

## Do Now:

In 2013, the United States Postal Service charged \$0.46 to mail a letter weighing up to 1 oz and \$0.20 per ounce for each additional ounce. Which function would determine the cost, in dollars,  $c(z)$ , of mailing a letter weighing  $z$  ounces where  $z$  is an integer greater than 1?

- 1)  $c(z) = 0.46z + 0.20$
- 2)  $c(z) = 0.20z + 0.46$
- 3)  $c(z) = 0.46(z - 1) + 0.20$
- 4)  $c(z) = 0.20(z - 1) + 0.46$

↑  
# of  
total  
ounces

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- |      |       |       |
|------|-------|-------|
| 1) 2 | 7) 4  | 13) 2 |
| 2) 3 | 8) 1  | 14) 2 |
| 3) 4 | 9) 2  | 15) 4 |
| 4) 3 | 10) 1 | 16) 4 |
| 5) 2 | 11) 3 | 17) 2 |
| 6) 4 | 12) 1 | 18) 4 |

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1 Which expression is equivalent to  $16x^2 - 36$ ?

(1)  $4(2x - 3)(2x - 3)$

(3)  $(4x - 6)(4x - 6)$

(2)  $4(2x + 3)(2x - 3)$

(4)  $(4x + 6)(4x + 6)$

$4(x^2 - 9)$

$4(2x - 3)(2x + 3)$

$\sqrt{16x^2} - \sqrt{36}$

$(4x - 6)(4x + 6)$

$2(2x - 3)2(2x + 3)$

$4(2x - 3)(2x + 3)$

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2 What is the solution set of the equation  $(x - 2)(x - a) = 0$ ?

(1)  ~~$-2$  and  $a$~~

(3)  $2$  and  $a$

(2)  ~~$-2$  and  $-a$~~

(4)  $2$  and  $-a$

$x - 2 = 0$

$x - a = 0$

$x = 2$

$x = a$

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**3** Analysis of data from a statistical study shows a linear relationship in the data with a correlation coefficient of  $-0.524$ . Which statement best summarizes this result?

- (1) There is a strong positive correlation between the variables.
- (2) There is a strong negative correlation between the variables.
- (3) There is a moderate positive correlation between the variables.
- (4) There is a moderate negative correlation between the variables.

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**4** Boyle's Law involves the pressure and volume of gas in a container. It can be represented by the formula  $P_1V_1 = P_2V_2$ . When the formula is solved for  $P_2$ , the result is

- (1)  $P_1V_1V_2$
- (2)  $\frac{V_2}{P_1V_1}$
- (3)  $\frac{P_1V_1}{V_2}$
- (4)  $\frac{P_1V_2}{V_1}$

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5 A radio station did a survey to determine what kind of music to play by taking a sample of middle school, high school, and college students. They were asked which of three different types of music they prefer on the radio: hip-hop, alternative, or classic rock. The results are summarized in the table below.

	Hip-Hop	Alternative	Classic Rock
Middle School	28	18	4
High School	22	22	6
College	16	20	14

What percentage of college students prefer classic rock?

- (1) 14%
- (2) 28%
- (3) 33%
- (4) 58%

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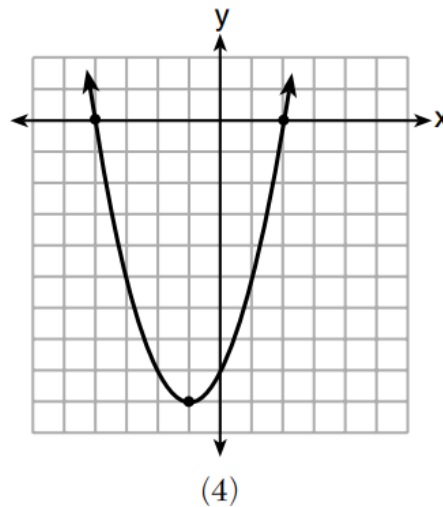
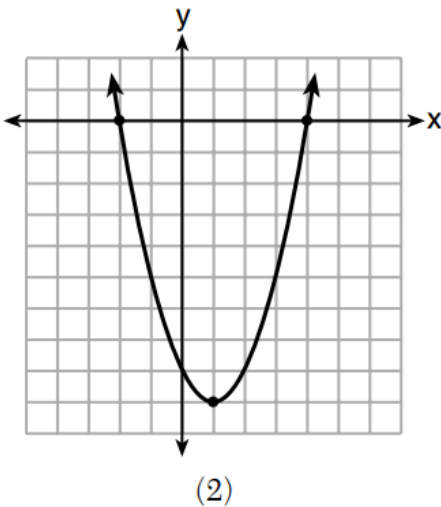
6 Which function has zeros of  $-4$  and  $2$ ?

$$f(x) = x^2 + 7x - 8$$

(1)

$$g(x) = x^2 - 7x - 8$$

(3)



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7 Which expression is equivalent to  $2(3g - 4) - (8g + 3)$ ?

(1)  $-2g - 1$

(3)  $-2g - 7$

(2)  $-2g - 5$

(4)  $-2g - 11$

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8 In 2014, the cost to mail a letter was 49¢ for up to one ounce. Every additional ounce cost 21¢. Which recursive function could be used to determine the cost of a 3-ounce letter, in cents?

(1)  $a_1 = 49; a_n = a_{n-1} + 21$

~~(2)  $a_1 = 0; a_n = 49a_{n-1} + 21$~~

~~(3)  $a_1 = 21; a_n = a_{n-1} + 49$~~

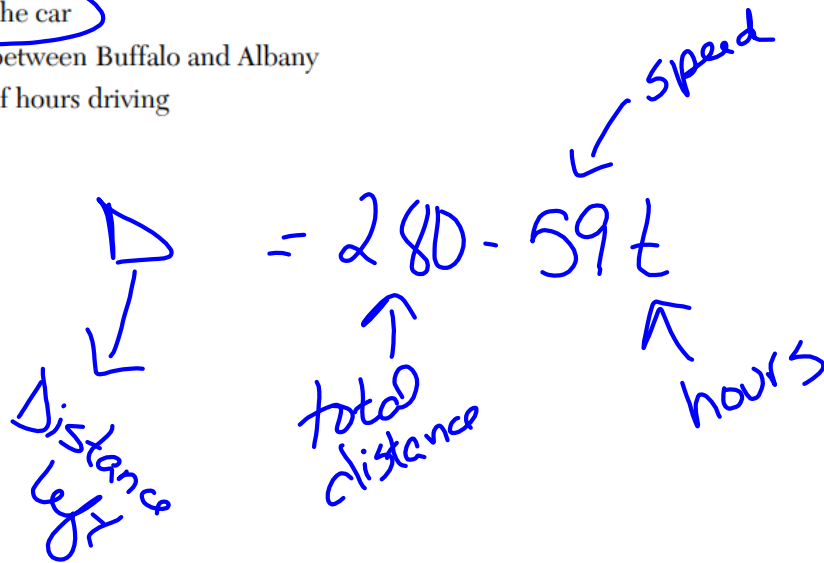
~~(4)  $a_1 = 0; a_n = 21a_{n-1} + 49$~~

$$a_1 = 49$$

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9 A car leaves Albany, NY, and travels west toward Buffalo, NY. The equation  $D = 280 - 59t$  can be used to represent the distance,  $D$ , from Buffalo after  $t$  hours. In this equation, the 59 represents the

- (1) car's distance from Albany
- (2) speed of the car
- (3) distance between Buffalo and Albany
- (4) number of hours driving



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10 Faith wants to use the formula  $C(f) = \frac{5}{9}(f - 32)$  to convert degrees Fahrenheit,  $f$ , to degrees Celsius,  $C(f)$ . If Faith calculated  $C(68)$ , what would her result be?

- (1) 20° Celsius
- (2) 20° Fahrenheit
- (3) 154° Celsius
- (4) 154° Fahrenheit

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11 Which scenario represents exponential growth?

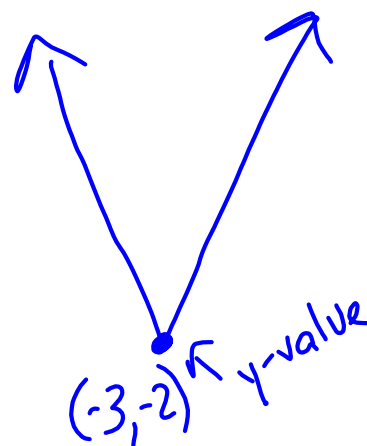
- (1) A water tank is filled at a rate of 2 gallons/minute.
- (2) A vine grows 6 inches every week.
- (3) A species of fly doubles its population every month during the summer.
- (4) A car increases its distance from a garage as it travels at a constant speed of 25 miles per hour.

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12 What is the *minimum* value of the function  $y = |x + 3| - 2$ ?

- (1) -2  
(2) 2

- (3) 3  
(4) -3



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13 What type of relationship exists between the number of pages printed on a printer and the amount of ink used by that printer?

- (1) positive correlation, but not causal
- (2) positive correlation, and causal
- (3) negative correlation, but not causal
- (4) negative correlation, and causal

↑ pages    ↑ ink  
Positive correlation

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14 A computer application generates a sequence of musical notes using the function  $f(n) = 6(16)^n$ , where  $n$  is the number of the note in the sequence and  $f(n)$  is the note frequency in hertz. Which function will generate the same note sequence as  $f(n)$ ?

- (1)  $g(n) = 12(2)^{4n}$
- (2)  $h(n) = 6(2)^{4n}$
- (3)  $p(n) = 12(4)^{2n}$
- (4)  $k(n) = 6(8)^{2n}$

↑  $(2^4)^n$   
 $6(16)^n$

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15 Which value of  $x$  is a solution to the equation  $13 - 36x^2 = -12$ ?

(1)  $\frac{36}{25}$

(3)  $-\frac{6}{5}$

(2)  $\frac{25}{36}$

(4)  $-\frac{5}{6}$

$$\begin{aligned}
 & \cancel{13} - 36x^2 = \cancel{-12} \\
 & \quad \quad \quad -13 \quad \quad \quad -13 \\
 \hline
 & \quad \quad \quad -36x^2 = -25 \\
 & \quad \quad \quad \underline{-36} \quad \quad \quad \underline{-36} \\
 & \quad \quad \quad \sqrt{x^2} = \sqrt{\frac{25}{36}} \\
 & \quad \quad \quad x = \pm \frac{5}{6}
 \end{aligned}$$

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16 Which point is a solution to the system below?

$$2y < -12x + 4$$

$$y < -6x + 4$$

~~(1)  $(1, \frac{1}{2})$~~   
~~(2)  $(1, 6)$~~

~~(3)  $(-\frac{1}{2}, 5)$~~   
(4)  $(-3, 2)$

$$\begin{aligned}
 2\left(\frac{1}{2}\right) &< -12(1) + 4 \\
 1 &< -12 + 4 \\
 1 &< -8
 \end{aligned}$$


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$$\begin{aligned}
 2(5) &< -12\left(-\frac{1}{2}\right) + 4 \\
 10 &< 6 + 4 \\
 10 &< 10
 \end{aligned}$$

$$\begin{aligned}
 2(6) &< -12(0) + 4 \\
 12 &< 4
 \end{aligned}$$

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17 When the function  $f(x) = x^2$  is multiplied by the value  $a$ , where  $a > 1$ , the graph of the new function,  $g(x) = ax^2$

- (1) opens upward and is wider
- (2) opens upward and is narrower
- (3) opens downward and is wider
- (4) opens downward and is narrower

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18 Andy has \$310 in his account. Each week,  $w$ , he withdraws \$30 for his expenses. Which expression could be used if he wanted to find out how much money he had left after 8 weeks?

- (1)  $310 - 8w$
- (2)  $280 + 30(w - 1)$
- (3)  $310w - 30$
- (4)  $280 - 30(w - 1)$

x	y
0	310
1	280
2	250
3	220

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