

SAT Math Practice Test 4 Module 2.1 – Answers

*1 **A.** Mental Math:

$$\frac{10y}{2} = 5 \rightarrow 5y = 5 \rightarrow y = 1.$$

*2 **9.** Since $5x = 8$, the value of $10x$ in the bottom equation = 16. Substitute this for $10x$.
 $-10x + y = -7 \rightarrow -16 + y = -7 \rightarrow y = 16 - 7 = 9$.

3 **29.** $5x + x + 3x + 3x + 12 = 360 \rightarrow 12x = 360 - 12 \rightarrow 12x = 348 \rightarrow x = 29$.

4 **B.** In 3 ounces packets: $6 \times 6 = 36$ cookies. In 6 ounces packets: $3 \times 12 = 36$ cookies. Total = $36 + 36 = 72$.

*5 **D.**

$$\frac{2x-1}{x-3} - \frac{x}{x-3} = 2 \rightarrow \frac{2x-1-x}{x-3} = 2 \rightarrow x-1 = 2(x-3) \rightarrow x-1 = 2x-6 \rightarrow x = 5$$

*6 **C.** $g(2) = 7$ is point $(2, 7)$ and $g(-2) = 1$ is point $(-2, 1)$. Slope = $\frac{7-1}{2-(-2)} = \frac{6}{4} = \frac{3}{2}$.

Plug in slope and any point in $y = mx + b$ equation to determine b .

$$7 = \left(\frac{3}{2} \times 2\right) + b \rightarrow 7 = 3 + b \rightarrow b = 4.$$

(*This question may be solved quicker using the Desmos graphing calculator.)

7 **D.** Determine feet per hour. Let feet = x . Set up a proportion: $\frac{\text{miles}}{\text{feet}} = \frac{1}{5,280} = \frac{120}{x} \rightarrow x = 120 \times 5,280$ feet per hour.

Convert to feet per minute: $\frac{120 \times 5,280}{60} = 10,560$. Alternatively, use conversion factors method.

8 **C.** Mental Math: Since the associated margin of error is 12 minutes, it is plausible that the employees take between $40 - 12 = 28$ and $40 + 12 = 52$ minutes of lunch break each working day.

*9 **9.** Rearrange as quadratic equation $ax^2 - 6x + 1 = 0$. Set the discriminant to 0 and determine a : $b^2 - 4ac = 0 \rightarrow (-6)^2 - (4 \times a \times 1) = 0 \rightarrow 36 - 4a = 0 \rightarrow 36 = 4a \rightarrow a = 9$.

(*This question may be solved quicker using the Desmos graphing calculator, if a student is proficient in using the slider feature.)

10 **D.** Mental Math: $x =$ reciprocal of $\frac{5}{9}$ will result in 1. This will decrease y by 1. See verification: $y = 524 - \left(\frac{5}{9} \times \frac{9}{5}\right) = 524 - 1 = 523$.

11 **B.** There are 8 multiples of 5 between 1 and 40: 5, 10, 15, 20, 25, 30, 35, and 40. Hence there are $40 - 8 = 32$ numbers in the basket. There are 13 multiples of 3 between 1 and 40, but 15 and 30 are excluded. Hence, there are 11 remaining multiples of 3.

$$\frac{\text{multiples of 3 from integers 1 to 40, excluding multiples of 5}}{\text{total integers from 1 to 40 excluding multiples of 5}} = \frac{11}{32}$$

*12 **A.** Equation 1: Let number of ice cream cones = x and let number of ice cream cups = y . Hence, $x + y = 79$.

Equation 2: Cost of x ice cream cones = $1.50x$ and cost of y ice cream cups = $1y = y$. Hence, $1.5x + y = 104$.

$$\begin{array}{r} 1.5(x + y = 79) \quad \rightarrow \quad 1.5x + 1.5y = 118.5 \\ -(1.5x + y = 104) \quad \rightarrow \quad -1.5x - y = -104 \\ \hline \end{array}$$

$$0.5y = 14.5 \rightarrow y = 29$$

(*After the two equations have been identified, this question may be solved quicker using the Desmos graphing calculator to determine the value of y .)

13 **C.** No Calculation Required: When $a = 1$, the height of the plant will increase by 0.125.

*14 **3.5.** $x = \frac{3}{2} = 1.5$. Hence, $f(1.5) = 2(1.5)^3 - 5(1.5)^2 + 8 = 6.75 - 11.25 + 8 = 3.5$. (*This question may be solved quicker using the Desmos graphing calculator.)

15 C. Each side = 5.5. Since one side of each cube is glued, the surface area of each cube is reduced by one side. Hence, the surface area of each cube is $5s^2$. Surface area of the two cubes = $10s^2 = 10 \times 5.5 \times 5.5 = 302.5$.

16 A. Rearrange to quadratic equation: $y = 2x^2 + 8x + 3$.

Determine x -coordinate of the vertex: $-\frac{b}{2a} = -\frac{8}{4} = -2$. Hence, the factor for vertex form is $(x + 2)^2$.

Determine the y -coordinate of the vertex: Plug $x = -2$ in the equation. $y = 2(-2)^2 + (8 \times -2) + 3 = 8 - 16 + 3 = -5$.

(*This question may be solved quicker using the Desmos graphing calculator.)

***17 B.** Move 4 to the right-side and square both sides: $(\sqrt{5x + 26})^2 = (x + 4)^2 \rightarrow 5x + 26 = (x + 4)^2$.

Form a quadratic equation and solve for factors: $5x + 26 = x^2 + 8x + 16 \rightarrow x^2 + 8x - 5x + 16 - 26 = 0 \rightarrow$

$x^2 + 3x - 10 = 0$. The two factors are $(x - 2)$ and $(x + 5)$. Hence, the values of x are 2 and -5 .

Check for extraneous solution by plugging both the values of x in the given equation. -5 is an extraneous solution.

(*This question may be solved quicker using the Desmos graphing calculator. Desmos does not graph the extraneous solution.)

***18. A.** Although the value of a is unknown, it will not affect at how many points the graph intersects the x -axis. Plug in $a = 1$ and the given coordinates of the vertex in the vertex form equation and then convert it to standard form equation.

$y = 1(x - 7)^2 + 1 \rightarrow y = (x - 7)^2 + 1 \rightarrow y = x^2 - 14x + 49 + 1 \rightarrow y = x^2 - 14x + 50$.

Discriminant = $(-14)^2 - (4 \times 1 \times 50) = 196 - 200 = -4$. Since the discriminant is less than 0, there is no real solutions.

(*This question may be solved quicker using the Desmos graphing calculator.)

19. D. Area of the equilateral triangular base = $\frac{\sqrt{3}}{4} \times 4 \times 4 = 4\sqrt{3}$. Volume of the prism = $4\sqrt{3} \times 6\sqrt{3} = 24 \times 3 = 72$.

***20 C.** Translated function $h(x) = -5(x + 6) + 22$.

$a = x$ -intercept: $0 = -5x - 30 + 22 \rightarrow 0 = -5x - 8 \rightarrow 5x = -8 \rightarrow x = -1.6$.

$b = y$ -intercept: $y = -5(0 + 6) + 22 \rightarrow y = -30 + 22 = -8$.

$a - b = -1.6 - (-8) = -1.6 + 8 = 6.4$.

(*This question may be solved quicker using the Desmos graphing calculator.)

21 A. Since there are 40 adults, the bar that includes the 20th and 21st adult contains the median number of times. Starting from the left bar, continue a cumulative count of the number of adults for each bar till the bar containing the 20th to 21st adult is reached. The bar that is at least 10 but less than 15 includes 20th to 21st adult and, hence, contains the median data point. The median can be any integer between 10 and 14. Correct answer is 10, 11, 12, 13, or 14.

***22 B.** $f(x + 3)$ is a translation of 3 units to the left. Hence, $f(x) = (x + 2 - 3)^2 + 1 \rightarrow f(x) = (x - 1)^2 + 1$. Start with the x value of the point from the table in the first answer choice. Plug it in the above equation and evaluate the corresponding y value. It must match with the y value in the table. The table that contains all three correct x and y values is the correct answer choice. (*This question may be solved quicker using the Desmos graphing calculator.)

SAT Math Practice Test 4 Module 2.2 – Answers

*1 **B.** Positive value: $x - 4 = 3 \rightarrow x = 7$. Negative value: $x - 4 = -3 \rightarrow x = 1$. Since 7 is greater than 1, $b = 7$.

*2 **D.** Slope = $\frac{6-0}{4-2} = \frac{6}{2} = 3$. Plug slope and any point in $y = mx + b$ equation. $0 = (3 \times 2) + b \rightarrow 0 = 6 + b \rightarrow b = -6$. (*This question may be solved quicker using the Desmos graphing calculator.)

*3 **D.** $2n + 6 = 3n - 6 \rightarrow 3n - 2n = 6 + 6 \rightarrow n = 12$. (*This question may be solved quicker using the Desmos graphing calculator.)

4 **1/2 or 0.5.** $k^7 = \frac{1}{4} \times k^5 \rightarrow \frac{k^7}{k^5} = \frac{1}{4} \rightarrow k^2 = \frac{1}{4} \rightarrow k = \frac{1}{2}$.

*5 **2.** Select any two points from the table to determine slope. Slope = $\frac{6-2}{7-1} = \frac{4}{6} = \frac{2}{3}$.

Plug slope and any point in $y = mx + b$. $2 = \frac{2}{3}(1) + b \rightarrow b = 1\frac{1}{3}$.

$m + b = \frac{2}{3} + 1\frac{1}{3} = 2$. (*This question may be solved quicker using the Desmos graphing calculator.)

6 **D.** No Calculation Required: cost of x pounds of apples + y pounds of blueberries is \$83.70. Hence, $1.69x + 4.99y = 83.70$.

7 **B.** Mental Math: Slope is positive and $\frac{\text{rise}}{\text{run}} = 1$ from the graph. The y -intercept is negative since it is below 0. Only answer choice B matches this.

*8 **B.** No Calculation Required: The distinct zeros are 0, 3, 1, and -2 . Hence, 4 distinct zeros.

*9 **D.** Slope: = $\frac{15.95-9.97}{4-2} = \frac{5.98}{2} = 2.99$. y -intercept is the cost of 0 pounds of cherries. For every 2 pounds of cherries difference in cost is \$5.98. Hence, for 0 pounds of cherries cost is $9.97 - 5.98 = 3.99$. This matches answer choice D.

10 **B.** Length l increased by 20% is $1.2l$. Width w decreased by 30% is $0.7w$. Changed area = $1.2l \times 0.7w = 0.84lw$. This is 16% decrease of lw .

11 **5.** A: one-fourth of 12 is 3. B: one and three-fourth of 4 is $4 + 3 = 7$. Total in 2 cups = $3 + 7 = 10$. Hence, 1 cup = 5.

12 **B.** Total jackets = $40 + 40 + 35 + 25 + 30 + 30 = 200$.

Jackets sold online (top bar) = $25 + 20 + 25 + 5 + 20 + 5 = 100$. 100 is 50% of 200.

13 **B.** Sum formula: $-\frac{B}{A} = 2 \rightarrow -\frac{38k-52}{45} = 2 \rightarrow -(38k - 52) = 2 \times 45 \rightarrow -38k = 90 - 52 = 38 \rightarrow k = -1$.

14 **B.** Margin of error is $60\% - 5\% = 55\%$ and $60\% + 5\% = 65\%$. Hence, number of friends is between $200 \times 0.55 = 110$ and $200 \times 0.65 = 130$ and the inequality is $110 \leq \text{friends} \leq 130$.

After including 15 family members: $15 + 110 \leq x \leq 15 + 130 \rightarrow 125 \leq x \leq 145$.

15 **100.** Mental Math: At every point on the graph the total cost is d dollars. Select any point and determine the total cost of folders and notebooks. Calculation is easier using the intercepts.

x -intercept = 50 folders. Total cost = $50 \times \$2 = 100$. Note that at y -intercept = notebooks the total cost is same, $40 \times \$2.50 = 100$.

*16 **B.** Evaluate each point for true and false for both the inequalities. (*This question may be solved quicker using the Desmos graphing calculator.)

17 **C.** Since angles A and B are same, ABC is a right isosceles triangle. Hence, $AB = BC$. Let $AB = BC$ be a . Use Pythagorean theorem to determine BC :

$$(AB)^2 + (BC)^2 = (AC)^2 \rightarrow a^2 + a^2 = \left(\frac{4}{\sqrt{2}}\right)^2 \rightarrow 2a^2 = \frac{16}{2} \rightarrow a^2 = \frac{16}{4} = 4 \rightarrow a = \pm 2$$

Since a length cannot be negative $a = 2 = BC$.

$$18 \text{ A. } f(-2) = f(-12) \rightarrow a(-2)^2 - 5(-2) + c = a(12)^2 - 5(12) + c \rightarrow 4a + 10 + c = 144a - 60 + c \rightarrow 140a = 70 \rightarrow a = \frac{70}{140} = \frac{1}{2}$$

19 C. **Mental Math:** The x -coordinate of the vertex = 4.2 is the midpoint of the two x -intercepts (solutions). Both x -intercepts are equidistant from 4.2. The distance between 7 and 4.2 is 2.8. Hence, the other x -intercepts $4.2 - 2.8 = 1.4$.

*20 B. Since the system has infinitely many solutions, the ratios of coefficients a , b , and c are the same. Rearrange equations to standard form and equate the ratio of c with either a or b . Ratios of a and c are equated below.

$$x - \frac{7}{2}y + \frac{k}{2} = -\frac{3}{2}x + \frac{1}{2}y \rightarrow x - \frac{7}{2}y + \frac{3}{2}x - \frac{1}{2}y = -\frac{k}{2} \rightarrow \frac{5}{2}x - 4y = -\frac{k}{2}$$

$$\frac{1}{2}x - \frac{3}{5}y = 4 + \frac{1}{5}y \rightarrow \frac{1}{2}x - \frac{3}{5}y - \frac{1}{5}y = 4 \rightarrow \frac{1}{2}x - \frac{4}{5}y = 4$$

Equate the ratios of a and c :

$$\frac{5}{2} \div \frac{1}{2} = -\frac{k}{2} \div 4 \rightarrow \frac{5}{2} \times 2 = -\frac{k}{2} \times \frac{1}{4} \rightarrow 5 = -\frac{k}{8} \rightarrow k = -40$$

(*This question may be solved quicker using the Desmos graphing calculator, if a student is proficient in using the slider feature.)

21 D. Area = $\frac{\sqrt{3}}{4}a^2 = \sqrt{3} \rightarrow a^2 = 4 = 2^2 \rightarrow a = 2$. Hence, $AB = BC = AC = ED = EF = FD = 2$. Since all sides of the square $BCDE$ are same, $BC = CD = DE = BE = 2$.

$$\text{Perimeter} = AB + BE + EF + DF + CD + AC = 2 \times 6 = 12.$$

*22 0.5. Rearrange: $y = -3x^2 + 5x + 2$ and $y = 2x + a$.

$$\text{Equate and form a quadratic equation: } -3x^2 + 5x + 2 = 2x + a \rightarrow -3x^2 + 5x + 2 - 2x - a = 0 \rightarrow -3x^2 + 3x + 2 - a = 0.$$

Set the discriminant to 0 and determine a : (Note that in the above equation, $c = 2 - a$.)

$$b^2 - 4ac \rightarrow 3^2 - (4 \times -3 \times (2 - a)) = 0 \rightarrow 9 - (-12 \times (2 - a)) = 0 \rightarrow 9 - (-24 + 12a) = 0 \rightarrow 9 + 24 - 12a = 0 \rightarrow 33 - 12a \rightarrow 2.75 = a.$$

$$\text{Plug } a \text{ and determine } x: -3x^2 + 3x + 2 - 2.75 = 0 \rightarrow -3x^2 + 3x - 0.75 = 0 \rightarrow -x^2 + x - 0.25 = 0 \rightarrow x^2 - x + 0.25 = 0 \rightarrow (x - 0.5)^2 = 0 \rightarrow x = 0.5.$$

(*This question may be solved quicker using the Desmos graphing calculator, if a student is proficient in using the slider feature.)

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Digital SAT Math

Practice Test 5

Module 2.1

Test duration - 35 min

Total questions - 22

Time the test: If you have not completed all the questions in this module within 35 minutes, then leave the remaining questions and proceed to Module 2.2. You can complete the remaining questions after you have completed checking the answers.

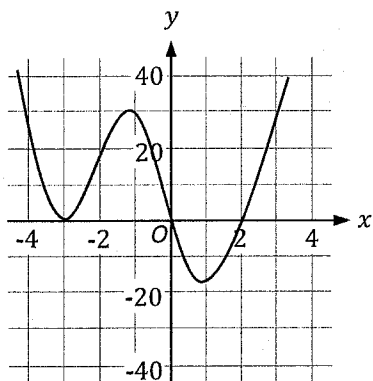
Practice Test 5

1

A helicopter takes-off from a rooftop helipad and rises at a constant rate of 32 feet per second. If the rooftop helipad is 65 feet from the ground, which of the following equations can be used to determine the height h , in feet, of the helicopter above the ground s seconds after take-off, where $65 < h < 8,000$?

- A) $h = 32 + \frac{s}{65}$
 B) $h = 65 + \frac{s}{32}$
 C) $h = 32 + 65s$
 D) $h = 65 + 32s$

2



In the xy -plane, the graph of the function f , where $y = f(x)$, is shown above. What equation defines f ?

- A) $f(x) = x(x - 2)(x + 3)^2$
 B) $f(x) = x(x + 2)(x - 3)^2$
 C) $f(x) = (x - 2)(x + 3)^2$
 D) $f(x) = (x + 2)(x - 3)^2$

3

$$10x - 7y = 21$$

$$-8x + 5y = -18$$

The lines corresponding to the above system of equations intersect at the point (x, y) . What is the value of $x - y$?

4

The radius of a right circular cone is 6 times its height. Which of the following equation expresses the volume V of the cone in terms of its height h ?

- A) $V = \frac{1}{3}\pi + 6h$
 B) $V = 3\pi h^3$
 C) $V = 6\pi h^3$
 D) $V = 12\pi h^3$

5

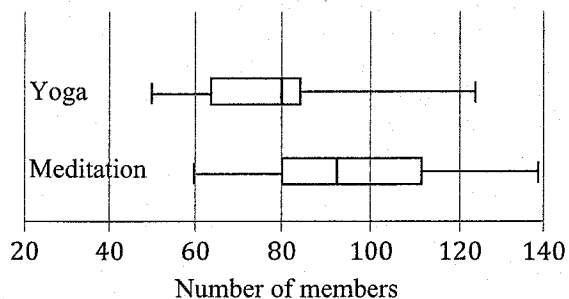
Lannie has \$15.50 to buy muffins and donuts. Each muffin costs \$0.85 and each donut costs \$1.10. If Lannie wants to buy 7 muffins and no sales tax is added, what is the maximum number of whole donuts Lannie can buy?

- A) 6
 B) 8
 C) 9
 D) 11

Practice Test 5

6

Number of Members in Yoga and Meditation Classes



The above box plot summarizes the distribution of the number of members at a gym who attended either yoga classes or meditation classes in August 2021. If a is the median number of members who attended yoga classes and b is the median number of members who attended meditation classes, which of the following statements is true?

- A) $a = b$
- B) $a > b$
- C) $a < b$
- D) Insufficient information is given.

7

$$h(t) = -16t^2 + 80t + 96$$

When an object is thrown in the air from a 96 inches high platform, the height of the object in the air after t seconds can be determined by the function h shown above. How many seconds does the object take to reach the maximum height in the air?

8

$$y = x^2 - 4x - 16$$

One of the zeros of the above equation can be written in the format $a + 2\sqrt{b}$. What is the sum of the constants a and b ?

9

Which expression is equivalent to $(m^3p^2s^{-4})(m^{-3}p^{-4}s^6)$, where m , p , and s are greater than 0?

- A) $\frac{ms^2}{p^{-4}}$
- B) $\frac{ms^2}{p^2}$
- C) mps^{-2}
- D) mp^2s^2

10

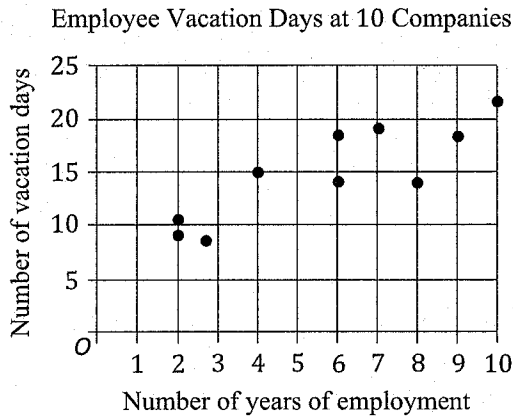
x	-11	-3	3
y	-6.5	k	14.5

The above table shows three values of x and their corresponding values of y , where k is a constant. What is the value of k ?

- A) -3.5
- B) -1.0
- C) 5.5
- D) 10.5

Practice Test 5

11



The above scatter plot shows the number of vacation days of an employee at 10 companies based on the number of years an employee has been employed at a company. Which of the following is the best interpretation of the y -intercept of a line of best fit?

- A) The estimated number of vacation days of an employee at the start of the employment.
- B) The estimated number of vacation days of an employee who has never worked before.
- C) The estimated number of vacation days of an employee who has been employed for 8 years.
- D) The estimated number of years an employee must be employed before getting vacation days.

12

The population of bees in a certain forest decreased exponentially by 3% every 2 years. If the population P in 2012 was n millions, which of the following represents the population of bees t years after 2012?

- A) $P = n(1.3)^{2t}$
- B) $P = n(1.3)^t$
- C) $P = n(0.97)^t$
- D) $P = n(0.97)^{\frac{t}{2}}$

13

A restaurant received an order for 60 packaged meals on a certain day. The preparation of the packaged meals was equally divided amongst x cooks, where x is a constant. If after 1 hour y packaged meals were prepared, which of the following expression represents the number of packaged meals left for each cook to prepare?

- A) $\frac{60-y}{x}$
- B) $\frac{y-60}{x}$
- C) $\frac{60}{y-x}$
- D) $60x - y$

14

$$y \leq \frac{1}{4}x + 1$$

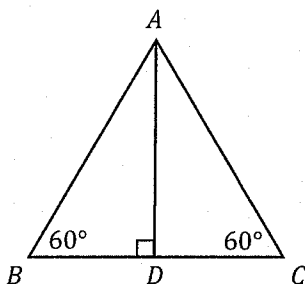
$$y \geq -\frac{1}{6}x - 11$$

The point $(55, y)$ is a solution to the given system of inequalities. What is a possible value of y ?

- A) -25
- B) -19
- C) 18
- D) 29

Practice Test 5

15



In the figure above, $AD = \sqrt{3}$ bisects \overline{BC} at point D . What is the length of \overline{BC} ?

16

A coffee distribution company sells coffee packs in varying sizes, in pounds. The graph of the function $g(x) = -3(x - 2)(x - 10)$ in the xy -plane, where $y = g(x)$, models the company's monthly profit y , in thousands of dollars, as a function of the pack size x , in pounds. Based on the equation, the maximum monthly profit of the company, in thousands of dollars, is for what pack size, in pounds?

17

A manufacturing company specializes in producing glass bottles of varying sizes. An inspection of a random sample of 400 glass bottles showed that 2 glass bottles had one or more cracks. If the manufacturer produces 20,000 bottles in a month and the proportion of the glass bottles with one or more cracks is the same, how many glass bottles produced in a month have one or more cracks?

18

In the xy -plane, the graphs of two perpendicular lines r and q intersect at the point $(-2, -10)$. Line r intersects the y -axis at the point $(0, -14)$. Which of the following table gives three values of x and their corresponding values of y on the graph of line q ?

A)

x	y
-12	-3
-2	8
1	-16

B)

x	y
-8	2
-3	8
1	-16

C)

x	y
10	-4
17	5
30	6

D)

x	y
10	-4
22	2
30	6

Practice Test 5

19

In a right triangle, the two acute angles are x and y . If $\sin (2a - 20)^\circ$ of the angle x is equal to $\cos (3a + 10)^\circ$ of the angle y , what is the value of a ?

- A) 5
B) 10
C) 20
D) 22

20

$$y = (x - 2)(x + 8)$$

$$2x - y = 11$$

Which (x, y) ordered pair is a solution to the given system?

- I. $(-5, -21)$
II. $(1, 9)$
- A) I only
B) II only
C) I and II
D) Neither I nor II

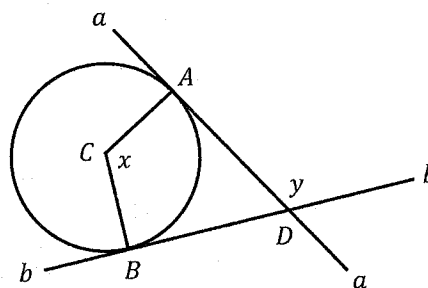
21

$$-\frac{3}{2}x + \frac{1}{4}y = \frac{3}{2}x - \frac{k}{4}y + 8$$

$$\frac{5}{2}x - \frac{1}{2}y - \frac{1}{4} = x + \frac{3}{2}y + \frac{3}{4}$$

In the given system of equations, k is a constant. For what value of k , the system has no solution?

22



Note: Figure not drawn to scale

In the figure above, point C is the center of the circle and lines a and b are tangent to the circle at points A and B , respectively, and intersect at the point D .

If $x = \frac{2\pi}{3}$, what is the value of y , in radians?

- A) $\frac{\pi}{3}$
B) $\frac{5\pi}{9}$
C) $\frac{2\pi}{3}$
D) $\frac{5\pi}{3}$

Digital SAT Math

Practice Test 5

Module 2.2

Test duration - 35 min

Total questions - 22

Time the test: If you have not completed all the questions in this module within 35 minutes, then leave the remaining questions and proceed to check the answers. You can complete the remaining questions after you have completed checking the answers.

Practice Test 5

1

$$\frac{2}{3}x - \frac{1}{2} = \frac{1}{6}x$$

What is the value of x in the above equation?

- A) 1
- B) 5
- C) 6
- D) 10

2

Which expression is equivalent to $(3x^3 + 2x^2 + 2x) - x(2x^2 - 3x + 2)$?

- A) $-5x^3 - 5x^2 + 4$
- B) $-3x^3 + 2x^2 + 2$
- C) $x^3 - x^2$
- D) $x^3 + 5x^2$

3

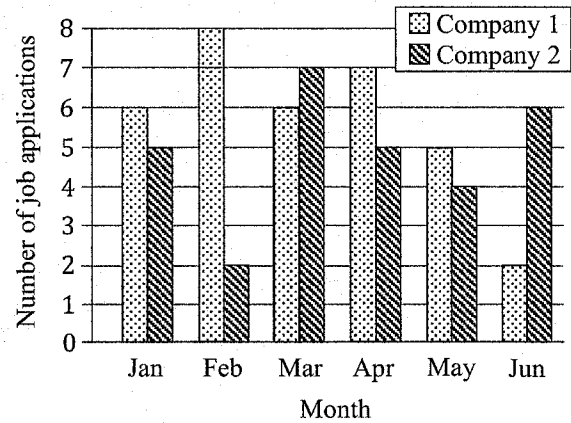
$$g(x) = \frac{5+x}{3}$$

For the function g defined above, what is the value of $g(7) + g(10)$?

- A) 4
- B) 5
- C) 9
- D) 17

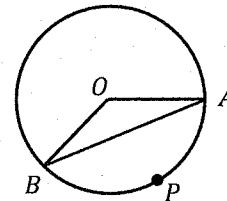
4

Number of Job Applications at 2 Companies



The above bar graph shows the number of job applications received at two companies, Company 1 and Company 2, from January to June last year. By how much is the median number of job applications at company 1 greater than the median number of job applications at Company 2?

5



Note: Figure not drawn to scale

In the figure above, O is the center of the circle and points A , B , and P lie on the circumference of the circle. The degree measure of the arc APB is 120° . Which of the following is true about the degree measure of angle OAB ?

- A) The degree measure of angle OAB is 120° .
- B) The degree measure of angle OAB is 60° .
- C) The degree measure of angle OAB is 30° .
- D) The degree measure of angle OAB is 20° .

Practice Test 5

6

$$3\left(mx - \frac{2}{15}\right) = \frac{7.5}{20}x + \frac{6}{15}$$

The given equation has no solution, where m is a constant. What is the value of m ?

7

A party planner bought 60 balloons to display on 5 tables. $\frac{1}{4}$ th of the balloons popped and had to be discarded. The remaining balloons were equally divided for display on the 5 tables. Of the total number of balloons bought by the party planner, what percent of the balloons were displayed on each of the 5 tables?

- A) 8%
- B) 12%
- C) 15%
- D) 20%

8

Which equation is equivalent to $y = (4x)^{\frac{2}{a}}$, where $x > 0$?

- A) $y = \sqrt[a]{4x^2}$
- B) $y = \sqrt[a]{16x^2}$
- C) $y = \sqrt{16x^a}$
- D) $y = 16x$

9

Samona opened a bank account with an initial deposit of \$400. Each week after the account opening, she deposited at least \$50 but not more than \$75 in the account. Which of the following inequalities represents all possible amounts A , in dollars, in the bank account after 16 weekly deposits, assuming no withdrawals or additional deposits were made?

- A) $800 \leq A \leq 1,200$
- B) $800 \leq A \leq 1,600$
- C) $1,200 \leq A \leq 1,600$
- D) $1,200 \leq A \leq 1,800$

10

Number of boxes	Weight, in pounds
2	1
4	2
4	5
6	10
4	15
5	20

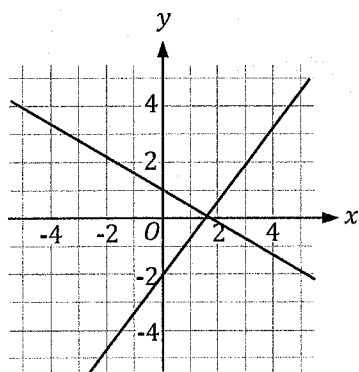
The above table shows the individual weight of 25 boxes, in pounds. What is the mean weight, in pounds, of the 25 boxes?

Practice Test 5

11

In a triangle with sides a , b , and c , $a = 4$ and $b = 7$. If $c > 8$, what can be one possible integer value of c ?

12



In the xy -plane, the graph of two lines in a linear system of equations is given above. Which of the following could be the system of equations of the given graph?

- A) $-4x - 3y = 6$
 $x - 3y = 6$
- B) $4x - 3y = 6$
 $3x - 5y = 5$
- C) $3x + 5y = 5$
 $4x - 3y = 6$
- D) $x + 3y = -2$
 $2x + 2y = 1$

13

If $t(x) = x^3 - h(x + 1)$ and $h(x) = x^2 - 26$, what is the value of $t(5)$?

- A) 15
B) 32
C) 115
D) 135

14

$$\sqrt{4(2x + 3)} = 2x$$

What values of x satisfy the expression above?

- I -3
II -1
III 3
- A) I only
B) III only
C) I and III only
D) II and III only

Practice Test 5

15

$$(2ax + 3)(bx + 4) = 6x^2 + 17x + 12$$

The above expression is true for all values of x . What is the value of ab , where a and b are constants?

16

The function f is defined by $f(x) = 5x - 14$. Which of the following table gives three values of x and their corresponding values of $y = f(x) + 5$ in the xy -plane?

A)

x	y
-2	-24
3	1
5	11

B)

x	y
-2	-19
3	1
7	21

C)

x	y
-2	-19
4	1
8	21

D)

x	y
-2	-19
2	1
6	21

17

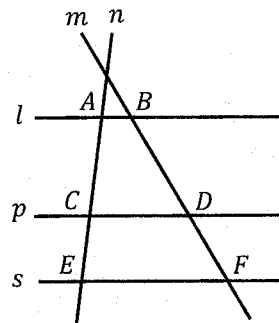
$$\frac{3}{5}x(7x - 13) = \frac{6}{5}x^2 + c$$

In the xy -plane, the graph of the above equation has exactly two solutions, where c is a constant. The product of the two solutions is $\frac{1}{4}$. What is the value of c ?

A) -4

B) $-\frac{3}{4}$ C) $\frac{3}{5}$ D) $\frac{3}{4}$

18



Note: Figure not drawn to scale.

In the above figure, lines m and n intersect parallel lines l , p , and s . Points A and B are on line l , points C and D are on line p , and points E and F are on line s . If $AC = 5.6$, $CE = 3.5$, and $BD = 7$, which of the following ranges contain the length of \overline{DF} ?

A) 4.2 to 4.4

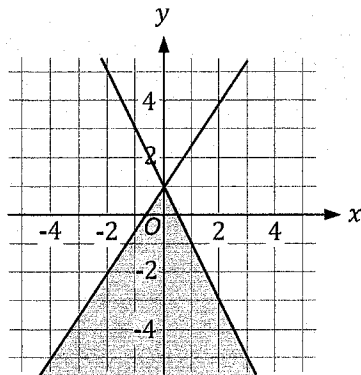
B) 4.5 to 4.7

C) 4.8 to 5.0

D) 5.1 to 5.3

Practice Test 5

19



Which of the following system of inequalities contain the solution of the above graph in the xy -plane?

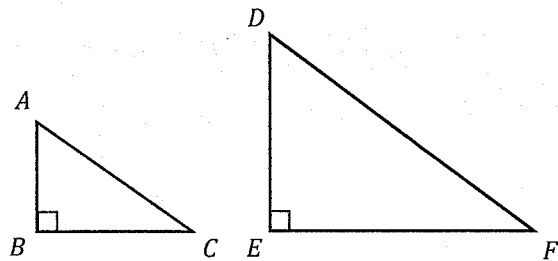
- A) $-y < -2x - 1$
 $y < -3x + 2$
- B) $y > -2x - 1$
 $-y \leq x + 2$
- C) $y \geq 3x + 1$
 $y \leq 2x + 1$
- D) $y \leq -2x + 1$
 $y \leq 1.5x + 1$

20

The function $B(m) = w(0.75)^{\left(\frac{6}{30}\right)m}$ models the number of bacterial colonies in m minutes since the start of a scientific experiment, where w is the number of bacterial colonies at the start of the experiment and $B(m)$ is the number of bacterial colonies in m minutes after the start of the experiment. What is the best interpretation of $(0.75)^{\left(\frac{6}{30}\right)m}$?

- A) The number of bacterial colonies reduced by 2% every minute.
- B) The number of bacterial colonies reduced by 25% every 5 minutes.
- C) The number of bacterial colonies reduced by 25% every 6 minutes.
- D) The number of bacterial colonies reduced by 0.25% every 30 minutes.

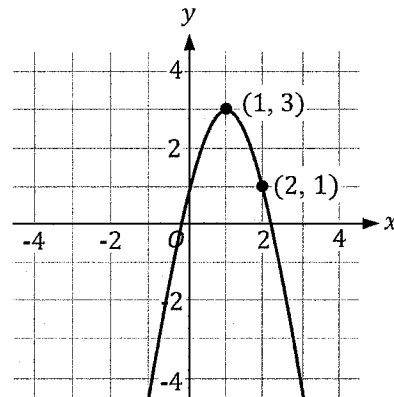
21



Note: Figure not drawn to scale.

In the triangle ABC above, $\cos C = 0.8$. Triangle DEF is a similar triangle, where vertices D , E , and F correspond to vertices A , B , and C , respectively. If $DE = 15$, what is the length of \overline{EF} ?

22



The graph of a parabola in the xy -plane is shown above. If the equation of the parabola is written in the form $y = ax^2 + bx + c$, where a , b , and c are constants, what is the value of $a - b$?

- A) -6
- B) -2
- C) 2
- D) 6

Digital SAT Math

Practice Test 5

Answers

SAT Math Practice Test 5 Module 2.1 – Answers

1 D. No Calculation Required: Starting height = 65. Increase in height = 32 feet per second. Hence, increase in height in s seconds = $32s$. Total height in s seconds = $65 + 32s$.

2 A. No Calculation Required: The graph intersects the x -axis at 0 and 2. The corresponding factors are x (or multiple of x) and $x - 2$. The graph touches the x -axis at -3 and curves back. The corresponding factors are $(x + 3)^2$.

***3 1.5 or 3/2 Mental Math:** It can be observed that adding the two equations will give the value of $2x - 2y = 3$. Dividing this by 2 is $x - y = 1.5$.

4 D. Radius is 6 times the height h . Hence, radius = $6h$. Plug $6h$ for radius in the volume formula.

$$\frac{1}{3}\pi r^2 h \rightarrow \frac{1}{3}\pi(6h)^2 h \rightarrow \frac{1}{3}\pi \times 6h \times 6h \times h \rightarrow 12\pi h^3$$

5 B. Cost of 7 muffins = $7 \times 0.85 = 5.95$. Let number of donuts = x . Hence, cost of x donuts = $1.1x$. Total cost must be \$15.50 or less. Hence, $5.95 + 1.1x \leq 15.50 \rightarrow x \leq 8.68 = 8$ maximum whole donuts.

6 C. Mental Math: Median number of members who attended meditation class b is greater.

***7 2.5.** Time to reach maximum height = x -coordinate of the vertex = $-\frac{b}{2a} = -\frac{80}{2(-16)} = 2.5$. (*This question may be solved quicker using the Desmos graphing calculator.)

8 7. Use the quadratic formula to determine the roots.

$$\frac{-(-4) \pm \sqrt{(-4)^2 - (4 \times 1 \times -16)}}{2 \times 1} = \frac{4 \pm \sqrt{16 + 64}}{2} = \frac{4 \pm \sqrt{80}}{2} = \frac{4 \pm \sqrt{16 \times 5}}{2} = \frac{4 \pm 4\sqrt{5}}{2} = 2 \pm 2\sqrt{5} \rightarrow a = 2, b = 5$$

Hence, $a + b = 2 + 5 = 7$.

9 B. $m^{3-3}p^{2-4}s^{-4+6} = m^1p^{-2}s^2 = \frac{ms^2}{p^2}$.

10 C. Set up 2 slope equations, one including k and one excluding k .

$$\frac{14.5 - (-6.5)}{3 - (-11)} = \frac{14.5 - k}{3 - (-3)} \rightarrow \frac{21}{14} = \frac{14.5 - k}{6} \rightarrow \frac{3}{2} = \frac{14.5 - k}{6} \rightarrow 3 = \frac{14.5 - k}{3} \rightarrow 3 \times 3 = 14.5 - k \rightarrow 9 = 14.5 - k \rightarrow k = 14.5 - 9 = 5.5$$

(*This question may be solved quicker using the Desmos graphing calculator.)

11 A. No Calculation Required: y -intercept from graph = number of days at start of employment.

12 D. Mental Math: 3% decrease = $1 - 0.03 = 0.97$ and every 2 years = $\frac{t}{2}$ per year. This matches answer choice D.

13 A. Mental Math: Remaining meals $60 - y$. Remaining meals per cook = $\frac{60-y}{x}$.

***14 B.** Plug $x = 55$ and y value from each answer choice, one at a time, in both the inequalities and evaluate. (*This question may be solved quicker using the Desmos graphing calculator, if a student is proficient in using the slider feature.)

15 2. Mental Math: Triangle ADB and ADC are congruent 30: 60: 90 triangles, and $BD = CD$. Hence, $BD: AD: AB = a: a\sqrt{3}: 2a$. Since $AD = a\sqrt{3} = \sqrt{3}$, $a = 1 = BD = CD$. Hence, $BC = BD + CD = 1 + 1 = 2$.

***16 6. Mental Math:** Determine the x -coordinate of the vertex. The two factors are $(x - 2)$ and $(x - 10)$. The corresponding x -intercepts are 2 and 10. x -coordinate of the vertex is their midpoint equal to 6. (*This question may be solved quicker using the Desmos graphing calculator.)

17 100. Set up proportion.

$$\frac{\text{bottles with cracks}}{\text{total bottles}} = \frac{2}{400} = \frac{x}{20,000} \rightarrow 400x = 2 \times 20,000 \rightarrow x = 100$$

***18 D.** Slope of line $r = \frac{-14 - (-10)}{0 - (-2)} = \frac{-4}{2} = -2$. Hence, slope of line $q = \frac{1}{2}$. The slope-intercept equation is $y = \frac{1}{2}x + b$.

Determine b for line q : $-10 = \frac{1}{2}(-2) + b \rightarrow -10 = -1 + b \rightarrow b = -9$. Hence, the equation is $y = \frac{1}{2}x - 9$.

Start with the x value from the table in the first answer choice and plug it in the equation of line q . It must match with the corresponding y value. The table that contains all three correct x and y values is the correct choice. (*This question may be solved quicker using the Desmos graphing calculator.)

19 C.

\sin of one acute angle and \cos of the other acute angle add to 90° .

$$(2a - 20) + (3a + 10) = 90 \rightarrow 5a - 10 = 90 \rightarrow 5a = 100 \rightarrow a = 20.$$

***20 A.** Convert quadratic equation to standard form and linear equation to slope-intercept form.

$$y = (x - 2)(x + 8) \rightarrow y = x^2 + 6x - 16 \text{ and } 2x - y = 11 \rightarrow y = 2x - 11$$

Equate the two equations and create one quadratic equation. Factor the quadratic equation to determine the values of x .

$$x^2 + 6x - 16 = 2x - 11 \rightarrow x^2 + 4x - 5 = 0 \rightarrow (x + 5)(x - 1) = 0 \rightarrow x = -5 \text{ and } 1.$$

Plug the values of x in either equation to determine y .

For $x = -5$: $2(-5) - y = 11 \rightarrow -10 - y = 11 \rightarrow y = -10 - 11 = -21$. Hence, Option I is a solution.

For $x = 1$: $2(1) - y = 11 \rightarrow 2 - y = 11 \rightarrow y = 2 - 11 = -9$. Hence, Option II is not a solution.

(*This question may be solved quicker using the Desmos graphing calculator.)

***21 15.** Since the system has no solution, the ratios of coefficients a and b in both the equations will be same.

$$-\frac{3}{2}x + \frac{1}{4}y = \frac{3}{2}x - \frac{k}{4}y + 8 \rightarrow -\frac{3}{2}x - \frac{3}{2}x + \frac{1}{4}y + \frac{k}{4}y = 8 \rightarrow -3x + \frac{1+k}{4}y = 8$$

$$\frac{5}{2}x - \frac{1}{2}y - \frac{1}{4} = x + \frac{3}{2}y + \frac{3}{4} \rightarrow \frac{5}{2}x - x - \frac{1}{2}y - \frac{3}{2}y = \frac{3}{4} + \frac{1}{4} \rightarrow \frac{3}{2}x - 2y = 1$$

Equate the ratios.

$$(-3) \div \left(\frac{3}{2}\right) = \left(\frac{1+k}{4}\right) \div -2 \rightarrow -3 \times \frac{2}{3} = \frac{1+k}{4} \times -\frac{1}{2} \rightarrow -2 = \frac{1+k}{-8} \rightarrow -2 \times -8 = 1+k \rightarrow k = 15$$

(*This question may be solved quicker using the Desmos graphing calculator, if a student is proficient with the slider feature.)

22 C. Since lines a and b are tangent to the circle, $\angle CBD$ and $\angle CAD$ are 90° .

The sum of the angles of a quadrilateral = 360° . Hence, $\angle CBD + \angle CAD + x + \angle ADB = 360$.

For ease, convert x to degrees. $x = \frac{2\pi}{3} \times \frac{180}{\pi} = 120^\circ$

$$90 + 90 + 120 + \angle ADB = 360 \rightarrow 300 + \angle ADB = 360 \rightarrow \angle ADB = 360 - 300 = 60$$

$\angle ADB$ and $\angle y$ are on a straight line. Hence, $\angle ADB + \angle y = 180 \rightarrow 60 + \angle y = 180 \rightarrow \angle y = 120^\circ = 120 \times \frac{\pi}{180} = \frac{2\pi}{3}$.

SAT Math Practice Test 5 Module 2.2 – Answers

***1 A.** $\frac{2}{3}x - \frac{1}{6}x = \frac{1}{2} \rightarrow \frac{4}{6}x - \frac{1}{6}x = \frac{1}{2} \rightarrow \frac{3}{6}x = \frac{1}{2} \rightarrow \frac{1}{2}x = \frac{1}{2} \rightarrow x = 1$. (*This question may be solved quicker using the Desmos graphing calculator.)

***2 D.** $3x^3 + 2x^2 + 2x - 2x^3 + 3x^2 - 2x = x^3 + 5x^2$.

***3 C.** $g(7) + g(10) = \frac{5+7}{3} + \frac{5+10}{3} = \frac{12}{3} + \frac{15}{3} = 4 + 5 = 9$.

4 1. Company 1: Jan = 6. Feb = 8. Mar = 6. Apr = 7. May = 5. Jun = 2. Median of 2, 5, 6, 6, 7, 8 is 6 = A .

Company 2: Jan = 5. Feb = 2. Mar = 7. Apr = 5. May = 4. Jun = 6. Median of 2, 4, 5, 5, 6, 7 is 5 = B . $A - B = 1$.

5 C. Mental Math: Triangle AOB is an isosceles triangle. Angle OAB = angle OBA . Central angle AOB = corresponding arc APB = 120° . Hence, sum of angles OAB and OBA is 60° and each angle is 30° .

6 7.5/60 or 1/8. $3mx - \frac{6}{15} = \frac{7.5}{20}x + \frac{6}{15}$. The constants on both sides of the equation are not equal ($-\frac{6}{15}$ and $+\frac{6}{15}$ are not the same). Hence, the coefficients of x on both sides of the equation must be equal to guarantee the equation has no solution.

$$3m = \frac{7.5}{20} \rightarrow m = \frac{7.5}{60} = \frac{1}{8}$$

7 **C**. One fourth of 60 is 15. Hence, remaining are 45. 45 equally divided by 5 is 9. Hence, each table has 9 ballonnns.

$$9 \text{ is what percent of } 60 = \frac{9}{60} \times 100 = 15\%$$

8 **B**. Mental Math: a is the root of the expression and 2 is the exponent of the expression. Since $(4x)^2$ is $16x^2$, the expression becomes $\sqrt[2]{16x^2}$.

9 **C**. Determine the conditional relationship: Possible amounts saved per week can be $50 \leq \text{possible amount per week} \leq 75$.

Possible amounts saved in 16 weeks can be $(50 \times 16) \leq A \leq (75 \times 16) = 800 \leq A \leq 1,200$.

Possible total amounts A in the bank account in 16 weeks can be $400 + 800 \leq A \leq 1,200 + 400 \rightarrow 1,200 \leq A \leq 1,600$.

*10 **10**. Total weight of boxes = $(2 \times 1) + (4 \times 2) + (4 \times 5) + (6 \times 10) + (4 \times 15) + (5 \times 20) = 250$.

Mean = $\frac{250}{25} = 10$. (*This question may be solved quicker using the Desmos graphing calculator.)

11 **9 or 10**. The 3 conditions are $4 + 7 > c \rightarrow 11 > c$, $4 + c > 7 \rightarrow c > 3$, and $7 + c > 3 \rightarrow c > -4$. Hence, $11 > c > 3$. It is given that $c > 8$. Hence, c can be 9 or 10.

*12 **C**. Mental Math: Evaluate the y -intercepts of the two equations in each answer choice as $\frac{C}{B}$. The y -intercept of one equation must be 1 and the y -intercept of the other equation must be -2 . This matches answer choice C.

*13 **C**. $t(5) = (5)^3 - h(5 + 1) = (5)^3 - h(6)$. Plug in the definition of $h(x)$: $t(5) = (5)^3 - ((6)^2 - 26) = 125 - (36 - 26) = 125 - (10) = 115$. (*This question may be solved quicker using the Desmos graphing calculator.)

*14 **B**. $\sqrt{4(2x + 3)} = 2x \rightarrow 8x + 12 = (2x)^2 \rightarrow 8x + 12 = 4x^2 \rightarrow 4x^2 - 8x - 12 = 0 \rightarrow x^2 - 2x - 3 = 0 \rightarrow (x + 1)(x - 3) \rightarrow x = -1$ and 3 . (*This question may be solved quicker using the Desmos graphing calculator.)

Check -1 for extraneous solution: $\sqrt{4((2 \times -1) + 3)} = 2 \times -1 \rightarrow \sqrt{4} = -2 \rightarrow 2 = -2 \rightarrow$ extraneous solution.

Check 3 for extraneous solution: $\sqrt{4((2 \times 3) + 3)} = 2 \times 3 \rightarrow \sqrt{36} = 6 \rightarrow 6 = 6 \rightarrow$ real solution.

*15 **3**. $2abx^2 + 8ax + 3bx + 12 = 6x^2 + 17x + 12$. Hence, $2ab = 6 \rightarrow ab = 3$.

*16 **D**. The graph of $y = f(x) + 5$ is $y = f(x) = 5x - 14 + 5 = 5x - 9$. Start with the x value of the point from the table in the first answer choice. Plug it in the above equation and evaluate the corresponding y value. It must match with the y value in the table. The table that contains all three correct x and y values is the correct answer choice. (*This question may be solved quicker using the Desmos graphing calculator.)

17 **B**. The product of solution from standard form equation = $\frac{C}{A}$. It is given that the product = $\frac{1}{4}$. Hence, $\frac{C}{A} = \frac{1}{4}$.

Rearrange to form standard form equation: $\frac{21}{5}x^2 - \frac{39}{5}x - \frac{6}{5}x^2 - c = 0 \rightarrow \frac{15}{5}x^2 - \frac{39}{5}x - c = 0 \rightarrow 3x^2 - \frac{39}{5}x - c = 0$.

Hence, $a = 3$ and $c = -c$. Product = $\frac{C}{A} = \frac{1}{4} \rightarrow \frac{-c}{3} = \frac{1}{4} \rightarrow -4c = 3 \rightarrow c = -\frac{3}{4}$.

18 **A**. $\frac{AC}{CE} = \frac{BD}{DF} \rightarrow \frac{5.6}{3.5} = \frac{7}{DF} \rightarrow 5.6 \times DF = 7 \times 3.5 \rightarrow DF = 4.375$. This falls in answer choice A.

*19 **D**. No Calculation Required: Both the lines in the graph have y -intercept = 1. This eliminates answer choices A and B. Both the equations in the answer choice C have a positive slope. This eliminates answer choice C. As seen in the graph, one line has a negative slope. (*This question may be solved quicker using the Desmos graphing calculator.)

20 **B**. Mental Math: Determine the components of exponential decay: $r = 0.25 = 25\%$. Time interval = $\frac{6}{30} = \frac{1}{5}$ is once every 5 minutes. This matches answer choice B.

21 **20**. $\cos C = 0.8 = \frac{8}{10} = \frac{4}{5} = \frac{BC}{AC}$. 4 and 5 are ratios of Pythagorean triple 3: 4: 5. Hence, $AB: BC: AC = 3: 4: 5 =$

$DE: EF: DF$ (sides of similar triangles have the same ratios for the corresponding sides). $DE = 15$ is 5 times of 3, hence, all sides of triangle are 5 times of 3: 4: 5 = $5(3: 4: 5) = 15: 20: 25 = DE: EF: DF \rightarrow EF = 20$.

22 **A**. Determine a : The graph gives the vertex and a point on the parabola. Plug these in the vertex form equation to determine the value of a . $y = a(x - h)^2 + k \rightarrow 1 = a(2 - 1)^2 + 3 \rightarrow 1 = a(1)^2 + 3 \rightarrow 1 = a + 3 \rightarrow a = -2$.

Determine b : The x -coordinate of vertex is 1. Hence, $-\frac{b}{2a} = 1 \rightarrow -\frac{b}{2(-2)} = 1 \rightarrow -\frac{b}{-4} = 1 \rightarrow b = 4$.

$a - b = -2 - 4 = -6$.

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