

Go on to the next page to finish item 29.

Item 29. *Continued.*

Part B

The point on the coordinate grid shown represents the number of hours, x, Felix spent doing chores and the number of hours, y, he spent doing homework last week.



Part B

The week before, Felix spent the same total amount of time doing chores and homework. Felix only spent 1 hour doing chores that week.

What are the coordinates of the point for the week before?

Ⓐ (1, 7)

Ⓑ (3, 5)

Ⓒ (5, 3)

Ⓓ (7, 1)

Use a mouse, touchpad, or touchscreen to select a response.

MATHEMATICS ADDITIONAL SAMPLE ITEM KEYS

Item	Standard/ Element	DOK Level	Correct Answer	Explanation
1	MGSE5.OA.1	1	C	The correct answer is choice (C) (3 + 2) × (13 – 5). The order of operations requires that you solve the operations within the parentheses first, then multiply and divide from left to right, and then add and subtract from left to right. The values inside the two parentheses in (3 + 2) × (13 – 5) are 5 and 8, which are multiplied together for a product of 40. Choice (A) is incorrect because you multiply 2 by the difference within the parentheses, 8, which is 16. Next you add 3, which has a total value of 19. Choice (B) is incorrect because you must first multiply 2 × 13, which is 26. The order of operations requires that you add next, so 26 + 3 = 29. Finally, you subtract 29 – 5, which is 24. Choice (D) is incorrect because you first add 3 and 2, which is 5, and then multiply by 13 for a product of 65. Finally, you subtract, 65 – 5 = 60.
2	MGSE5.OA.2	2	Part A: C Part B: B	Part A: The correct answer is choice (C) (7 – 1) ÷ 1. Choices (A) and (D) are incorrect because they show the division as happening first. Choice (B) is incorrect because it shows the 3 divided by the difference. Part B: The correct answer is choice (B) multiply 4 by 2, then add 5. As the product is inside parentheses, it will happen before the addition. Choice (A) is incorrect because the addition does not happen first. Choice (C) is incorrect because 5 is not multiplied by 2. Choice (D) is incorrect because 4 is multiplied by 2, not added to 2.
3	MGSE5.OA.2	2	N/A	See scoring rubric and exemplar response on page 147.
4	MGSE5.NBT.1	3	N/A	See scoring rubric and exemplar response on page 148.
5	MGSE5.NBT.3	1	B	The correct answer is choice (B) 0.839. This is the decimal form for the given expression. Choice (A) is incorrect because it shows the decimal form for $8 \times \left(\frac{1}{100}\right) + 3 \times \left(\frac{1}{1000}\right) + 9 \times \left(\frac{1}{10000}\right)$. Choice (C) is incorrect because it shows the decimal form for $8 \times (1) + 3 \times \left(\frac{1}{10}\right) + 9 \times \left(\frac{1}{100}\right)$. Choice (D) is incorrect because it shows the decimal form for $8 \times (10) + 3 \times (1) + 9 \times \left(\frac{1}{10}\right)$.

Item	Standard/ Element	DOK Level	Correct Answer	Explanation
6	MGSE5.NBT.4	1	A	The correct answer is choice (A) 5.8. When rounding to the nearest tenth, use the digit in the hundredths place. If that digit is less than 5, round down. Since the digit 1 in 5.816 is less than 5, round down to 8 in the tenths place. Choice (B) is incorrect because the response shows 5.816 rounded to the nearest hundredth rather than the nearest tenth. Choice (C) is incorrect because it indicates rounding up to 9 tenths, rather than rounding down to 8 tenths. Choice (D) is incorrect because it indicates rounding to the nearest whole number rather than to the nearest tenth.
7	MGSE5.NBT.4	2	Part A: B/E Part B: D	Part A: The correct answers are choice (B) 5.762 and choice (E) 5.677. Choice (A) is incorrect because it rounds to 5.61 which is less than 5.67. Choice (C) is incorrect because it rounds to 5.67, which is equal to 5.67, not greater than it. Choice (D) is incorrect because it rounds to 5.10, which is less than 5.67. Part B: The correct answer is choice (D) 11.249. When 11.34 is rounded to the nearest tenth, it is 11.3, and when 11.249 is rounded to the nearest tenth, it is 11.2, which is less than 11.3. Choice (A) is incorrect because it rounds to 11.4, which is greater than 11.3. Choices (B) and (C) are incorrect because they round to 11.3, which is equal to 11.3.
8	MGSE5.NBT.4	1	N/A	See scoring rubric and exemplar response on page 149.
9	MGSE5.NBT.2	1	C	The correct answer is choice (C) 10^7. When you multiply by 10, each digit's value becomes 10 times as much. Choice (A) is incorrect because the product would be 54,200. Choice (B) is incorrect because the product would be 542,000. Choice (D) is incorrect because the product would be 54,200,000.
10	MGSE5.NBT.7	1	C	The correct answer is choice (C) 8.32. This response shows that the student multiplied correctly. Choice (A) is incorrect because the response indicates adding 6 + 0.22 + 0.012 instead of 6 + 2.2 + .12. Choice (B) is incorrect because the response indicates rounding 3.2 to 3 before multiplying. Choice (D) is incorrect because the response indicates rounding 2.6 to 3 before multiplying.
11	MGSE5.NBT.7	1	B	The correct answer is choice (B) 3. The student divided correctly and understood that in this case, the quotient is the number of equal groups. Choice (A) is incorrect because the response shows that the decimal portion of the number was not considered. Choices (C) and (D) are incorrect because they indicate the student misunderstood place value when dividing.

Item	Standard/ Element	DOK Level	Correct Answer	Explanation
12	MGSE5.NF.3	1	C	The correct answer is choice (C) $7\frac{1}{2}$ pounds. This response indicates that the student wrote the division as a fraction, $\frac{60}{8}$, and evaluated the expression. Choice (A) is incorrect because the response indicates the student reversed the dividend and divisor. Choice (B) is incorrect because the response indicates the student subtracted 8 before dividing. Choice (D) is incorrect because the response indicates the student added 8 before dividing.
13	MGSE5.NF.1	1	C	The correct answer is choice (C) $\frac{23}{24}$. This response shows that the mixed number was made into an improper fraction, $\frac{13}{8}$, and a common denominator, 24, was found for the minuend and subtrahend. Choice (A) is incorrect because the response indicates an error was made when the mixed number was changed to an improper fraction. Choice (B) is incorrect because the response shows $\frac{2}{3}$ multiplied by $\frac{8}{8}$. Choice (D) is incorrect because the response indicates the student did not find a common denominator and just subtracted the numerators and denominators separately.
14	MGSE5.NF.4	1	D	The correct answer is choice (D) $4 \times \frac{3}{4} = \frac{12}{4} = 3$. This response shows that the total of 4 groups of $\frac{3}{4}$ is 3. Choice (A) is incorrect because it finds how much of the circles are not shaded. Choice (B) is incorrect because it shows the numerators added instead of multiplied. Choice (C) is incorrect because it shows the numerator of the first fraction multiplied by the denominator of the second.
15	MGSE5.NF.5	2	N/A	See scoring rubric and exemplar response on page 150.

Item	Standard/ Element	DOK Level	Correct Answer	Explanation
16	MGSE5.G.3	1	C	The correct answer is choice (C). This shape is a rectangle. It has four right angles. Choice (A) is incorrect because this quadrilateral is a trapezoid with no right angles. Choice (B) is incorrect because this quadrilateral is a trapezoid with only two right angles. Choice (D) is incorrect because it is a right triangle, which has only one right angle.
17	MGSE5.G.3	1	C	The correct answer is choice (C) Both figures always have two pairs of parallel sides. Choice (A) is incorrect because it does not take into account that rhombuses do not always have four right angles. Choice (B) is incorrect because it does not take into account that rectangles do not always have four sides of equal length. Choice (D) is incorrect because it does not take into account that both figures have two pairs of parallel sides.
18	MGSE5.MD.2	2	D	The correct answer is choice (D) 5 in. The three longest insects are $1\frac{1}{2}$, $1\frac{3}{4}$, and $1\frac{3}{4}$, so add those together to get the total length. Choice (A) is incorrect because it is only the sum of only the insects that are $\frac{3}{4}$ in. Choice (B) is incorrect because there are not just three 1-inch insects. Choice (C) is incorrect because it adds only the top three lengths, not accounting for how many there are in each length.
19	MGSE5.MD.2	2	N/A	See scoring rubric and exemplar response on page 151.
20	MGSE5.MD.2	3	N/A	See scoring rubric and exemplar response beginning on page 152.
21	MGSE5.MD.5	1	D	The correct answer is choice (D) 48. The response shows that the student correctly multiplied the length, width, and height to find the volume, or that the student counted rows and columns of unit cubes. Choices (A), (B), and (C) are incorrect because each is the result of multiplying only two of the dimensions, which results in the area of a side, not the volume of the prism.
22	MGSE5.MD.5b	2	A/B/E	The correct answers are choices (A), (B), and (E). Choice (A) has a volume of 540, choice (B) has a volume of 504, and choice (E) has a volume of 512. Choice (C) is incorrect because the volume is 480, which is less than 500 and too small for Greg's shed. Choice (D) is incorrect because the volume is 648, which is greater than 600 and too big for Greg's shed. Choice (F) is incorrect because the volume is 432, which is less than 500 and too small for Greg's shed.

Item	Standard/ Element	DOK Level	Correct Answer	Explanation
23	MGSE5.G.3	3	A/D/F	The correct answer is choices (A), (D), and (F). Choice (A) is correct because squares are a subset of rectangles and all rectangles have four right angles. Choice (D) is correct because squares are a subset of parallelograms and all parallelograms have two pairs of parallel sides. Choice (F) is correct because rhombuses are a subset of parallelograms and all parallelograms have opposite angles that are congruent. Choice (B) is incorrect because squares are not a subset of rhombuses. Choice (C) is incorrect because rectangles are not a subset of rhombuses. Choice (E) is incorrect because rectangles are not a subset of squares.
24	MGSE5.G.2	1	D	The correct answer is choice (D). Choice (A) is incorrect because the response shows a graph with the point (4, 1) rather than (1, 4). Choice (B) is incorrect because the response shows a graph with the points (4, 1), (0, 7), and (6, 4) rather than (1, 4), (7, 0), and (4, 6). Choice (C) is incorrect because the response shows a graph with the point (7, 1) rather than (7, 0).
25	MGSE5.G.1	3	N/A	See scoring rubric and exemplar response on page 154.
26	MGSE5.G.2	1	C	The correct answer is choice (C) (8, 2). To locate coordinates for a point on a coordinate plane, start at (0, 0), move across the *x*-axis, and then move up or down the *y*-axis. To get to point *G*, first move across 8 and then move up 2. Choice (A) is incorrect because its coordinates show the location for point *E*. Choice (B) is incorrect because its coordinates show the location for point *F*. Choice (D) is incorrect because it reverses the *x*- and *y*-coordinates, showing a movement across 2 and then up 8, which would locate a point at a different location than point *G*.
27	MGSE5.MD.5	3	N/A	See scoring rubric and exemplar response beginning on page 155.
28	MGSE5.OA.3	2	N/A	See scoring rubric and exemplar response on page 157.
29	MGSE5.G.2	3	N/A	See scoring rubric and exemplar response on page 158.