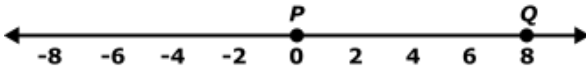


Directions: Answer the following question(s).

- 1 Which of the following statements is correct based on the number line below?



- A. $\sqrt{68}$ is to the right of Point Q because it is less than 8.
- B. $\sqrt{68}$ is between points P and Q because it is less than 0 and greater than 8.
- C. $\sqrt{68}$ is between points P and Q because it is greater than 0 and less than 8.
- D. $\sqrt{68}$ is to the right of Point Q because it is greater than 8.

Master ID: 3212383 Revision: 1

Correct: D

Rationale:

- A. Student(s) may have correctly determined that $\sqrt{68}$ is to the right of point Q , but they may have misidentified the reason why.
- B. Student(s) may have mixed up the positions of "greater than" and "less than" in the statement when mistakenly determining that $\sqrt{68}$ is less than 8, but they may have correctly determined what this would have meant.
- C. Student(s) may have mistakenly determined that $\sqrt{68}$ is less than 8, but they may have correctly determined what this would have meant.
- D. Correct answer

Rubric: 1 Point(s)

Standards:

8.NS.A.2

- 2 Between what two integers is the value of $\sqrt{\frac{107}{9}}$?

$$\sqrt{107} = 10.34408043\dots$$

- A. 1 and 2
- B. 3 and 4
- C. 7 and 8
- D. 10 and 11

Master ID: 3212379 Revision: 1

Correct: B

Rationale:

- A. Student(s) may have mistakenly divided $\sqrt{107}$ by 9 to arrive at the answer.
- B. Correct answer
- C. Student(s) may have mistakenly subtracted $\sqrt{9}$ from $\sqrt{107}$ to arrive at the answer.
- D. Student(s) may have mistakenly chosen the two integers that $\sqrt{107}$ is between as the correct answer.

Rubric: 1 Point(s)

Standards:

8.NS.A.2

- 3 Drag and drop the correct rational number next to its equivalent decimal expansion.

Web Only Interaction

Directions: Answer the following question(s).

Master ID:	2113650	Revision:	5
Rubric:	1 Point(s)		
0.1212...			
If $x = 0.1212\dots$, then $100x = 12.1212\dots$			
Subtracting: $100x - x = 12$ or $99x = 12$. Thus, $x = 12/99$ or $4/33$.			
0.4444...			
If $x = 0.444\dots$, then $10x = 4.444\dots$			
Subtracting: $10x - x = 4$ or $9x = 4$. Thus, $x = 4/9$.			
0.8333...			
If $x = 0.8333\dots$, then $100x = 83.333\dots$ and $10x = 8.333\dots$			
Subtracting: $100x - 10x = 75$ or $90x = 75$. Thus, $x = 75/90 = 5/6$.			
0.1010...			
If $x = 0.1010\dots$, then $100x = 10.1010\dots$			
Subtracting: $100x - x = 10$ or $99x = 10$. Thus, $x = 10/99$.			
Standards:			
8.NS.A.1			

4 Simplify:

$$\frac{2^7 \cdot 3^{-2} \cdot 4^{-1}}{2^{-5} \cdot 3^3 \cdot 4^5}$$

- A. $\frac{2^2}{3 \cdot 4^4}$
- B. $\frac{2^{12}}{3^5 \cdot 4^6}$
- C. $\frac{2^2}{3^5 \cdot 4^6}$
- D. $2^{-35} \cdot 3^{-6} \cdot 4^{-5}$

Master ID:	3280563	Revision:	1
Correct:	B		
Rationale:			
A. Student(s) may have added the exponents.			
B. Correct answer			
C. Student(s) may have added the exponents of the 2 base and then subtracted the other exponents.			
D. Student(s) may have multiplied the exponents.			
Rubric:	1 Point(s)		
Standards:			
8.EE.A.1			

Directions: Answer the following question(s).

5 Which value is equivalent to $\frac{2^8 \cdot 5^9 \cdot 10^4}{2^5 \cdot 5^8 \cdot 10^7}$?

- A. $\frac{1}{25}$
- B. 1
- C. 10
- D. 100

Master ID:	3250581	Revision:	1
Correct:	A		
Rationale:			
A. Correct answer			
B. Student(s) may have reduced all the bases before applying the exponents.			
C. Student(s) may have simplified incorrectly and believed the expression could be rewritten as $\frac{10^{17} \cdot 10^4}{10^{13} \cdot 10^7}$.			
D. Student(s) may have simplified incorrectly, multiplying the bases and adding the powers, regardless of whether they were the same, and believed the expression was equal to $\frac{100^{21}}{100^{20}}$.			
Rubric:	1 Point(s)		
Standards:	8.EE.A.1		

6 Simplify:
 $3(8)^0 \cdot (3)^{-2}$

- A. $\frac{24}{9}$
- B. -27
- C. $\frac{1}{3}$
- D. -216

Master ID:	3293674	Revision:	1
Correct:	C		
Rationale:			
A. Student(s) may have multiplied 3 times 8 instead of evaluating 8^0 as 1.			
B. Student(s) may have incorrectly evaluated 3^{-2} as $-(3^2)$, which is equal to -9.			
C. Correct answer			
D. Student(s) may have evaluated 3^{-2} as $-(3^2)$ and may have evaluated 8^0 as 8 instead of 1.			
Rubric:	1 Point(s)		
Standards:	8.EE.A.1		

Directions: Answer the following question(s).

7 Simplify.

$$6^{-2} \times 6^0$$

- A. 0
- B. $\frac{1}{36}$
- C. 36
- D. Undefined

Master ID:	3271273	Revision:	1
Correct:	B		
Rationale:			
A.	Student(s) may have thought $6^0 = 0$ instead of 1.		
B.	Correct answer		
C.	student(s) may have been confused about which exponent should go in the denominator and simplified $\frac{6^2}{6^0}$.		
D.	Student(s) may have thought that $6^0 = 0$ instead of 1 and compounded that error by placing both 6^{-2} and 6^0 in the denominator $\left(\frac{1}{6^2 \times 6^0}\right)$.		
Rubric:	1 Point(s)		
Standards:	8.EE.A.1		

8 Evaluate.

$$5^0 \cdot 5^2$$

- A. 0
- B. 10
- C. 25
- D. 625

Master ID:	3271715	Revision:	1
Correct:	C		
Rationale:			
A.	Student(s) may have thought a zero exponent equaled zero.		
B.	Student(s) may have multiplied instead of simplifying the exponent.		
C.	Correct answer		
D.	Student(s) may have multiplied the bases before adding the powers.		
Rubric:	1 Point(s)		
Standards:	8.EE.A.1		

9 Solve:

$$\frac{9^0}{9^{-2}}$$

- A. $\frac{1}{81}$
- B. $\frac{1}{9}$
- C. 81
- D. 729

Master ID:	3280554	Revision:	1
Correct:	C		
Rationale:			
A.	Student(s) may have overlooked the negative exponent.		
B.	Student(s) may have thought $9^0=9$ instead of 1 and overlooked the negative exponent.		
C.	Correct answer		
D.	Student(s) may have thought $9^0=9$ instead of 1.		
Rubric:	1 Point(s)		
Standards:	8.EE.A.1		

Directions: Answer the following question(s).

10 What value of x makes this statement true?

$$3x = 2x + 12$$

- A. 2
- B. 5
- C. 6
- D. 12

Master ID: 3293913 Revision: 1
 Correct: D
 Rationale:
 A. Student(s) may have multiplied the x coefficients to get $6x = 12$ and then may have divided 12 by 6 to get $x = 2$.
 B. Student(s) may have added the two coefficients of x ($3 + 2 = 5$) and may have ignored the 12.
 C. Student(s) may have ignored the $3x$, moved the $2x$ to the left side of the equation to get $2x = 12$ and then may have divided both sides by 2.
 D. Correct answer
 Rubric: 1 Point(s)
 Standards:
 8.EE.C.7.b

11 Solve for t :

$$t - 3(4 - t) = -24$$

- A. -6
- B. -3
- C. 3
- D. 6

Master ID: 3291308 Revision: 1
 Correct: B
 Rationale:
 A. Student(s) may have forgotten that when two negative integers are multiplied, the result is a positive integer. Student(s) may have made the following miscalculations:
 $t - 3(4 - t) = -24, t - 12 - 3t = -24, -2t = 12, t = -6$
 B. Correct answer
 C. Student(s) may have missed a negative sign when dividing. Student(s) may also have solved to $4(t - 3) = -24$ and did not realize that the right hand side must equal zero before assuming that $t = 3$.
 D. Student(s) may have forgotten that when two negative integers are multiplied, the result is a positive integer. Student(s) may have made the following miscalculations:
 $t - 3(4 - t) = -24, t - 12 - 3t = -24, -2t = -12, t = 6$
 Rubric: 1 Point(s)
 Standards:
 8.EE.C.7.b

Directions: Answer the following question(s).

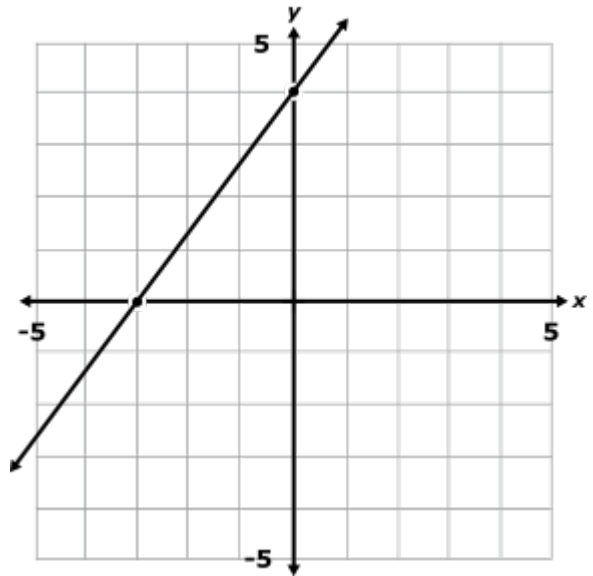
12 Solve:

$$2(3r + 4) - 3(r + 1) = 11$$

- A. 0
- B. 2
- C. 3
- D. $\frac{16}{3}$

Master ID:	3291195	Revision:	1
Correct:	B		
Rationale:	<p>A. Student(s) may have made the following miscalculations: $2(3r + 4) - 3(r + 1) = 11$, $6r + 8 - 3r + 3 = 11$, $3r + 11 = 11$, $r = 0$</p> <p>B. Correct answer</p> <p>C. Student(s) may have made the following miscalculations: $2(3r + 4) - 3(r + 1) = 11$, $5r + 4 - 3r + 1 = 11$, $2r + 5 = 11$, $r = 3$</p> <p>D. Student(s) may have added 5 to each side of the equation instead of subtracting it.</p>		
Rubric:	1 Point(s)		
Standards:	8.EE.C.7.b		

13 The graph below represents a linear function.




Which of the following equations represents the graph?

- A. $y = \frac{3}{4}x - 3$
- B. $y = \frac{3}{4}x + 4$
- C. $y = \frac{4}{3}x - 3$
- D. $y = \frac{4}{3}x + 4$

Directions: Answer the following question(s).

Master ID: 3225114 Revision: 1
 Correct: D
 Rationale:
 A. Student(s) may have found the ratio of the difference in x -values to the difference in y -values when determining the value of m in $y = mx + b$ and may have used the x -intercept, rather than the y -intercept, when determining the value of b .
 B. Student(s) may have found the ratio of the difference in x -values to the difference in y -values when determining the value of m in $y = mx + b$.
 C. Student(s) may have used the x -intercept, rather than the y -intercept, when determining the value of b in $y = mx + b$.
 D. Correct answer
 Rubric: 1 Point(s)
 Standards: 8.F.A.3

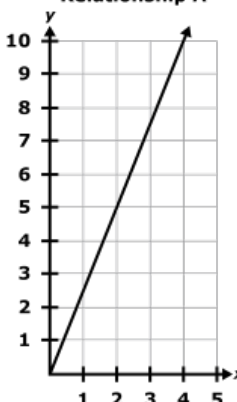
14 Four families are traveling to an amusement park. Each family begins their journey from their home. The representations show the distance each family is from the amusement park over time. Assume all families are traveling at a constant rate. Decide whether each statement below is true or false.

<p>Family A: $y = 80x - 120$</p>	<p>Family D:</p> 					
<p>Family B: Family B lives 95 miles from the amusement park and drives 55 mph.</p>						
<p>Family C:</p> <table border="1"> <thead> <tr> <th>Hours</th> <th>Distance from amusement park</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>85</td> </tr> <tr> <td>1.5</td> <td>10</td> </tr> </tbody> </table>		Hours	Distance from amusement park	0	85	1.5
Hours	Distance from amusement park					
0	85					
1.5	10					

Web Only Interaction

Master ID: 3465466 Revision: 1
 Rubric: 1 Point(s)
 Standards: 8.EE.B.5

15 Three proportional relationships are shown.

<p>Relationship A</p> 	<p>Relationship B</p> <table border="1"> <thead> <tr> <th>x</th> <th>y</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> </tr> <tr> <td>3</td> <td>7.8</td> </tr> <tr> <td>6</td> <td>15.6</td> </tr> <tr> <td>9</td> <td>23.4</td> </tr> </tbody> </table>	x	y	0	0	3	7.8	6	15.6	9	23.4	<p>Relationship C</p> <p>$y = 2.51x$</p>
x	y											
0	0											
3	7.8											
6	15.6											
9	23.4											

Drag the proportional relationships to order the unit rates from LEAST to GREATEST.

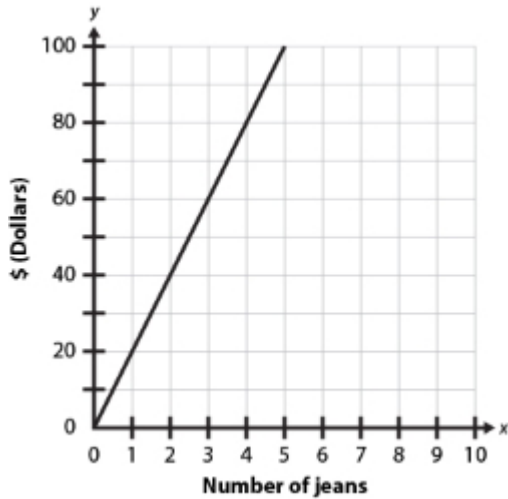
Web Only Interaction

Master ID: 3461930 Revision: 1
 Rubric: 1 Point(s)
 Relationship A → Relationship C → Relationship B
 Standards: 8.EE.B.5

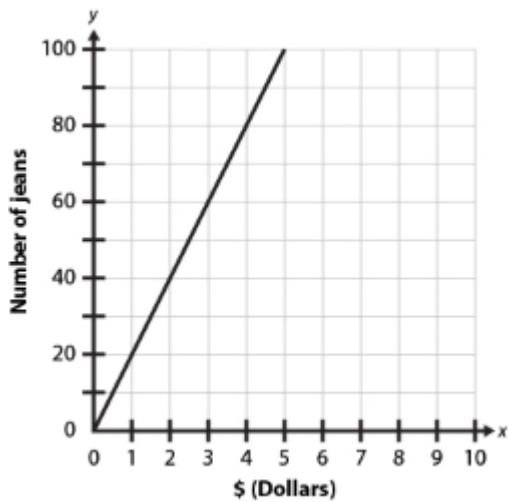
Directions: Answer the following question(s).

16 Which graph correctly displays the cost of jeans at \$20 per pair?

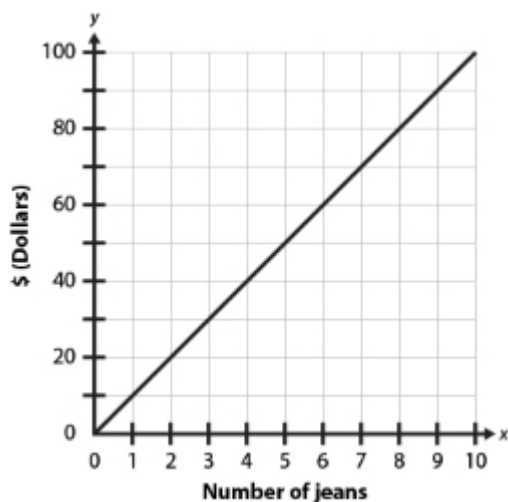
A.



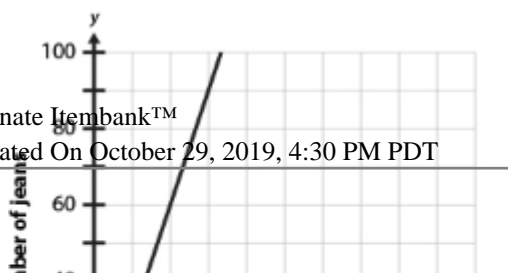
B.



C.



D.



Master ID: 3279792 Revision: 1

Correct: A

Rationale:

- A. Correct answer
- B. Student(s) may not have looked at the axis description to see that dollars was on the x-axis and jeans was on the y-axis.
- C. Student(s) may have glanced at the direction of the sloping graph and saw that it was correct but not have made sure that the points were accurate.
- D. Student(s) may have had a hard time lining the points up because of the increasing units of 10 as opposed to 20.

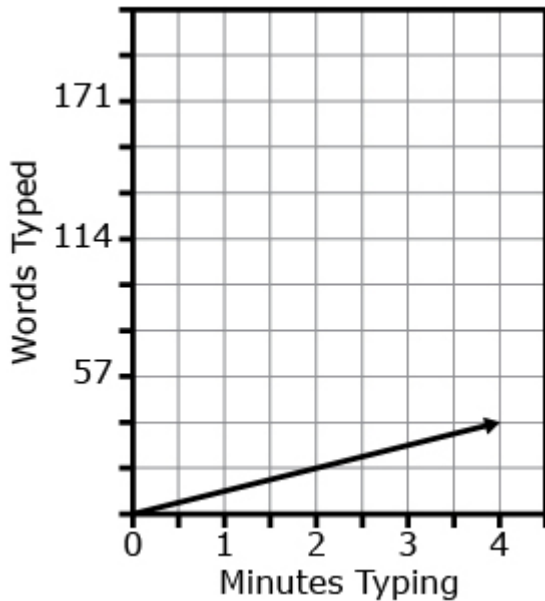
Rubric: 1 Point(s)

Standards:
8.EE.B.5

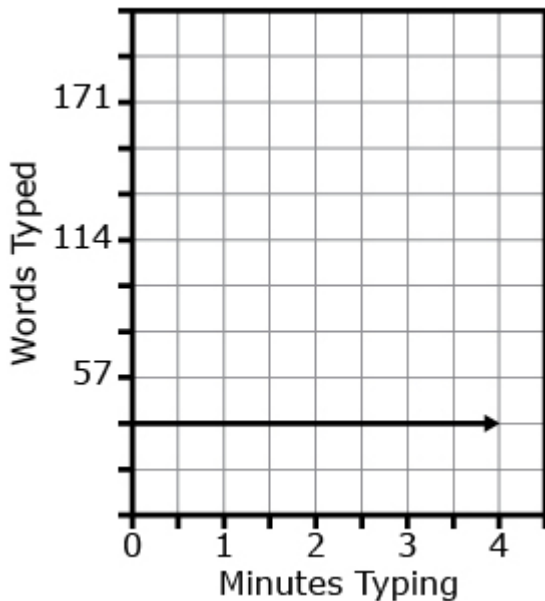
Directions: Answer the following question(s).

17 Cecilia types at a speed of 38 words per minute. Which graph correctly represents the total words Cecilia types over a 4 minute period?

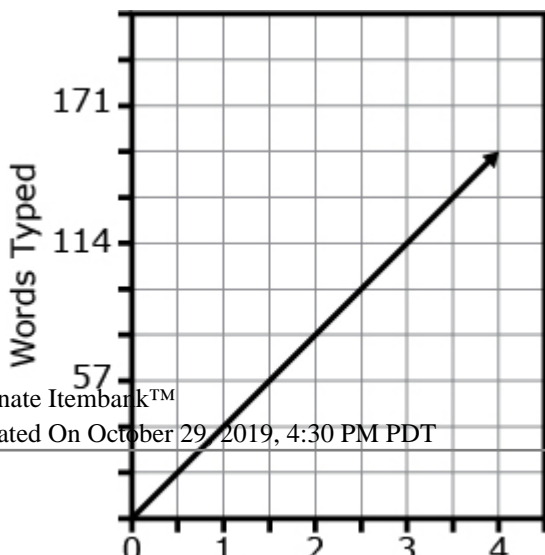
A.



B.



C.



Master ID: 3253352 Revision: 1

Correct: C

Rationale:

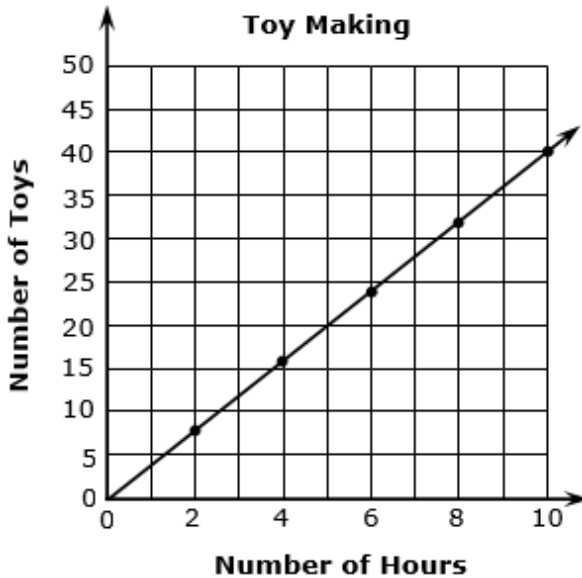
- A. Student(s) may have chosen this option because 4 minutes and 38 words per minute are the only two values in the stem, not realizing that (4, 38) is not a point on the line plot.
- B. Student(s) may have chosen this option because the rate is 38 words per minute, not realizing the number of words typed would increase as time passed.
- C. Correct answer
- D. Student(s) may have recognized that in four minutes she would type 152 words but expected the graph to go to that y-value at the wrong x-value.

Rubric: 1 Point(s)

Standards:
8.EE.B.5

Directions: Answer the following question(s).

- 18 Nicolas makes toys at a toy shop. The graph represents the relationship between the number of toys (t) that Nicolas makes and the number of hours (h) Nicolas works at the shop.



Which of the following equations represents a toy-making rate, in toys per hour, that is HALF that of Nicolas's toy-making rate?

- A. $t = 2h$
- B. $t = 4h$
- C. $t = 8h$
- D. $t = 16h$

Master ID:	3235868	Revision:	1
Correct:	A		
Rationale:	<ul style="list-style-type: none"> A. Correct answer B. Student(s) may have thought that Nicolas had a toy-making rate of 8 toys per hour based on an incorrect interpretation of the first plotted point. C. Student(s) may have reversed the relationship, i.e., found an equation with a toy-making rate twice that of Nicolas's. D. Student(s) may have thought that Nicolas had a toy-making rate of 8 toys per hour and may have reversed the relationship, finding a rate twice that of Nicolas's. 		
Rubric:	1 Point(s)		
Standards:	8.EE.B.5		

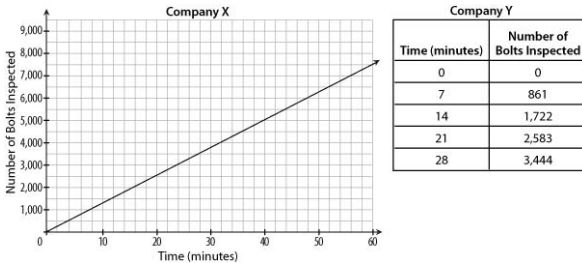
- 19 The equation $p = 10t$ gives the pay (p) in dollars Felix received in relation to the time (t) in hours that he babysat last month. Graph the proportional relationship between the time in hours and the pay in dollars.

Web Only Interaction

Master ID:	3232457	Revision:	1
Rubric:	1 Point(s)		
Standards:	8.EE.B.5		

Directions: Answer the following question(s).

- 20 Managers at Company X and Company Y carefully inspect the bolts that workers at each company manufacture. The numbers of bolts inspected over time are shown in the graph and table below.



Choose all the statements that are correct.

- A. Managers at both companies inspect 125 bolts per minute.
- B. Managers at Company X inspect 123 bolts per minute, and managers at Company Y inspect 125 bolts per minute.
- C. Managers at Company X inspect 125 bolts per minute, and managers at Company Y inspect 123 bolts per minute.
- D. After 64 minutes, managers at both companies will inspect the same number of bolts.
- E. After 64 minutes, managers at Company X will inspect 128 more bolts than managers at Company Y will inspect.
- F. After 64 minutes, managers at Company Y will inspect 128 more bolts than managers at Company X will inspect.

Master ID: 940488 Revision: 1

Correct: CE

Rationale:

- A. This is the result of first identifying that the rate at Company X is 125 bolts per minute by calculating the slope of the graph, which goes through the points (0, 0) and (60, 7,500). This is done as follows: $m = (7,500 - 0)/(60 - 0) = 125$ bolts/minute. This rate is then incorrectly used for both companies.
- B. This is the result of incorrectly switching the bolt inspection rate for managers at Company X with that for managers at Company Y.
- C. This is the result of first correctly identifying that the rate at Company X is 125 bolts per minute by calculating the slope of the graph, which goes through the points (0, 0) and (60, 7,500). This is done as follows: $m = (7,500 - 0)/(60 - 0) = 125$ bolts/minute. Then, it is found that the rate at Company Y is 123 bolts per minute by calculating the ratio of the number of bolts inspected per minute as follows: $861 \text{ bolts}/7 \text{ minutes} = 1,722 \text{ bolts}/14 \text{ minutes} = 2,583 \text{ bolts}/21 \text{ minutes} = 3,444 \text{ bolts}/28 \text{ minutes} = 123$ bolts/minute.
- D. This is the result of incorrectly identifying that managers at both companies inspect the same number of bolts per minute.
- E. This is the result of first calculating that the bolt inspection rate at Company X is 125 bolts per minute and the rate at Company Y is 123 bolts per minute. Therefore, managers at Company X inspect $(125 \text{ bolts/minute})(64 \text{ minutes}) = 8,000$ bolts in 64 minutes and managers at Company Y inspect $(123 \text{ bolts/minute})(64 \text{ minutes}) = 7,872$ bolts in 64 minutes. Managers at Company X inspect $8,000 - 7,872 = 128$ more bolts in 64 minutes.
- F. This is the result of incorrectly switching the number of bolts that managers at Company X and Company Y inspect per minute.

Rubric: 1 Point(s)

Standards:

8.EE.B.5

Directions: Answer the following question(s).

- 21 Kylie compared the price per pound of two types of apples at her grocery store. She used the equation $y = 0.85x$ to represent y , the total cost in dollars of x pounds of apple A. She entered into the table below the cost of some weights of apple B.

Weight (pounds)	Cost (dollars)
2	2.50
4	5.00
6	7.50

What is the difference in the price per pound between apple A and apple B?

- A. \$0.40
- B. \$0.85
- C. \$1.25
- D. \$2.10

Master ID:	2351639	Revision:	3
Correct:	A		
Rationale:	<ul style="list-style-type: none"> A. This is the result of determining the price per pound in the table as $1.25x$ and subtracting $0.85x$. B. This is the price per pound (slope) for apple A. C. This is the price per pound (slope) for apple B. D. This is the result of adding instead of subtracting. 		
Rubric:	1 Point(s)		
Standards:	8.EE.B.5		

- 22 For every 30 cans it recycles, a recycling plant can produce one pound of aluminum.

Draw a graph on the coordinate grid below that best represents the total number of pounds of aluminum the plant can produce as a function of the total number of cans it recycles.

To graph a ray on the coordinate grid, click on the point that represents the endpoint of the ray. Then click on a second point located on the ray. You must graph the ray using only these two points; any other graphed points will cause the ray to be scored as incorrect.

Web Only Interaction

Master ID:	2113756	Revision:	3
Rubric:	1 Point(s)		
This item is worth 1 point.			
As the number of cans recycled increases, the amount of aluminum produced increases as well. This means that a graph of this relationship will be a line. Further, every time an additional 30 cans are recycled, the total amount of aluminum produced increases by 1 pound, implying the slope will be $1/30$.			
Because the number of cans recycled can't be negative and zero cans being recycled will mean no aluminum is produced, the line will start at $(0, 0)$. A second point on the line can be found by observing that recycling exactly 30 cans will result in exactly one pound of aluminum being produced. This is represented by the point $(30, 1)$.			
Standards:	8.EE.B.5		