Math 8 - SBAC Example Problems - DRAFT (not checked for errors yet)

8 NS A 1   1. Determine for each number whether it is a rational or irrational number.

Number	Rational	Irrational
$\frac{4}{7}$		
$\sqrt{30}$		
$\frac{21}{\sqrt{4}}$		
π		
-27		

8 NS A 1   2. Determine a fraction equivalent to $0.\overline{2}$. Use only whole numbers for numerators or denominators.

8 NS A 2   1. Which number is the closest approximation to $\sqrt{167}$?
   A. 12
   B. 13
   C. 83
   D. 84

8 NS A 2   2. Calculate the approximate value of $2\sqrt{47}$ to the nearest tenth.

8 NS A 2   3. Which range contains the value of $\sqrt{(16 + 9 + 20}$?
   A. between 6.6 and 6.8
   B. between 7.5 and 7.7
   C. between 16.8 and 17.0
   D. between 22.4 and 22.6

8 NS A 2   3. Select **all** expressions that have a value greater than 5.

   A. 2π
   B. $\frac{10}{\sqrt{3}}$
   C. $3 + \sqrt{2}$
   D. $5.7 - \frac{6}{\sqrt{20}}$

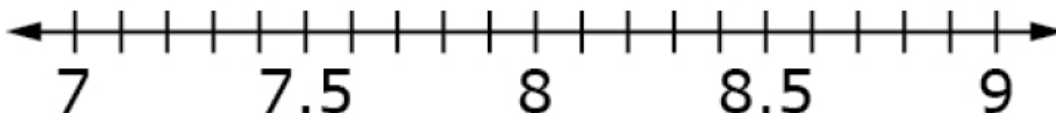**8 NS A 2** 4. Select True or False to indicate whether each comparison is true.

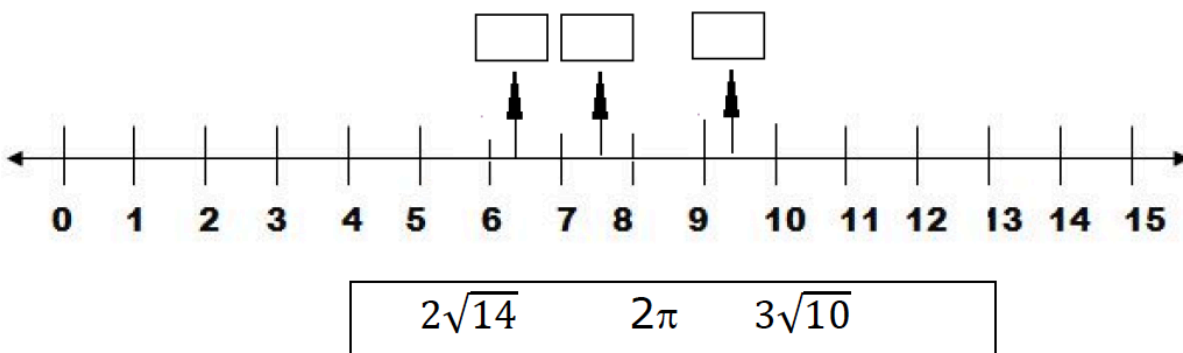|	True	False
$\frac{4}{7} > \sqrt{19}$		
$\sqrt{40} > 7$		
$\frac{20}{\sqrt{30}} > \frac{2}{3}$		

8 NS A 2 5. Approximate the value of $\sqrt{78}$ to the nearest tenth on the number line.

8 NS A 2 6. Place each expression in the box above the number line to show the approximate value.

$$2\sqrt{14} \qquad 2\pi \qquad 3\sqrt{10}$$

8 EE A 1 1. Select **all** expressions equivalent to $(4^5 \cdot 4^{-3})^{-2}$.

A. $\dfrac{1}{256}$

B. 256

C. $4^{-10} \bullet 4^{6}$

D. $4^{3} \bullet 4^{-5}$

8 EE A 1   2. Determine the value of n that makes the equation $4^{5} \bullet 4^{n} = 4^{15}$ true.

8 EE A 2   1. Select **all** possible values for x that solve the equation $x^{2} = 200$.

A. $10\sqrt{20}$
B. $100\sqrt{2}$
C. $10\sqrt{2}$
D. $\sqrt{200}$

8 EE A 2   1. Select **all** possible values for x in the equation $x^{2} = 200$.

A. $10\sqrt{2}$
B. $10\sqrt{20}$
C. $20\sqrt{10}$
D. $-10\sqrt{2}$
E. $-10\sqrt{20}$
F. $-20\sqrt{10}$

8 EE A 2   1. Select **all** possible values for x in the equation $x^{3} = 250$.

A. $5\sqrt[3]{2}$
B. $\sqrt[3]{250}$
C. $5\sqrt[3]{10}$
D. $25\sqrt[3]{10}$

8 EE A 3   1. How many times larger than 2×10^3 is 6×10^6 ?

$\qquad$ A. 3×10^2
$\qquad$ B. 3×10^3
$\qquad$ C. 6×10^6
$\qquad$ D. 12×10^9

(DOK 1)

8 EE A 4   1. Approximately 7.5×10^5 gallons of water flow over a waterfall each second. There are 8.6×10^4 seconds in 1 day.
 What is the approximate number of gallons of water that flow over the waterfall in 1 day?

$\qquad$ A. 6.45×10^{21}
$\qquad$ B. 6.45×10^{20}
$\qquad$ C. 6.45×10^{10}
$\qquad$ D. 6.45×10^{9}

8 EE A 4   2. Which value is closest to $(6 \times 10^6) + (2 \times 10^4)$?

$\qquad$ A. 8.0×10^{10}
$\qquad$ B. 8.0×10^6
$\qquad$ C. 6.0×10^{10}
$\qquad$ D. 6.0×10^6

(DOK 1)

8 EE B 5   1. The cost c, in dollars, for p pounds of meat is shown in the table.

p	c
3	15
5	25
7	35
9	45
10	50

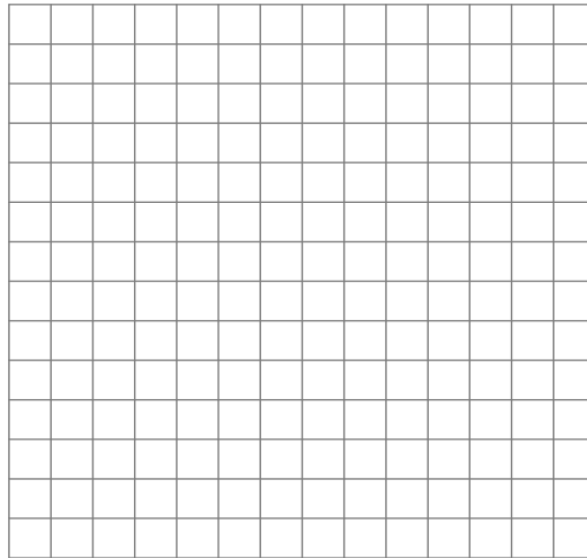 Graph the proportional relationship between the number of pounds of meat and the total cost.
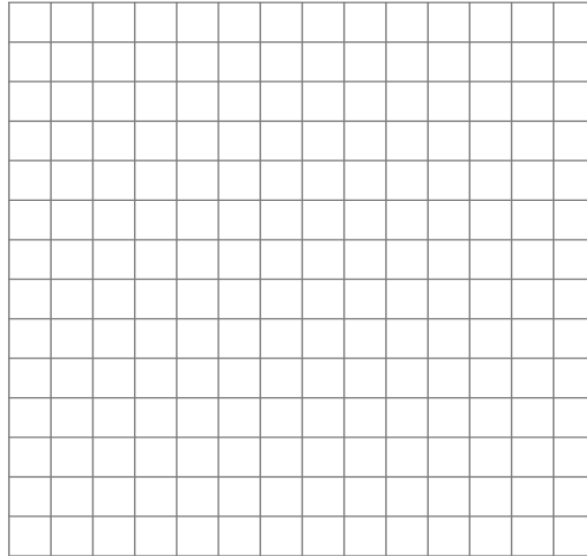
8 EE B 5   2. Meat costs $5.00 per pound at a store.

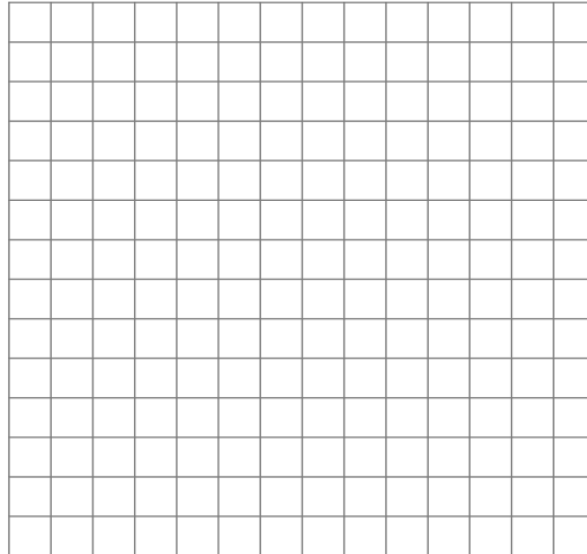 Graph the proportional relationship between the number of pounds of meat and the total cost.

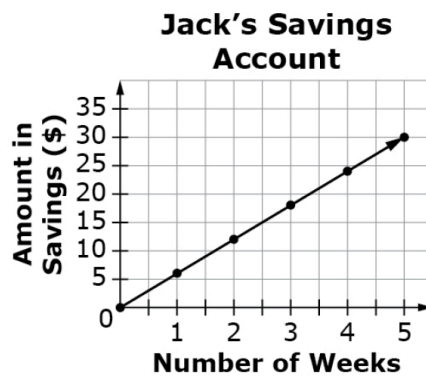**8 EE B 5**   3. The cost c, in dollars, for p pound of meat can be represented by the equation

$$c = 5p$$

  Graph the proportional relationship between the number of pound of meat and the total cost.

8 EE B 5   1. This graph shows a proportional relationship between the amount of money and Jack's savings account and the number of weeks Jack has been saving money.

Jack's Savings Account

Which statement identifies the correct slope, and the correct interpretation of the slope for this situation?

A. The slope of the line is $\frac{6}{1}$, so Jack's savings rate is $6 dollars every week.

B. The slope of the line is $\frac{6}{1}$, so Jack's savings rate is $1 dollar every 6 weeks.

C. The slope of the line is $\frac{1}{6}$, so Jack's savings rate is $6 dollars every week.

D. The slope of the line is $\frac{1}{6}$, so Jack's savings rate is $1 dollars every 6 weeks.

8 EE B 5   2. The table shows the proportional relationship between the cost in dollars (c) of meat and the weight in pounds (p) at Lane Grocery Store.

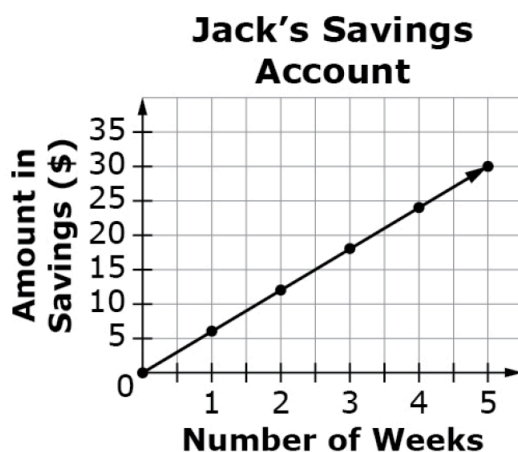| p	c
3	15
5	25
7	35
9	45
10	50

Select the equation that shows a cost of meat per pound which is twice the cost of meat per pound at Lane Grocery Store.

A. $c = 5p$
B. $c = 6p$
C. $c = 10p$
D. $c = 30p$

(DOK 2)

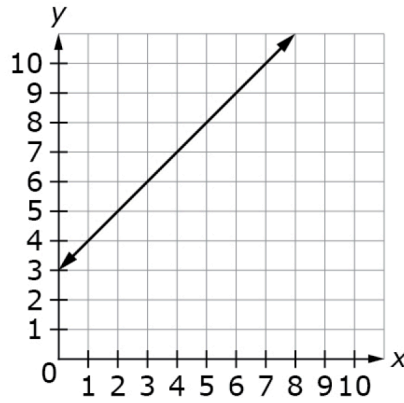**8 EE B 6**   1. This graph shows the amount of money s , in dollars, in Jack's account after w weeks.

Jack's Savings Account

Enter an equation to represent the amount of money s, in dollars, in Jack's account after w weeks.

(DOK 2)

8 EE B 6   1. Consider the line shown on the graph.

Consider the line shown on the graph.

Enter the equation of the line in the form $y = mx + b$ where m is the slope and b is the y-intercept.

(DOK 2)

8 EE C 7a   1. Place a number into each box to create an equation that has exactly one real solution.

$$3(2x + 5) - x = \boxed{}\, x + \boxed{}$$

(DOK 2)

8 EE C 7a   2. Place a number into each box to create an equation that has no real solution.

$$3(2x + 5) - x = \boxed{}\, x + \boxed{}$$

(DOK 2)

8 EE C 7a   3. Place a number into each box to create an equation that has an infinite number of solutions.

$$3(2x + 5) - x = \boxed{}\, x + \boxed{}$$

(DOK 2)

8 EE C 7a   4. Select **all** equations that have no solution.

A. $6x - 2 - 3x = 3x - 2$
B. $6x - (3x + 8) = 16x$
C. $10 + 6x = 15 + 9x - 3x$
D. $11 + 3x - 7 = 6x + 5 - 3x$

8 EE C 7a   5. Kim is solving the following linear equation.

$11 + 3x - 7 = 6x + 5 - 3x$

Her final two steps are:

$4 + 3x = 3x + 5$
$4 = 5$

Select the statement that correctly interprets Kim's solution.

A. The solution is $x = 0$.
B. The solution is the ordered pair (4, 5).
C. There is no solution since 4 = 5 is a false statement.
D. There are infinitely many solutions because there is no x in the final equation.

8 EE C 7b   1. Determine the value for x that makes the equation
$-4(x + 13) + 3x = 80$ true.

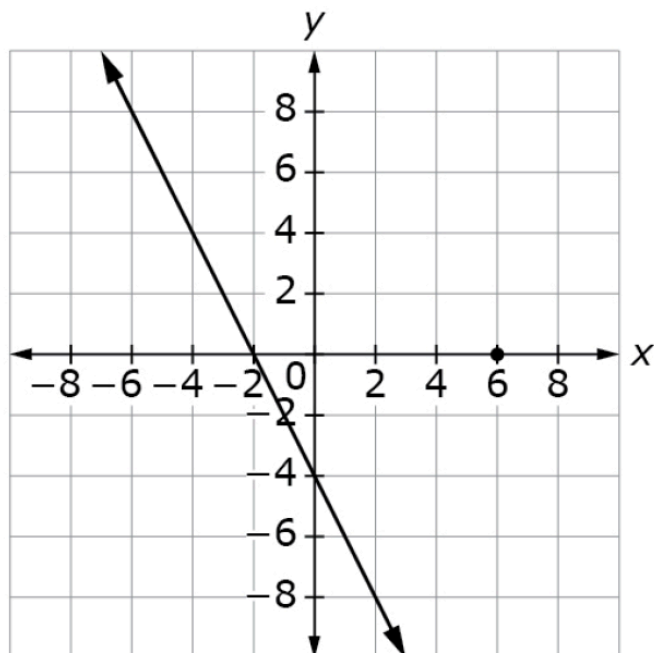**8 EE C 8b**   1. The graph shown compares the height of Tree A and the height of Tree B over time (in years).
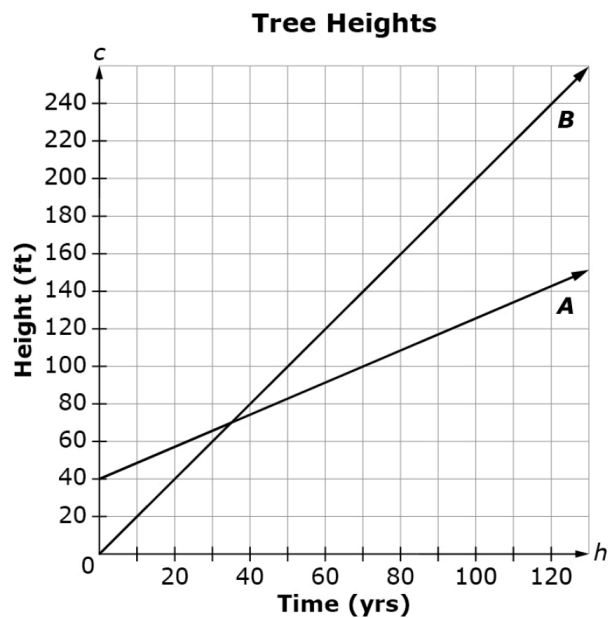
Tree Heights

How many years after Tree B was planted did Tree A and Tree B have the same height?

8 EE C 8b   2. The graph of $2x - y = 4$ is shown.
Graph the equation y = 3x - 2 on the same coordinate plane. Plot and indicate the solution to the system consisting of the two equations.

8 EE C 8b   3. A system of two linear equations has no solution. The first equation is $3x + y = -2$. Select the second equation that would make this system have no solution.

$$\text{A. } 2x + y = 4$$
$$\text{B. } 2x + y = 5$$
$$\text{C. } 3x + y = 4$$
$$\text{D. } 4x + y = 5$$

4. Select the statement that correctly describes the solution to this system of equations.

$$3x + y = -2$$
$$x - 2y = 4$$

A. There is no solution.
B. There are infinitely many solutions.
C. There is exactly one solution at (−2, −4).
D. There is exactly one solution at (0, −2).

4. Determine the y coordinate of the solution to this system of equations.

$$3x + y = -2$$
$$x - 2y = 4$$

1. A tree that is 8 feet tall is growing at a rate of 1 foot each year. A tree that is 10 feet tall is growing at a rate of $\frac{1}{2}$ foot each year.

Calculate the number of years it will take the two trees to reach the same height.

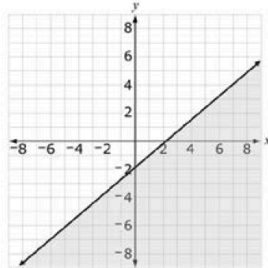1. Which relation defines y as a function of x?

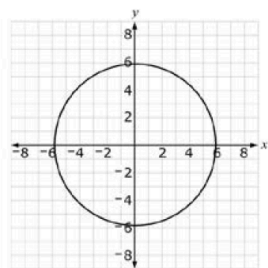A. The proportional relationship $y = 2.4x$.

B. The table showing the age in years, x, and weight in pounds, y, of five dogs.

x	y
3	30
4	38
4	21
5	9
6	42

C. The graph of an inequality as shown by the shaded region.

D. The graph of $x^2 + y^2 = 36$ as shown.

2. Which equation(s) define p as a function of t?

A. $p = 3t + 2$
B. $t = 3p + 2$
C. $p = 0t + 2$
D. $t = 0p + 2$

3. Select **all** ordered pairs that correspond to input-output pairs for the function $y = -6x + 7$.

A. (1, 1)
B. (−1, 1)
C. (−6, 7)
D. (3, −11)

8 F A 1   4. A swimming pool had 30 gallons of water in it. Then water was added to the pool at a rate of 5 gallons per second.

The function $y = 5t + 30$ describes the relationship between the number of gallons, y, and the number of seconds water was added, t.

Select **all** of the ordered pairs that correspond to input-output pairs for the function.

    A. (45, 3)
    B. (3, 45)
    C. (0, 30)
    D. (30, 0)

8 F A 2   1. Consider the function represented by this table of values.

x	y
-4	-10
-3	-7
-2	-4
-1	-1
0	2

Which function could have produced the values in the table?

    A. $y = -x - 14$
    B. $y = -3x + 2$
    C. $y = 3x - 22$
    D. $y = 3x + 2$

8 F A 2   2. A swimming pool as 30 gallons of water in it. Water is added to the pool at a rate of 5 gallons per second.

Which equation models the relationship between W, the number of gallons of water, and t, the number of seconds water is being added to the swimming pool?

A. $W = 30t + 5$
B. $W = 5t + 30$
C. $W = t + 35$
D. $W = 35t$

(DOK 2)

8 F A 2   2. Each relation shown defines y as a function of x. Which function has the greatest rate of change?
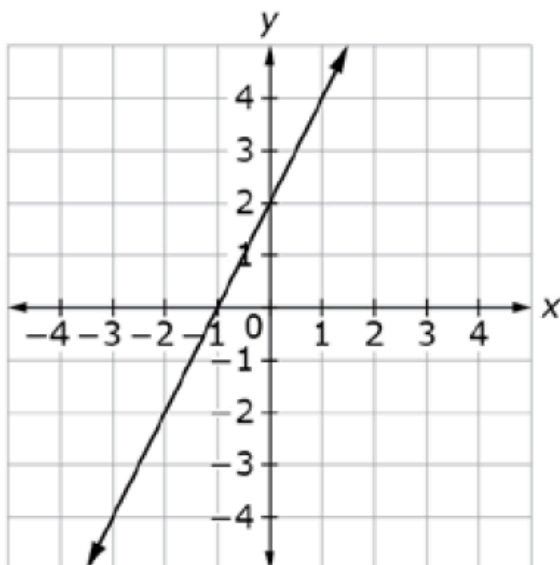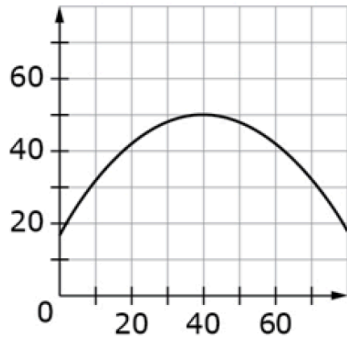
A. $y = \dfrac{7}{3}x + 4$

B. $y = 3x - 1$

C.

x	y
0	4
2	12
4	20
6	28

D.

(DOK 2)

8 F A 3   1. Several functions are represented in the table.

Function	Could be linear	Cannot be linear
$y = \dfrac{3}{4}x + 2$		
x: −2, −1, 0, 1, 2 **y**: 5, 9, 13, 17, 21		

The table in the third row:

x	y
−2	5
−1	9
0	13
1	17
2	21

(DOK 2)

8 F B 4   1. This table of values represents a linear function.
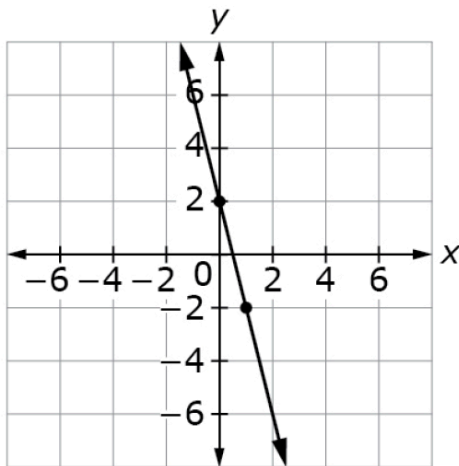
x	y
2	−6
3	−6.5
8	−9

Enter an equation in the form $y = mx + b$ that represents the function.

(DOK 2)

8 F B 4   2. This graph represents a linear function.

Enter an equation in the form $y = mx + b$ that represents the function.

3. A swimming pool with 1600 gallons of water is emptied at a constant rate of 300 gallons every 2 hours.

  Find an equation in the form $y = mx + b$ that represents the amount of water y, in gallons, remaining in the pool after x hours.

4. In this table, y is a linear function of x.

x	y
0	50
2	40
4	30
6	20

Enter the rate of change of this function.

5. This table shows the water level in a tank as a linear function of time.

Time (hr)	Water Level (ft)
0	50
2	40
4	30
6	20

Enter the rate of change of the water level, in feet per hour.

6. This graph shows water level in a tank as a linear function of time.
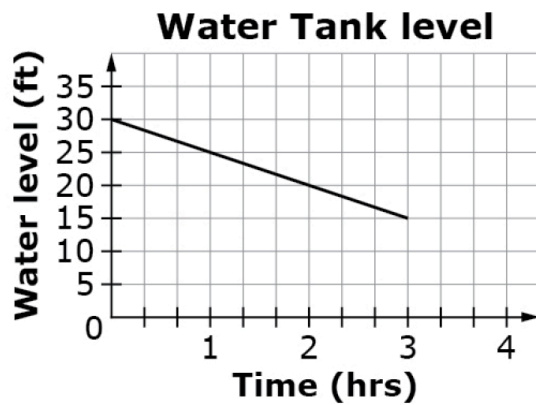
Water Tank level

Enter the initial water level, in feet, of the water tank.

8 F B 4 7. A swimming pool containing 1600 gallons of water is emptied at a constant rate of 300 gallons every 2 hours.
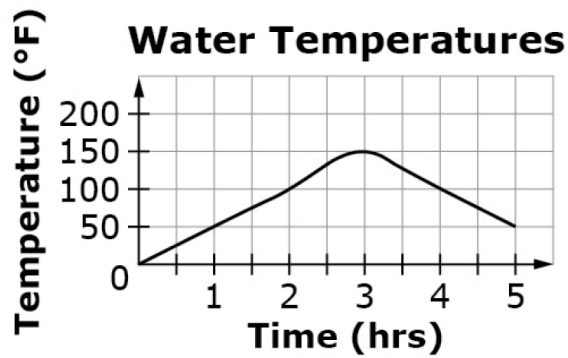
Determine whether each statement about the amount of water in the pool is true. Select True or False for each statement.

Statement	True	False
The initial amount of water in the pool is 1600 gallons.		
The amount of water in the pool decreases by 150 gallons every 1 hour.		
The amount of water in the pool at 3 hours is 450 gallons.		

8 F B 5 1. This graph shows the water temperature as a function of time.

Water Temperatures

Based on the graph, determine whether each statement is true. Select True or False for each statement.

| Statement	True	False
The water temperature is increasing between hour 1 and hour 2.		
The water temperature is increasing between hour 3 and hour 4.		
The water temperature is constant between hour 0 and hour 1.		

(DOK 2)

8 F B 5   2. John is riding his bike.

- He increases his speed for 30 seconds.
- He stays approximately the same speed for the next 20 seconds.
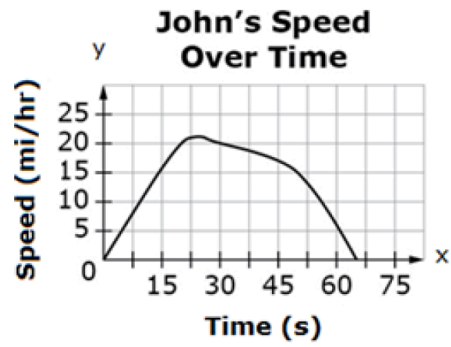- He slows down to a stop during the last 15 seconds.

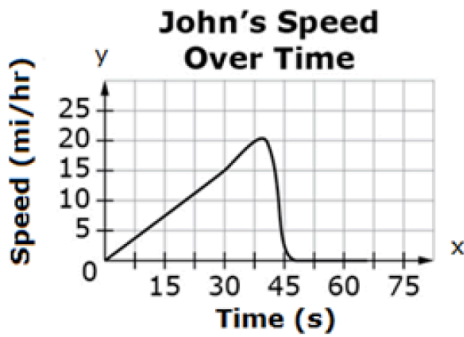Select the graph that best represents John's speed over time.

A.

John's Speed Over Time

B.

John's Speed Over Time

C.

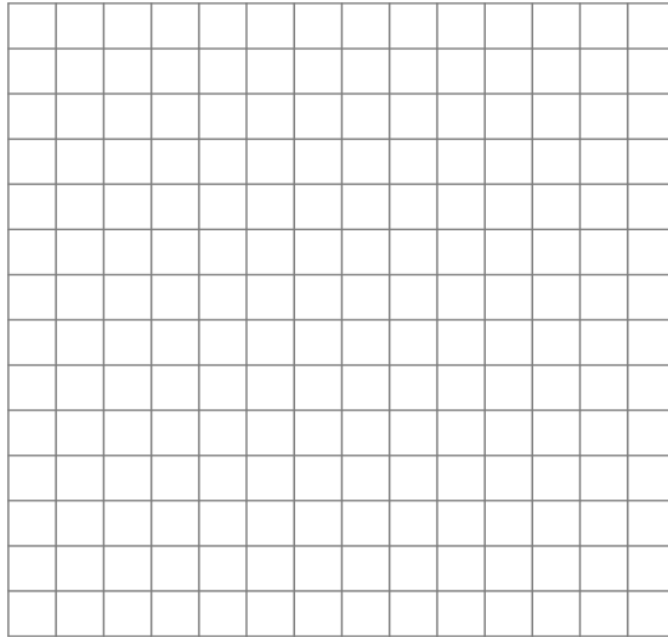**John's Speed Over Time**

D.
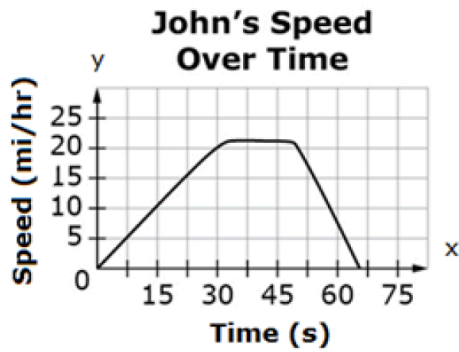
John's Speed Over Time

8 F B 5   3. John is riding his bike.

- He increases his speed for 30 seconds.
- He stays at the same speed for the next 20 seconds.
- He slows down to a stop during the last 15 seconds.
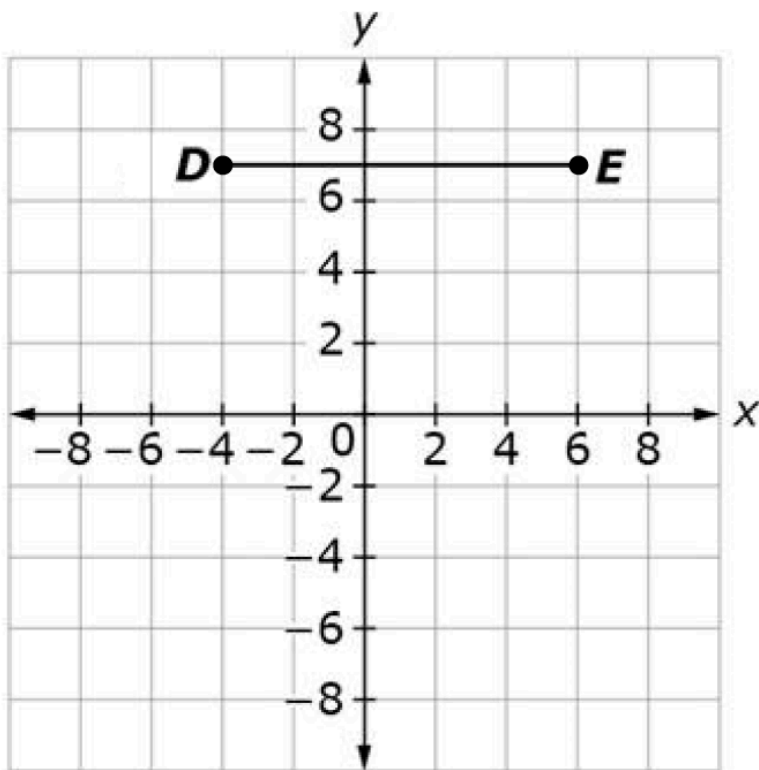
Draw a graph that represents John's speed over time.

Rubric: (1 point) The student correctly draws a graph that represents the relationship (e.g., see below).

John's Speed Over Time

8 G A 1   1. Line segment DE is translated left 3 units and down 2 units to form line segment D'E'.
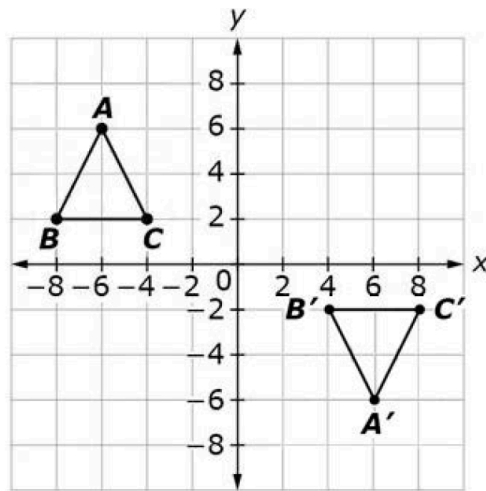
Enter the distance, in units, between point D' and point E'.

(DOK 1)

8 G A 1 2. Line segment FG begins at $(-2, 4)$ and ends at $(-2, -3)$. The segment is translated left 3 units and up 2 units to form line segment F'G'. Find the length, in units, of line segment F'G'.

(DOK 1)

8 G A 1 3. Triangle ABC is reflected across the x-axis and then translated right 12 units to form triangle A'B'C'.
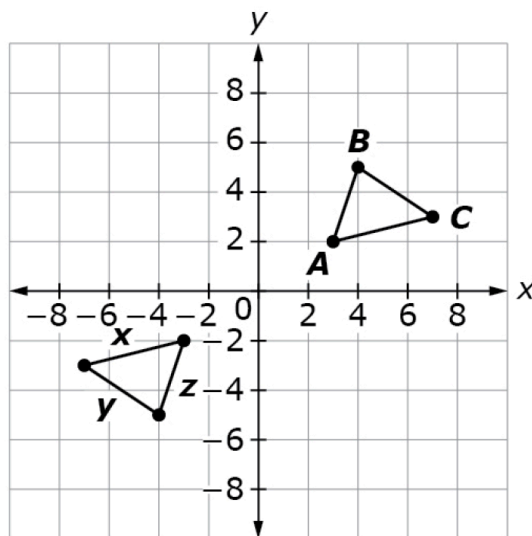
Select True or False for each statement.

Statement	True	False
Angle B has the same measure as angle B'.		
Side AC is longer than side A'C'.		
Side BC is the same length as side B'C'.		

(DOK 1)

8 G A 1   4. Triangle ABC was created by joining points $A(3, 2)$, $B(4, 5)$, and $C(7, 3)$ with line segments.

Triangle *ABC* is reflected over the *x*-axis and then reflected over the *y*-axis to form a triangle with side lengths *x*, *y*, and *z*.
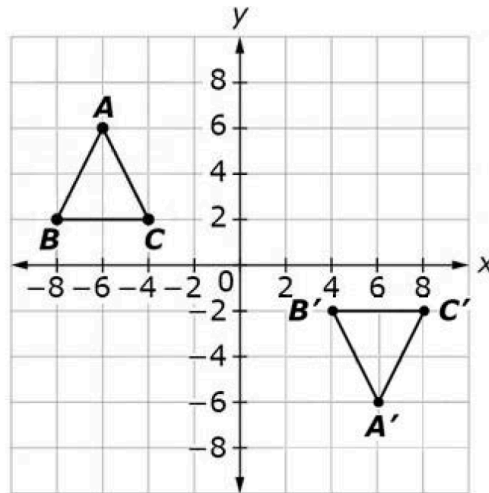

Fill in the table to show which side length are equal.

|	x	y	z
AB			
AC			
BC			

8 G A 2   1. Consider this figure.

Consider the statements in the table shown. Select True or False for each statement about the sequences of transformations that can verify that triangle *ABC* is congruent to triangle *A'B'C'*.

| Statement	True	False
Triangle *ABC* is translated 12 units to the right, followed by a reflection across the *x*–axis.		
Triangle *ABC* is a reflected across the *y*–axis, followed by a translation 12 units down.		
Triangle *ABC* is reflected across the *x*–axis, followed by a translation 12 units to the right.		

8 G A 3   1. The figure on the coordinate place is reflected across the y-axis.
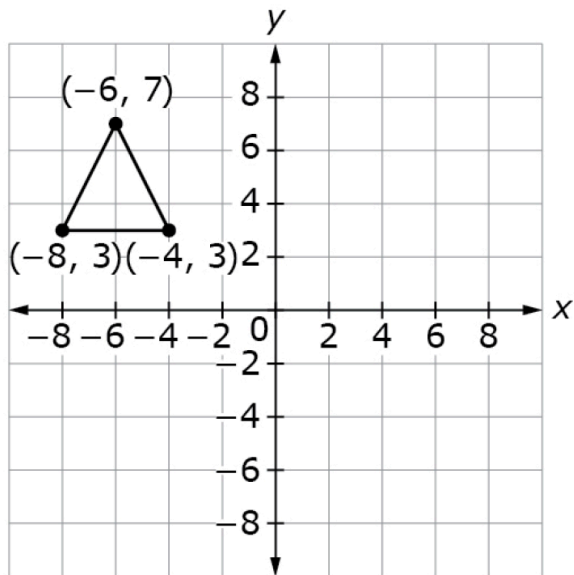
Draw the resulting image of the figure.
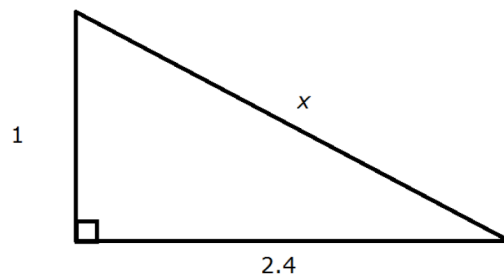
8 G A 3   2. Triangle ABC is reflected across the x-axis, and dilated by a scale factor of 2, with the origin as the center of the dilation.
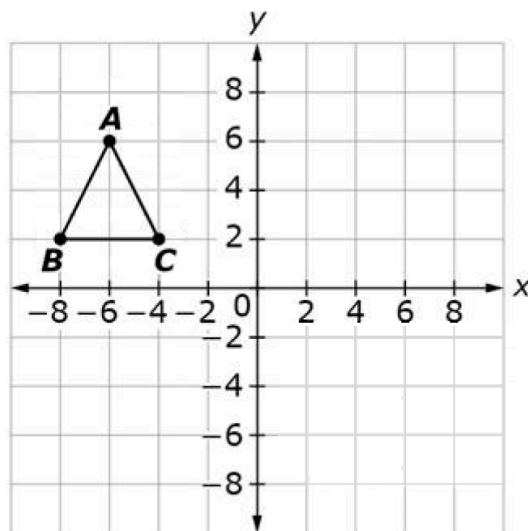
Give the coordinates of vertices of triangle A'B'C'

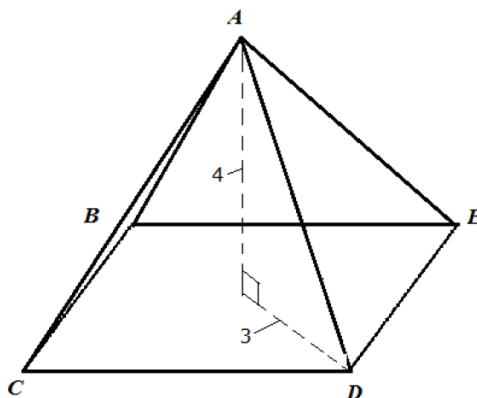**8 G B 7**   1. A right triangle is shown.

Calculate the value of x.

8 G B 7   2. A right square pyramid is shown. The height of the pyramid is 4 units. The distance from the center of the base of the pyramid to vertex D is 3 units, as shown.

Find the length of segment AD, in units.

8 G B 7   3. A 13-foot ladder is leaning on a tree. The bottom of the ladder is on the ground at a distance of 5 feet from the base of the tree. The base of the tree and the ground form a right angle as shown.
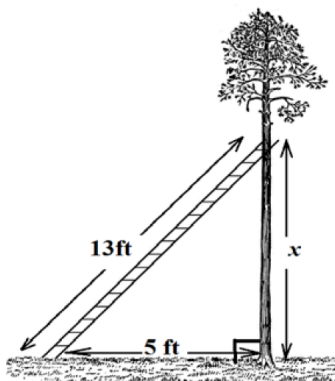
Find the distance between the ground and the top of the ladder, x, in feet.

8 G B 7   4. The table shows the side lengths for some triangles. Determine whether the side lengths define a right triangle.
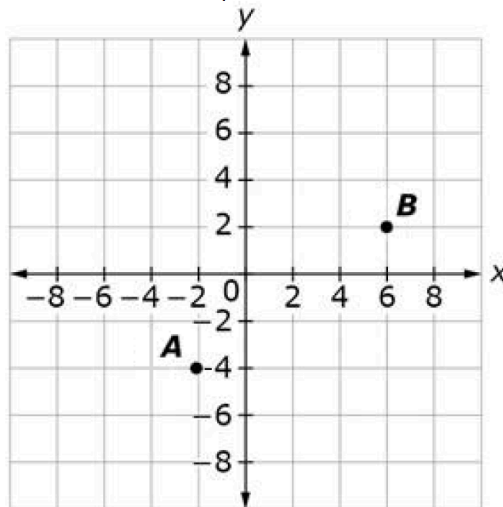
Select Yes if it is a right triangle. Select No if it cannot be a right triangle.

Triangle Side Lengths	Yes	No
4 cm, 5 cm, 8 cm		
8 ft, 10 ft, 16 ft		
21 in, 28 in, 35 in		

4. A coordinate plane is show with labeled points.

What is the distance between point A and point B on the coordinate plane?

A. 5
B. 6
C. 10
D. 14

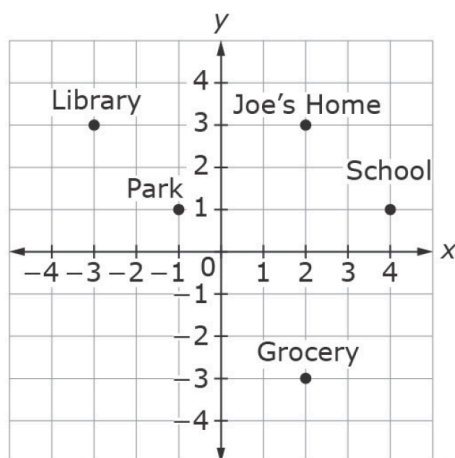5. What is the distance between point $(5, 2)$ and $(-3, -4)$ on the coordinate plane?

A. 5
B. 6
C. 10
D. 14

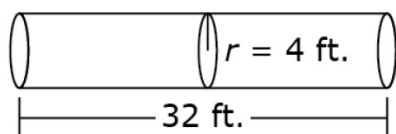6. The points show different locations in Joe's town. Each unit represents 1 mile.

Places in Joe's Town

What is the distance, in miles, between Joe's Home and the Park?
Round your answer to the nearest tenth.

8 G C 9   1. This figure shows the dimensions of a tanker truck. The tak forms a cylinder with a length of 32 feet and radius of 4 feet.

What is the volume, in cubic feet, of the tank? Round your answer to the nearest hundredth.

8 G C 9   2. A spherical baseball has a radius of 2 inches, as shown in the diagram.
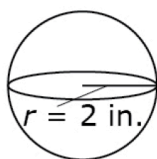
What is the volume, in cubic inches, of the baseball? Round your answer to the nearest hundredth.

8 G C 9   3. An ice cream cone has a height of 6 inches and a radius of 2 inches as shown. The ice cream completely fills the cone, as well as the half-sphere above the cone.

$r = 2$ in.

$h = 6$ in.

Which is closest to the total volume, in cubic inches, of the ice cream?

A. $\frac{16}{3}\pi$

B. 8π

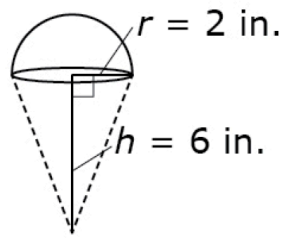C. $\frac{40}{3}\pi$

D. 20π

(DOK 2)

8 G C 9

4. A cone with radius 4 feet and height 10 feet is shown.

10 ft

4 ft
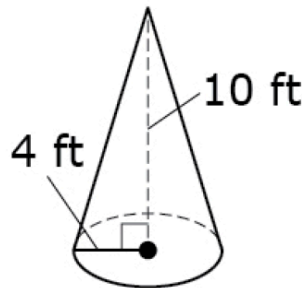
Enter the volume of the cone, in cubic feet. Round your answer to the nearest hundredth.

(DOK 2)

8 G C 9

5. A cone with radius 4 feet is shown. Its approximate volume is 165 cubic feet.

h

4 ft
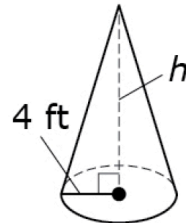
Enter the height of the cone, in feet. Round your answer to the nearest hundredth.

(DOK 1)

8 SP A 1

8 SP A 2

1. This scatter plot shows the relationship between the average weight and average heart rate for 11 different animals.

Animal Weight vs. Heart Rate
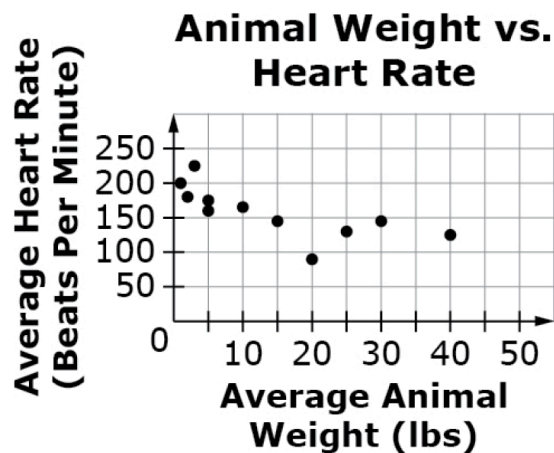
Select True or False for each statement based on the scatter plot.

Statement	True	False
There is a positive association between average weight and average heart rate for animals.		
Animals with higher body weights tend to have lower heart rates than animals with lower body weights.		
For animals weighing 20 lbs or less, there is a linear association between average weight and average heart rate.		

(DOK 1)

8 SP A 1
8 SP A 2
8 SP A 3

1. This scatter plot shows the relationship between the average weight and average heart rate for 11 different animals. The line of best fit is shown on the graph.

Animal Weight vs. Heart Rate
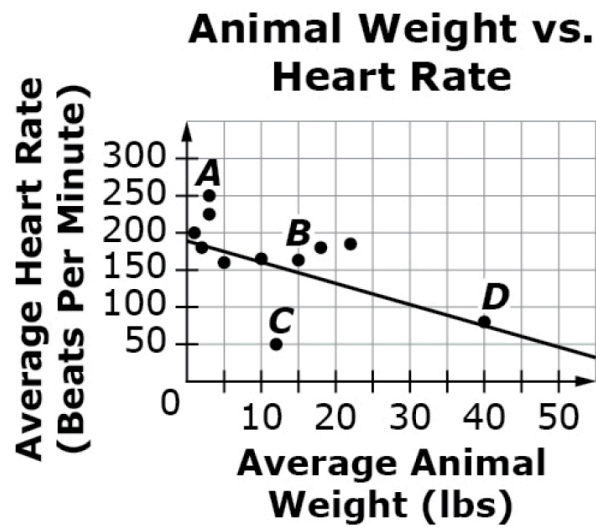
Select True or False for each statement based on the graph.

Statement	True	False
The line of best fit provides a good estimate of an animal's average heart rate based on its weight for all animals.		
The y-intercept is at approximately (0, 185).		
Point D is one outlier because it is far away from the other data points.		

(DOK 2)

8 SP 3   1. Every boxer puppy in a litter is weighed each day. The scatter plot show the age and mass recorded at each weighing.

Age and Mass of Boxer Puppies
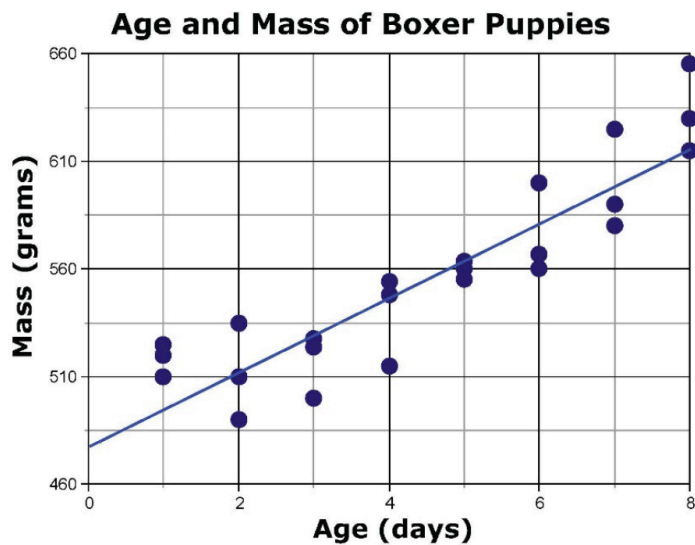
The line of best fit has equation $y = a + bx$, where a and b are constants. What does the y-intercept tell you about the puppies in the litter?

A. The predicted change in mass of a puppy each day.
B. The predicted mass of a puppy at birth.
C. The number of puppies born on day 0.
D. The mass of the entire litter of puppies.

(DOK 2)

8 SP 3   2. Each puppy in a litter is weighed each day. The scatter plot shows the age and mass recorded at each weighing.

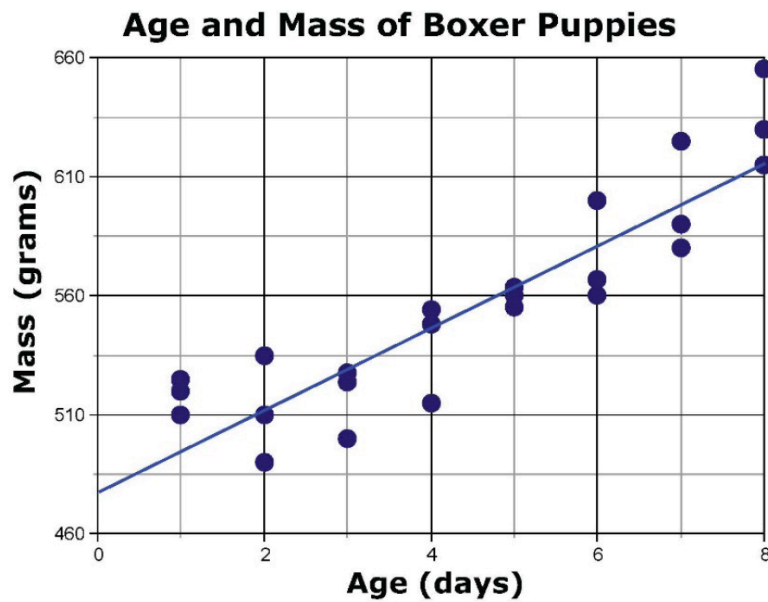## Age and Mass of Boxer Puppies

The line of best fit is shown on the scatter plot. What does the slope of the line tell you about the puppies in the litter?

A. The predicted change in mass of a puppy each day.
B. The predicted mass of a puppy at birth.
C. The number of puppies born on day 0.
D. The mass of the entire litter of puppies.

(DOK 2)

8 SP 4   1. All 8th grade students at a school answered Yes or No to the two survey questions shown.

- Do you have a cell phone?   Yes   No
- Do you have an MP3 player?   Yes   No

The results of the survey are shown in the table.

	MP3 Player	No MP3 Player	Total
Cell Phone	58	122	180
No Cell Phone	30	65	95
Total	88	187	275

What percentage of the students have both a cell phone and an MP3 player?

A. 21%
B. 32%
C. 66%
D. 68%

(DOK 2)

8 SP 4   2. A company surveyed both adults and children about whether or not they liked a particular game. The survey results are shown in the table.

	Liked the game	Did not like the game	Total
Adults	28	20	48
Children	54	98	152
Total	82	118	200

Which of the following correctly compares the proportion of adults who liked the game with the proportion of children who liked the game?

    A. They are approximately the same.

    B. The proportion of adults who liked the game is <u>greater than</u> the proportion of children who liked the game.

    C. The proportion of adults who liked the game is <u>less than</u> the proportion of children who liked the game.

    D. It is not possible to compare these proportions with the information given.

(DOK 2)

8 SP 4   3. All 8th grade students at a school answered Yes or No to the two survey questions shown.

- Do you have a cell phone?   Yes No
- Do you have an MP3 player?   Yes No

The results of the survey are shown in the table.

	MP3 Player	No MP3 Player	Total
Cell Phone	58	122	180
No Cell Phone	30	65	95
Total	88	187	275

Is there an association between owning a cell phone and owning an MP3 Player for the students at this school?

    A. Yes, because more than half of the students own a cell phone but less than half own an MP3 player.

    B. Yes, because the proportion of students who own an MP3 player is almost the same for students who own a cell phone and for students who do not.

    C. No, because more than half of the students own a cell phone but less than half own an MP3 player.

    D. No, because the proportion of students who own an MP3 player is almost the same for students who own a cell phone and for students who do not.

(DOK 2)

8 SP 4   4. A coach of a cross country team asked all 200 of the runners who ran at a meet two questions:

Did you get less than 8 hours of sleep last night?   Yes   No
Did you achieve a personal record in this meet?   Yes   No

A summary of the data is shown in the table.

	8 or more hours of sleep	Less than 8 hours of sleep	Total
Personal Record	28	20	48
No Personal Record	54	98	152
Total	82	118	200

The coach saw an association between the amount of sleep and achieving a personal record for the runners. Which statement provides evidence for this association?

  A. About 34% of the runners who got more than 8 hours of sleep achieved a personal record, but only 17% of those who got less than 8 hours of sleep did.
  B. More than 50% of the runners who achieved a personal record got 8 or more hours of sleep.
  C. Only 25% of the runners achieved a personal record at the meet.
  D. There is no evidence for an association.