Mathematics

Forward Exam Practice Test Grade 6

Wisconsin Forward Exam
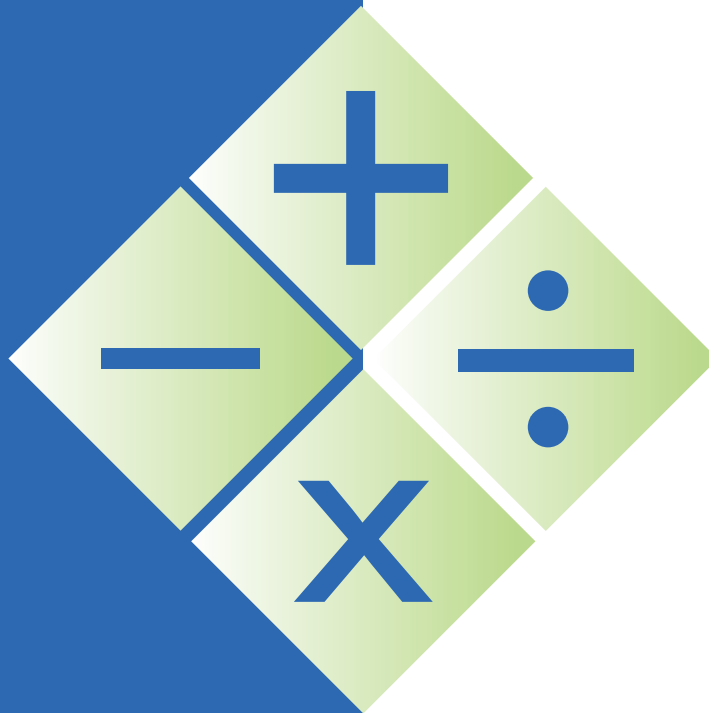
WISCONSIN DEPARTMENT OF
Public Instruction

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MATHEMATICS NON-CALCULATOR ITEMS—SESSION 1

Answer the items below. A calculator **may not** be used to assist with calculations necessary to answer items in Session 1.

1. Talia is converting 4 hours to seconds. She uses the expression shown to correctly convert hours to minutes.

$$4 \text{ hours} \times \frac{60 \text{ minutes}}{1 \text{ hour}}$$

Which ratio can be multiplied by the result of Talia's expression to determine the number of **seconds** in 4 hours?

A. $\dfrac{1 \text{ minute}}{60 \text{ seconds}}$

B. $\dfrac{1 \text{ hour}}{3,600 \text{ seconds}}$

C. $\dfrac{60 \text{ seconds}}{1 \text{ minute}}$

D. $\dfrac{3,600 \text{ seconds}}{1 \text{ hour}}$

Go on to the next page.

2. Write each expression in a box so that the values of the expressions are in order from least to greatest.

least		greatest

2^4 $4(5^2)$ 9^2

3. Isabel drank 6 cups of water in 9 hours. At this same rate, how many hours will Isabel need to drink 9 cups of water?

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4. Pedro purchased a rectangular piece of land that is $\frac{5}{6}$ mile long and has an area of $\frac{5}{8}$ square mile. How wide, in miles, is Pedro's piece of land?

A. $\frac{5}{24}$

B. $\frac{3}{4}$

C. $\frac{25}{48}$

D. $1\frac{11}{24}$

5. An algebraic expression is shown.

$$5(3 + 4y)$$

A student writes an equivalent expression as $15 + \square y$. What is the missing value in the student's expression?

6. A recreation center offers an art class and a fitness class over the summer. Both classes are held at the same time each day. There are 15 students enrolled in the art class and 25 students enrolled in the fitness class. Select the **two** statements that are true.

   Select **two** options.

   A. The ratio of students enrolled in the art class to students enrolled in both classes is 3:5.

   B. The ratio of students enrolled in both classes to students enrolled in the art class is 8:3.

   C. The ratio of students enrolled in the fitness class to students enrolled in both classes is 3:8.

   D. The ratio of students enrolled in the art class to students enrolled in the fitness class is 3:5.

   E. The ratio of students enrolled in the fitness class to students enrolled in the art class is 3:5.

7. Which expression matches the phrase "4 less than the quotient of x and 10"?

   A. $\frac{x}{10} - 4$

   B. $\frac{10}{x} - 4$

   C. $4 - \frac{x}{10}$

   D. $4 - \frac{10}{x}$

Go on to the next page.

8. Adam buys a shirt at a store. The regular price of the shirt is $24. The shirt is on sale for 15% off the regular price. What is the sale price, in dollars, of the shirt?

9. Andre used the equation shown to find the volume, V, of a cube with edge lengths of $\frac{3}{4}$ foot.

$$\left(\frac{3}{4}\right)^3 = V$$

What is the volume, in cubic feet, of the cube?

A. $\frac{27}{64}$

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

C. $\frac{9}{12}$

D. $\frac{9}{4}$

Go on to the next page.

10. Steve runs a window washing business. The table shows the amounts of time, in minutes, it takes Steve to wash different numbers of windows. He washes every window in the same amount of time.

Steve's Window Washing

Windows Washed	1	2	4	6	8
Time (minutes)	?	5	10	15	20

How many minutes does it take Steve to wash 1 window?

A. 0

B. 1

C. 1.5

D. 2.5

11. An egg weighs 14.71 grams. Another egg weighs 10.08 grams. How much heavier, in grams, is the first egg than the second egg?

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12. Sameera took a trip on a train. On the first day of the trip, the train traveled 455 miles in 7 hours at a constant rate. On the second day, the train traveled 348 miles in 6 hours at a constant rate. Which statement is true?

    A.   The train traveled at a faster rate on the first day because the train traveled a greater distance on the first day.

    B.   The train traveled at a faster rate on the first day because the ratio of miles to hours is greater for the first day.

    C.   The train traveled at a faster rate on the second day because the train traveled for less time on the second day.

    D.   The train traveled at a faster rate on the second day because the ratio of miles to hours is greater for the second day.

13. An expression is shown.

$4^3 + 5^3$

What is the value of the expression?

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14. A school cafeteria sells pizza slices and cheeseburgers. On Monday, the cafeteria sold 120 pizza slices and 40 cheeseburgers. Use the numbers below the blank lines to complete the statement about what the cafeteria sold on Monday.

On Monday, the ratio of pizza slices sold to cheeseburgers sold was _____ to _____.

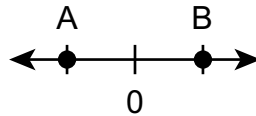|	
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10

STOP.

STOP

**STOP.**

MATHEMATICS CALCULATOR ITEMS—SESSION 2

Answer the items below. A calculator **may** be used to assist with calculations necessary to answer items in Session 2.

1. Points A and B are the same distance from 0 on a number line.

Which statement **best** describes the point that could represent ⁻5?

A. Point A could represent ⁻5 because ⁻5 < 0, so ⁻5 is to the left of 0 on a number line.

B. Point B could represent ⁻5 because ⁻5 < 0, so ⁻5 is to the right of 0 on a number line.

C. Point A could represent ⁻5 because ⁻5 > 0, so ⁻5 is to the left of 0 on a number line.

D. Point B could represent ⁻5 because ⁻5 > 0, so ⁻5 is to the right of 0 on a number line.

2. To go on a waterslide at a park, a child must be more than 5 years old. Graph an inequality on the number line to show all the possible ages of a child who can go on the waterslide.
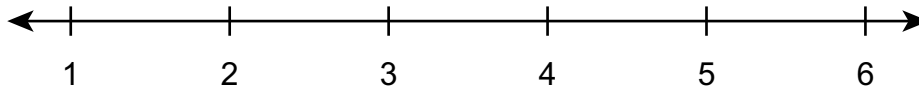
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3. On a rectangular wall, Terry paints a picture of a road. A picture of Terry's painting is shown. All measurements are in feet (ft).
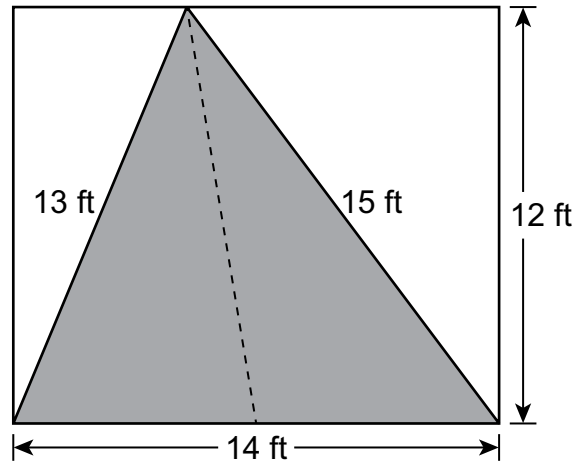
What is the area, in square feet, of the road in Terry's painting?

A. 42

B. 84

C. 105

D. 168

4. Point A is located at ($^-$5, 3) in the coordinate plane. Point B is a reflection of point A over the *x*-axis. What is the *x*-coordinate of point B?

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5. Nikki collects data during a hike on some trails in the woods by her home. Match each data measure to the appropriate unit of measure.

the average height of each tree		hours
the length of all the trails in the woods		feet
the median time needed to hike an entire trail		miles

6. Christine adopts a puppy. She records the initial weight of the puppy when she adopts it on a Saturday morning. Then, each Saturday morning after that, she records a value that shows the change in the puppy's weight from the previous Saturday morning. Select the **two** statements about the values Christine records that must be true.

Select **two** options.

A. Two positive recorded values in a row means the puppy's weight has doubled in the course of two weeks.

B. A negative recorded value means the puppy lost weight from one Saturday morning to the next Saturday morning.

C. Every recorded value will be positive because the number of days Christine has owned the puppy is always increasing.

D. A recorded value of 0 means the puppy's weight did not change from one Saturday morning to the next Saturday morning.

E. A positive recorded value followed by a negative recorded value means the puppy's weight has not changed for two weeks.

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7. An inequality is shown.

$$3x - 12 > 6$$

For each value of x in the table, determine whether it is a solution for the inequality shown.

	Solution	Not a Solution
$x = 12$		
$x = 6$		

8. A fish tank is filled $\frac{3}{4}$ full of water. The tank measures $18\frac{1}{2}$ inches long, 16 inches wide, and $12\frac{1}{2}$ inches high. What is the volume, in cubic inches, of the water in the tank?

A. 2,592

B. 2,775

C. 3,700

D. 3,952

9. Chad made a deposit of $40 into his bank account. The balance of his bank account after the deposit was less than $0. Which statement about the balance of Chad's account before the deposit is correct?

A. The bank account balance was at least ⁻$40 before the deposit.

B. The bank account balance was less than ⁻$40 before the deposit.

C. The bank account balance was between ⁻$40 and $0 before the deposit.
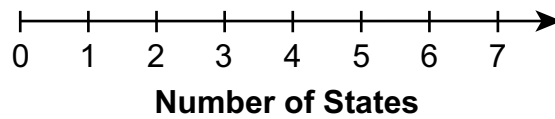
D. The bank account balance was $0 before the deposit.

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10. The list shows the numbers of states that some students have been to while traveling.

6, 7, 5, 1, 5, 2, 7, 3

Create a dot plot to represent the data in the list.

```
|——+——+——+——+——+——+——+——+——→
  0   1   2   3   4   5   6   7
```
Number of States

11. Amy earns $12.50 per hour at her work. She earned a total of $312.50 last week. Write an equation that could be used to find the number of hours, *h*, that Amy worked last week.

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│                 │
│                 │
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12. Points A, B, C, and D are shown on the graph.
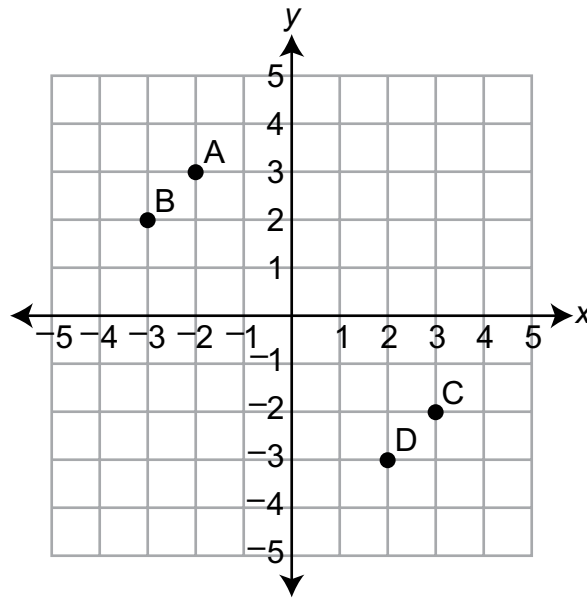
Which point is located at (3, ⁻2)?

A. Point A

B. Point B

C. Point C

D. Point D

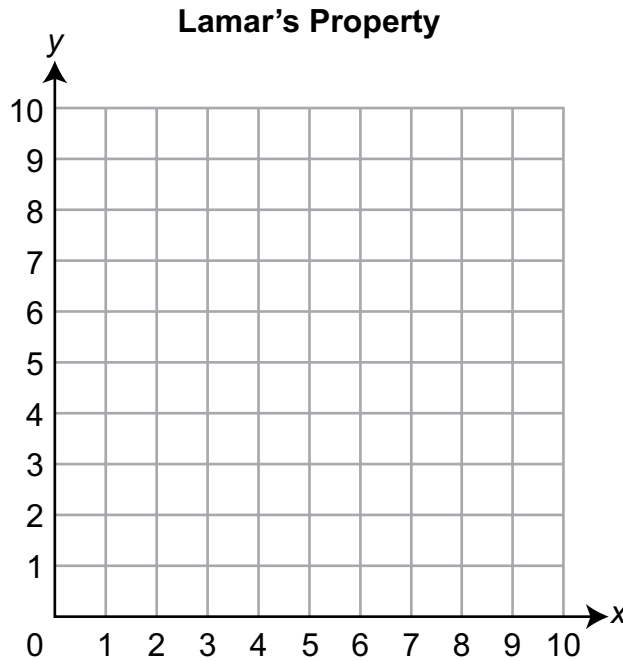**13.** Lamar owns property that is shaped like a rectangle. The locations of three of the corners of his property can be plotted as points on a coordinate grid using the following ordered pairs.

$$(1, 1), (1, 8), (8, 1)$$

Plot the ordered pairs given and the missing corner of the rectangle, and connect the points with line segments to create the shape of Lamar's property.

Lamar's Property

14. Ben rides his bike at an average speed of 15 miles per hour. Which equation could Ben use to find the distance, d, in miles, he has traveled after biking for t hours?

A. $d = 15t$

B. $t = 15d$

C. $d = 15 + t$

D. $t = 15 + d$

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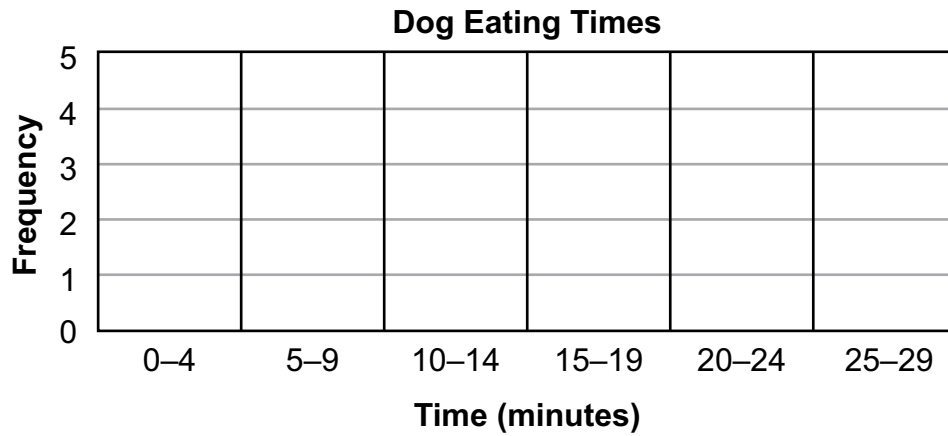
15. Cody records the time, in minutes, it takes his dog to eat its food each day for 14 days. His data are shown.

1, 1, 2, 3, 5, 6, 8, 12, 15, 19, 20, 22, 22, 29

Create a histogram to represent Cody's data.

Dog Eating Times

Frequency						
0–4	5–9	10–14	15–19	20–24	25–29

Time (minutes)

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16. An engineer is graphing the location of each end of a pipe on a coordinate plane. The location of one end of the pipe is shown as point P on the coordinate plane.
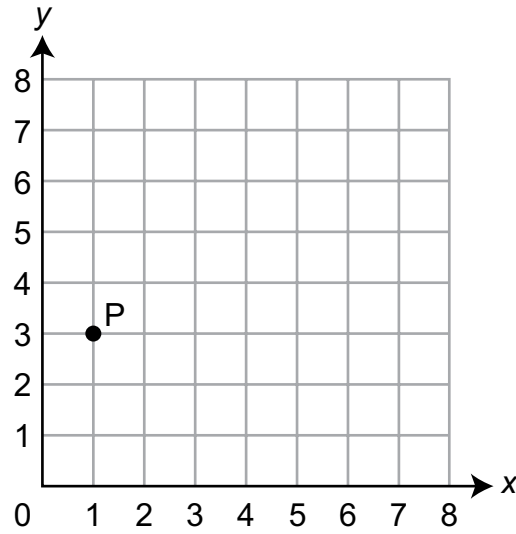
Each square on the coordinate plane has an area of 1 square foot. The length of the pipe is 7 feet. The *y*-coordinate of the location of the other end of the pipe is 3. What is the *x*-coordinate of the location of the other end of the pipe?

A.   1

B.   7

C.   8

D.   10

STOP.

STOP

STOP.

MATHEMATICS—APPENDIX

SUMMARY DATA—GRADE 6, SESSION 1

Number 1	
Alignment	M.6.RP.A.3d
Depth of Knowledge	2
Key(s)	C
Points	1
Annotations	The question asks the student to identify a ratio that can be used to change minutes to seconds. A. Incorrect. The student used a ratio for converting seconds to minutes. B. Incorrect. The student used a ratio for converting seconds to hours. C. Correct. The student chose the ratio that can be used to convert minutes to seconds because the given expression already converts hours to minutes. D. Incorrect. The student used a ratio for converting hours to seconds.

Number 2	
Alignment	M.6.EE.A.1
Depth of Knowledge	2
Key(s)	See Annotations
Points	1
Annotations	The question asks the student to evaluate numerical expressions involving whole-number exponents and then order the values from least to greatest. To receive full credit, the student must drag the three expressions into the correct order, as shown. 2^4 (least) 9^2 $4(5^2)$ (greatest) When evaluated, 2 to the power of 4 is 16, 9 to the power of 2 is 81, and 4 times 5 to the power of 2 is 100.

Number 3	
Alignment	M.6.RP.A.3b
Depth of Knowledge	2
Key(s)	13.5
Points	1
Annotations	The question asks the student to use a rate to solve a problem. To receive full credit, the student must enter 13.5 or an equivalent value.

Number 4	
Alignment	M.6.NS.A.1
Depth of Knowledge	2
Key(s)	B
Points	1
Annotations	The question asks the student to determine the width of a rectangle. A. Incorrect. The student subtracts $\frac{5}{8}$ from $\frac{5}{6}$. B. Correct. The student divides $\frac{5}{8}$ by $\frac{5}{6}$. C. Incorrect. The student multiplies $\frac{5}{8}$ and $\frac{5}{6}$. D. Incorrect. The student adds $\frac{5}{8}$ and $\frac{5}{6}$.

Number 5	
Alignment	M.6.EE.A.3
Depth of Knowledge	2
Key(s)	20
Points	1
Annotations	The question asks the student to rewrite an algebraic expression by using the distributive property. To receive full credit, the student must enter 20 or an equivalent value. Using the distributive property, the student can multiply 5 by both terms in the expression $3 + 4y$. Multiplying 5 by $4y$ equals $20y$.

Number 6	
Alignment	M.6.RP.A.1
Depth of Knowledge	2
Key(s)	B, D
Points	2
Annotations	The question asks the student to determine ratios from a problem situation. To receive full credit, the student must select both choices B and D. One point will be given for selecting either choice B or choice D but not both. A. Incorrect. The ratio 3:5 represents the ratio of students enrolled in the art class to students enrolled in the fitness class. B. Correct. There are a total of 40 students enrolled in the two classes, so the ratio of students enrolled in the two classes to students enrolled in the art class is 40:15, for which an equivalent ratio is 8:3. C. Incorrect. The ratio 3:8 represents the ratio of students enrolled in the art class to students enrolled in the two classes. D. Correct. The ratio of students enrolled in the art class to students enrolled in the fitness class is 15:25, which reduces to 3:5. E. Incorrect. The ratio 3:5 represents the ratio of students enrolled in the art class to students enrolled in the fitness class and not the other way around.

Number 7	
Alignment	M.6.EE.A.2a
Depth of Knowledge	2
Key(s)	A
Points	1
Annotations	The question asks the student to create a variable expression from its word form. A. Correct. The phrase "4 less than" means to subtract 4 from a value. The value is "the quotient of x and 10," which is represented by dividing x by 10. B. Incorrect. The student reversed the dividend and divisor in the quotient. C. Incorrect. The student subtracted the quotient from 4. D. Incorrect. The student subtracted the quotient from 4 and reversed the dividend and divisor in the quotient.

Number 8	
Alignment	M.6.RP.A.3c
Depth of Knowledge	2
Key(s)	20.40
Points	1
Annotations	The question asks the student to determine a price after a discount is applied. To receive full credit, the student must enter 20.40 or an equivalent value. To determine the price after a 15% discount is applied, the student can multiply the regular price by the percent discount and then subtract this value from the regular price or the student can subtract 0.15 from 1.00 and multiply the regular price by 0.85.

Number 9	
Alignment	M.6.EE.A.2c
Depth of Knowledge	1
Key(s)	A
Points	1
Annotations	The question asks the student to determine the volume of a cube. A. Correct. The student calculates $\frac{3}{4} \times \frac{3}{4} \times \frac{3}{4}$. B. Incorrect. The student calculates $\frac{3}{4} \times \frac{3}{4}$. C. Incorrect. The student multiplies both the numerator and the denominator by 3. D. Incorrect. The student multiplies $\frac{3}{4}$ by 3.

Number 10	
Alignment	M.6.RP.A.3a
Depth of Knowledge	2
Key(s)	D
Points	1
Annotations	The question asks the student to determine a unit rate. A. Incorrect. The student uses the pattern of the *y*-values in the table without noticing the *x*-value does not change by the same amount. B. Incorrect. The student interprets the situation to start at 1 minute. C. Incorrect. The student incorrectly divides 5 by 2. D. Correct. The student correctly identifies the unit rate.

Number 11	
Alignment	M.6.NS.B.3
Depth of Knowledge	1
Key(s)	4.63
Points	1
Annotations	The question asks the student to determine the difference between two weights. To receive full credit, the student must enter 4.63 or an equivalent value. To find how much heavier the first egg is than the second egg, the student must subtract the weight of the second egg from the weight of the first egg.

Number 12	
Alignment	M.6.RP.A.3b
Depth of Knowledge	2
Key(s)	B
Points	1
Annotations	The question asks the student to compare two rates. A. Incorrect. The student thought the train traveled for the same amount of time on each day. B. Correct. The student correctly determined that the rate on the first day, 65 mph, is greater than the rate on the second day, 58 mph. C. Incorrect. The student thought the train traveled the same distance on each day. D. Incorrect. The student incorrectly calculated the rate on one or both of the days.

Number 13	
Alignment	M.6.EE.A.1
Depth of Knowledge	1
Key(s)	189
Points	1
Annotations	The question asks the student to evaluate an exponential expression. To receive full credit, the student must enter 189 or an equivalent value. To determine the value of the expression, the student must add the product of 4 × 4 × 4 to the product of 5 × 5 × 5. The sum of the two products, 64 and 125, is 189.

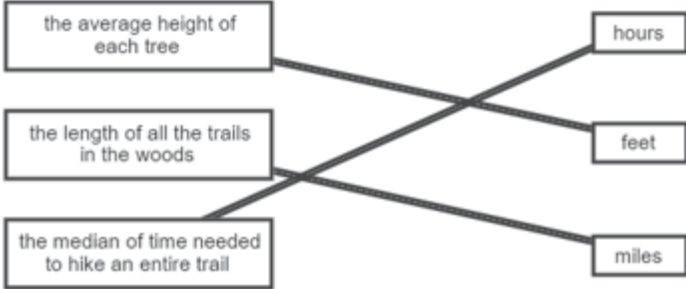| Number 14	
Alignment	M.6.RP.A.2
Depth of Knowledge	2
Key(s)	See Annotations
Points	1
Annotations	The question asks the student to determine a ratio from a problem situation. To receive full credit, the student can choose "3" in the first drop-down menu and choose "1" in the second drop-down menu. OR The student can choose "6" in the first drop-down menu and choose "2" in the second drop-down menu. OR The student can choose "9" in the first drop-down menu and choose "3" in the second drop-down menu.

SUMMARY DATA—GRADE 6, SESSION 2

Number 1	
Alignment	M.6.NS.C.7a
Depth of Knowledge	1
Key(s)	A
Points	1
Annotations	The question asks the student to determine the location of a number on a number line. A. Correct. The student chooses point A because it is to the left of 0 on the number line. B. Incorrect. The student places ⁻5 to the right of 0 on a number line. C. Incorrect. The student interprets a greater-than sign as a less-than sign. D. Incorrect. The student interprets a greater-than sign as a less-than sign and places ⁻5 to the right of 0 on a number line.

Number 2	
Alignment	M.6.EE.B.8
Depth of Knowledge	2
Key(s)	See Annotations
Points	1
Annotations	The question asks the student to represent a solution to a real-world inequality problem on a number line. To receive full credit, the student must place an open point at 5 and use a right line extension, as shown.

Number 3	
Alignment	M.6.G.A.1
Depth of Knowledge	2
Key(s)	B
Points	1
Annotations	The question asks the student to determine the area of a triangle.
	A. Incorrect. The student calculates the perimeter of the triangle.
	B. Correct. The student uses the area formula of a triangle, $A = \frac{1}{2}bh$.
	C. Incorrect. The student uses 15 as the height of the triangle.
	D. Incorrect. The student calculates the area of the rectangle.

Number 4	
Alignment	M.6.NS.C.6b
Depth of Knowledge	2
Key(s)	$^-5$
Points	1
Annotations	The question asks the student to determine one of the coordinates of a point after a reflection.
	To receive full credit, the student must enter $^-5$ or an equivalent value.
	When reflecting across the *x*-axis, the *x*-coordinate will remain the same.

Number 5	
Alignment	M.6.SP.B.5b
Depth of Knowledge	1
Key(s)	See Annotations
Points	1
Annotations	The question asks the student to summarize numerical data in relation to their context by describing how the data were measured and the units of measure. To receive full credit, the student must correctly match all the measures on the left to the units on the right, as shown.

Number 6	
Alignment	M.6.NS.C.5
Depth of Knowledge	2
Key(s)	B, D
Points	2
Annotations	The question asks the student to analyze a problem situation. To receive full credit, the student must select choices B and D. To receive partial credit, the student must select either choice B or choice D. A. Incorrect. The student assumed the values are twice as big without knowing the specific values. B. Correct. The values represent the change in the puppy's weight, so a negative value would mean the puppy's current weight is less than the previous weight. C. Incorrect. The student assumed the puppy would be gaining weight every week. D. Correct. If the difference between the puppy's weight from one week to the next is 0, then the weight of the puppy is the same for both weeks. E. Incorrect. The student assumed the size of the positive and negative values were the same without knowing the specific values.

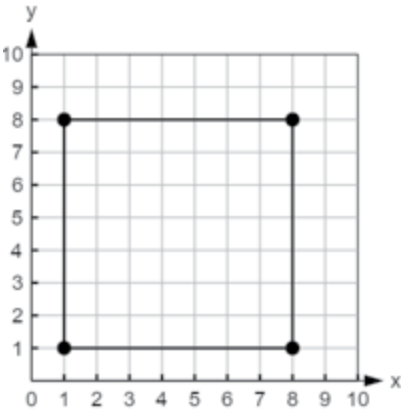| Number 7	
Alignment	M.6.EE.B.5
Depth of Knowledge	1
Key(s)	See Annotations
Points	1
Annotations	The question asks the student to determine whether given values are solutions to an inequality. To receive full credit, the student must select "Solution" for $x = 12$ and "Not a Solution" for $x = 6$. When 12 is substituted for x in the given inequality, the resulting expression, $24 > 6$, is true, which means $x = 12$ is a solution to the inequality. When 6 is substituted for x in the given inequality, the resulting expression, $6 > 6$, is not true, which means $x = 6$ is not a solution to the inequality.

Number 8	
Alignment	M.6.G.A.2
Depth of Knowledge	2
Key(s)	B
Points	1
Annotations	The question asks the student to determine the volume of a rectangular prism. A. Incorrect. The student ignored the fractional part of the measurements of the fish tank when calculating the volume. B. Correct. The student correctly multiplied $18\frac{1}{2} \times 16 \times 12\frac{1}{2} \times \frac{3}{4}$. C. Incorrect. The student calculated the total volume of the fish tank and not the volume of the water in the fish tank. D. Incorrect. The student rounded the fractional side lengths to the nearest whole numbers and found the total volume of the fish tank by using those numbers.

Number 9	
Alignment	M.6.NS.C.7d
Depth of Knowledge	2
Key(s)	B
Points	1
Annotations	The question asks the student to analyze a problem situation involving negative numbers. A. Incorrect. The student chose a starting balance that would result in a balance of $0 or more after the deposit. B. Correct. For the balance to be less than $0 after adding $40, the starting balance must be less than −$40. C. Incorrect. The student chose a starting balance that would result in a balance between $0 and $40 after the deposit. D. Incorrect. The student chose a starting balance that would result in a balance that would be greater than $0.
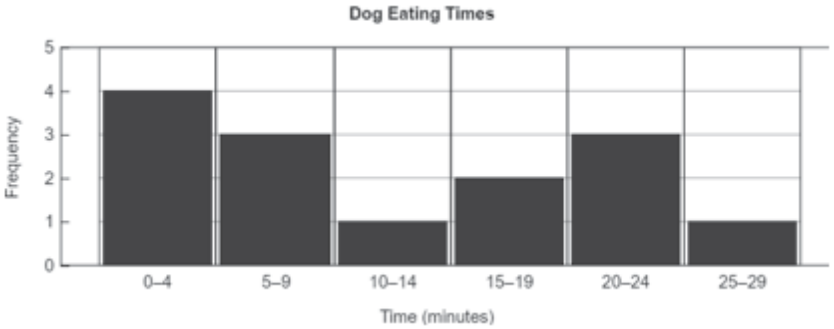
Number 10	
Alignment	M.6.SP.B.4
Depth of Knowledge	1
Key(s)	See Annotations
Points	1
Annotations	The question asks the student to display numerical data as a dot plot on a number line. To receive full credit, the student must have the correct number of dots at each number on the number line, as shown. **Number of States**

Number 11	
Alignment	M.6.EE.B.7
Depth of Knowledge	2
Key(s)	See Annotations
Points	1
Annotations	The question asks the student to write an equation from a word problem. To receive full credit, the student must enter $12.5h = 312.50$ or an equivalent equation.

Number 12	
Alignment	M.6.NS.C.6c
Depth of Knowledge	1
Key(s)	C
Points	1
Annotations	The question asks the student to identify a point on a coordinate grid. A. Incorrect. The student selected the point at $(-2, 3)$. B. Incorrect. The student selected the point at $(-3, 2)$. C. Correct. The student selected the point at $(3, -2)$. D. Incorrect. The student selected the point at $(2, -3)$.

Number 13	
Alignment	M.6.G.A.3
Depth of Knowledge	2
Key(s)	See Annotations
Points	1
Annotations	The question asks the student to plot ordered pairs on a coordinate grid. To receive full credit, the student must plot the points correctly at (1, 1), (1, 8), (8, 1), and (8, 8) and connect the points with line segments. Lamar's Property

Number 14	
Alignment	M.6.EE.C.9
Depth of Knowledge	1
Key(s)	A
Points	1
Annotations	The question asks the student to represent a situation with an equation. A. Correct. The student multiplies the rate of change, 15 miles per hour, by the number of hours, t. B. Incorrect. The student multiplies the rate of change, 15 miles per hour, by the distance traveled, d. C. Incorrect. The student adds the rate of change, 15 miles per hour, to the number of hours, t. D. Incorrect. The student adds the rate of change, 15 miles per hour, to the distance traveled, d.

Number 15	
Alignment	M.6.SP.B.4
Depth of Knowledge	1
Key(s)	See Annotations
Points	1
Annotations	The question asks the student to create a histogram to represent data. To receive full credit, the student must choose a frequency of 4 for 0–4 minutes, 3 for 5–9 minutes, 1 for 10–14 minutes, 2 for 15–19 minutes, 3 for 20–24 minutes, and 1 for 25–29 minutes.

Number 16	
Alignment	M.6.NS.C.8
Depth of Knowledge	2
Key(s)	C
Points	1
Annotations	The question asks the student to determine the *x*-coordinate of a point on a coordinate plane based on a problem situation. A. Incorrect. The student chose a point that would have the same *x*-coordinate but wouldn't have the same *y*-coordinate. B. Incorrect. The student chose the length of the pipe without placing one end of the pipe on the given point. C. Correct. The other end of the pipe is 7 units to the right of point P because they have the same *y*-coordinates. D. Incorrect. The student chose a point 7 units above point P.

Mathematics
Practice Test
Grade 6