

Question	Answer												
<p>1. Which number is equivalent to <math>5\sqrt{8} \cdot 3\sqrt{4}</math>?</p> <p>A <math>15\sqrt{2}</math>                      B <math>60\sqrt{2}</math>                      C <math>30\sqrt{3}</math>                      D <math>60\sqrt{3}</math></p> <p style="text-align: center;"><math>5\sqrt{8} \cdot 3(2) = 30\sqrt{8}</math>  <math>\begin{matrix} &amp; &amp; 4 &amp; &amp; \\ &amp; &amp; \swarrow &amp; \searrow &amp; \\ &amp; 2 &amp; &amp; &amp; 2 \\ &amp; \swarrow &amp; &amp; \searrow &amp; \\ &amp; &amp; &amp; &amp; \end{matrix}</math>  <math>30 \cdot 2\sqrt{2} =</math></p>	<p style="text-align: center;"><math>60\sqrt{2}</math>    B</p>												
<p>2. Solve the equation <math>x^2 - 10x + 25 = 0</math> by factoring.</p> <p style="text-align: center;"><math>(x-5)(x-5) = 0</math>  <math>x-5 = 0</math></p>	<p style="text-align: center;"><math>x = 5</math></p>												
<p>3. – Jose wants to spend <u>no more than \$30</u> on apples and grapes for the month. Apples cost \$1.50 per pound, and grapes cost \$2 per pound. Jose also wants his monthly caloric intake from apples and grapes to be greater than 2000 calories. He determines that 1 pound of apples has 200 calories and 1 pound of grapes has 300 calories. Let <math>a</math> represent the number of pounds of apples, and <math>g</math> represent the number of pounds of grapes. Which system of inequalities can be used to determine the number of pounds of apples and grapes that Jose can buy for a month?</p> <p style="text-align: center;"><math>1.5a + 2g \leq 30</math>  <math>200a + 300g &gt; 2000</math></p>	<p>A. <math>\begin{cases} 1.5a + 2g \geq 30 \\ 200a + 300g &gt; 2000 \end{cases}</math>                      B. <math>\begin{cases} 1.5a + 2g \leq 30 \\ 200a + 300g &gt; 2000 \end{cases}</math>                      C. <math>\begin{cases} 2a + 1.5g \leq 30 \\ 300a + 200g &gt; 2000 \end{cases}</math>                      D. <math>\begin{cases} 2a + 1.5g \geq 30 \\ 200a + 300g &lt; 2000 \end{cases}</math></p> <p style="text-align: center;">B</p>												
<p>4. Which set of data points could be modeled by a decreasing linear function?</p> <p style="text-align: center;">C.</p>	<p>A. <math>\{(0, 0), (1, 8), (2, 15), (3, 22), (4, 30)\}</math>                      B. <math>\{(0, 5), (1, 6), (2, 10), (3, 16), (4, 28)\}</math>                      C. <math>\{(0, 50), (1, 42), (2, 33), (3, 25), (4, 16)\}</math>                      D. <math>\{(0, 64), (1, 60), (2, 52), (3, 39), (4, 22)\}</math></p> <p style="text-align: center;">not linear →</p>												
<p>5. – Use these functions to answer this question.</p> <p><math>P(x) = x^2 - x - 6</math>  <math>Q(x) = x - 3</math></p> <p>What is <math>P(x) - Q(x)</math>?</p> <p style="text-align: center;"><math>x^2 - x - 6 - (x - 3)</math>  <math>= x^2 - x - 6 - x + 3</math>  <math>= x^2 - 2x - 3</math></p>	<p>A. <math>x^2 - 3</math>                      B. <math>x^2 - 9</math>                      C. <math>x^2 - 2x - 3</math>                      D. <math>x^2 - 2x - 9</math></p> <p style="text-align: center;">C.</p>												
<p>6. The total daily expenses to operate Sheila's pie bakery are the cost of salaries and ingredients. Sheila has four employees, and she pays each worker a daily rate. On average, it costs the same amount of money to make each pie. This expression shows the total daily expenses for Sheila's bakery to make <u><math>x</math> pies</u>.</p> <p><math>4(75) + \\$0.50x</math></p> <p style="text-align: center;">↑    ↑    ↑          4 emp    salary    50 cents per pie</p>	<p>What does the term <math>4(75)</math> represent?</p> <p>A. The amount of money Sheila must pay her employees per day.                      B. The number of pies Sheila must sell per day.                      C. The total cost of expenses per pie.                      D. The amount of money customers pay per pie.</p> <p style="text-align: center;">A.</p>												
<p>7. Which function represents the data in the table?</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;"><math>x</math></td> <td style="padding: 5px;">0</td> <td style="padding: 5px;">3</td> <td style="padding: 5px;">6</td> <td style="padding: 5px;">10</td> <td style="padding: 5px;">15</td> </tr> <tr> <td style="padding: 5px;"><math>y</math></td> <td style="padding: 5px;">1</td> <td style="padding: 5px;">2.5</td> <td style="padding: 5px;">4</td> <td style="padding: 5px;">6</td> <td style="padding: 5px;">8.5</td> </tr> </table> <p style="text-align: center;">↑    ↑    ↑    ↑          -1.5    1.5    2    2.5</p> <p style="text-align: center;">↑    ↑    ↑    ↑          -3    +3    +4    +5</p> <p style="text-align: center;">slope = <math>\frac{2}{4} = \frac{1}{2}</math></p>	$x$	0	3	6	10	15	$y$	1	2.5	4	6	8.5	<p>A. <math>f(x) = 2x + 1</math>                      B. <math>f(x) = \frac{x}{2} - 1</math>                      C. <math>f(x) = 2x - 1</math>                      D. <math>f(x) = \frac{x}{2} + 1</math></p> <p style="text-align: center;">D.</p>
$x$	0	3	6	10	15								
$y$	1	2.5	4	6	8.5								

8. What is the solution to this system of equations?

$$\begin{aligned} x - 3y &= 1 \\ x - 2y &= 6 \end{aligned}$$

$$\begin{array}{r} x - 3y = 1 \\ -x + 2y = -6 \\ \hline -y = -5 \\ y = 5 \end{array}$$

- A. (-4, -5)
- B. (-2, -1)
- C. (4, 1)
- D. (16, 5)

D.

9. Information about the costs of three catering companies is shown in this table.

Catering Company Costs

Acme Catering Company	Best Foods Company	Creative Catering Company
\$6 per person plus a flat \$100 time and equipment charge	\$8 per person plus a flat \$40 time and equipment charge	\$10 per person charge with no other fees

Gavin can spend no more than \$300 on catering. What is the greatest number of people he can invite using one of the three caterers?

- A. 30
- B. 32
- C. 33
- D. 37

C.

$$\begin{aligned} \text{Acme: } 6x + 100 &= 300 \\ 6x &= 200 \quad x = 33 \text{ guests} \end{aligned}$$

$$\begin{aligned} \text{BFC: } 8x + 40 &= 300 \\ 8x &= 260 \quad x = 32.5 \text{ guests} \end{aligned}$$

$$\begin{aligned} \text{CCC: } 10x &= 300 \\ x &= 30 \text{ guests} \end{aligned}$$

10. The set of ordered pairs shown represents a function  $f$ .  $\{(-5, 3), (4, 9), (3, -2), (0, 6)\}$

Select THREE ordered pairs that could be added to the set so that  $f$  remains a function.

no repeating x's

- A. (-3, -2)
- D. (1, 6)

- B. (4, 0)
- E. (2, 3)

- C. (0, -1)
- F. (-5, 9)

A, D, E

11. Which equation shows the following quadratic function?  
 $f(x) = x^2 + 8x + 15$

Part A: What is the factored form of  $f(x)$  that reveals the zeros of the function?

$$(x+3)(x+5)$$

Part B: What is the equivalent form of  $f(x)$  that reveals the minimum value of the function?

Vertex form:

$$x = \frac{-b}{2a} = \frac{-8}{2(1)} = \frac{-8}{2} = -4 \quad y = (-4)^2 + 8(-4) + 15 = 16 - 32 + 15 = -1$$

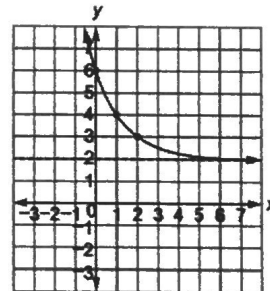
- A.  $f(x) = (x+4)(x+2)$
- B.  $f(x) = (x+3)(x+5)$
- C.  $f(x) = (x+2)(x+6)$
- D.  $f(x) = (x+1)(x+15)$

B.

- A.  $f(x) = (x+4)^2 - 1$
- B.  $f(x) = (x+3)^2$
- C.  $f(x) = (x+2)^2 + 3$
- D.  $f(x) = (x+1)^2 + 8$

A.

12. The graph of the exponential function  $f(x) = 4(0.5)^x + 2$  is shown.



Decay  
 $y = 2$

Part A: Which function has the same end behavior for large, positive values of  $x$ ?

- A.  $g(x) = 4(1.1)^x + 3$
- B.  $g(x) = 0.5(1.1)^x + 2$
- C.  $g(x) = 4(0.8)^x + 3$
- D.  $g(x) = 0.5(0.8)^x + 2$

D.

Decay,  $y = 2$

Part B: Select TWO functions whose graphs have a y-intercept of 1.

- A.  $h(x) = 5(2)^x$
- B.  $h(x) = 5(0.5)^x + 0.5$
- C.  $h(x) = (2)^x$
- D.  $h(x) = (0.5)^x + 1$
- E.  $h(x) = 0.5(2)^x + 0.5$

C.

E.

(0, 1)

13. Jill solved the inequality  $-\frac{x}{4} < \frac{x+2}{3}$  for x.

Her solution is shown.

Step 1:  $-3x < 4x + 8$  ✓

Step 2:  $-3x - 4x < 8$  ✓

Step 3:  $-7x < 8$  ✓

Step 4:  $x < -\frac{7}{8}$  ✓

Part A: Explain the mistake Jill made when solving for x.

Part B: Solve the inequality  $-\frac{x}{4} < \frac{x+2}{3}$  for x. Show or explain how you found your answer.

In step 4, Jill did not flip the inequality when she divided by  $-7$ , and she wrote the fraction backward.

$$x > \frac{-8}{7}$$

14. The student council makes an initial investment in a savings account that earns interest. The value of the savings account after m months is determined by the function  $v(m) = 2,000(1.005)^m$ . The student council also has a checking account which has a value after m months that is determined by the function  $c(m) = 250 + 100m$ .

Part A: What is the initial investment in the savings account?

Part B: What is the interest rate of the savings account?

When the student council has \$2,450 in its checking account, it will purchase new computers for the library.

Part C: After how many months will the student council purchase new computers for the library?

Part D: How much money will be in the student council's savings account when they purchase the new computers? Explain your reasoning.

A. \$2000

B. .005 or .5%

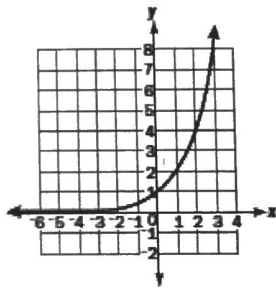
C.  $250 + 100m = 2450$   
 $100m = 2200$

$m = 22$

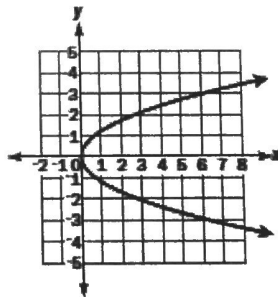
22 months

D.  $2000(1.005)^{22}$   
 $= \$2231.94$

15. Which of these is NOT a function?



A. (5, 3), (6, 4), (7, 3), (8, 4)    B.



C  $y = 3x^2$

D

D. does not pass the vertical line test.

16. The number of school buses needed to transport students on a field trip is given by the function  $f(x) = \frac{x+3}{30}$ . What is the domain of this function?

C.

- A.  $x$  is the set of all real numbers.
- B.  $x$  is the set of all integers.
- C.  $x$  is the set of all non-negative integers.
- D.  $x$  is the set of all non-negative real numbers.

← whole # of school buses

Question	Answer
<p>17. The value, <math>V</math>, of an automobile <math>n</math> years after purchase can be modeled with this formula. <math>V = I(1-d)^n</math></p> <p>In the formula, <math>I</math> is the purchase price, in dollars, of the automobile and the expression <math>(1-d)^n</math> is known as the <i>decay factor</i>. A car purchased for \$21,000 has a decay factor of 0.7. What is the present value of the car?</p>	<p>A \$6,300  <u>B \$14,700</u>            C \$30,000            D \$35,700</p> <p>B.</p> <p><math>V = 21,000(.7)^n</math></p>
<p>18. This expression is a product.  <math>4(2a+3b)(5x+y)</math></p> <p>As written, how many factors make up this product?</p>	<p>A 2            B 3            C 4            D 5</p> <p>B</p>
<p>19. An artist paints designs on T-shirts. It takes 15 minutes to set up the equipment and 40 minutes to clean the equipment and put it away. Once everything is set up, it takes the artist about 12 minutes to paint a design on each T-shirt. Which equation BEST models the number of shirts, <math>s</math>, the artist can make in 127 minutes?</p>	<p>A <math>12s - 55 = 127</math>            B <math>55 - 12s = 127</math>            C <math>12s + 25 = 127</math>  <u>D <math>12s + 55 = 127</math></u></p> <p>D</p> <p><math>12s + 55 = 127</math></p>
<p>20. Andrew invested \$1000 in his savings account. The interest rate, <math>r</math>, is compounded annually. Which equation shows the amount, <math>A</math>, in his account after <math>x</math> years?</p> <p>A <math>A = 1000(1-r)^x</math>            B <math>A = 1000(1+r)^x</math>            C <math>A = 1000(r-1)^x</math>            D <math>A = 1000^x</math></p>	<p>B.</p>
<p>21. If the value of <math>z</math> decreases by 2, how does the value of the expression <math>y(16+z)</math> change?</p>	<p><u>A decreases by <math>2y</math></u>            B decreases by <math>32y</math>            C increases by <math>14y</math>            D increases by <math>18y</math></p> <p>A</p>

$16y + yz$

$y(16 + z - 2)$

$y(14 + z)$

$14y + yz$

22. Look at the system of equations.

$$\begin{aligned} ax + by &= c & ax + by &= c \\ 2(dx + ey) &= f & 2dx + 2ey &= 2f \end{aligned}$$

The system has a unique solution,  $(x, y)$ .  
Which system of equations has the same solution?

- $ax + by = c$
- A  $dx - ey = f$
- $ax + by = c$
- B  $(a+e)x + (b+d)y = c+f$
- $ax + by = c$
- C  $(a+d)x + (b-e)y = c+f$
- $ax + by = c$
- D  $(a+2d)x + (b+2e)y = c+2f$

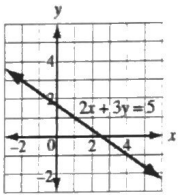
23. What is the x-value of the solution to this system of equations?

$$\begin{aligned} 3x + 2y &= 6 \\ -2(2x + y) &= 2 \end{aligned}$$

$$\begin{array}{r} 3x + 2y = 6 \\ -4x - 2y = -4 \\ \hline -1x = 2 \\ x = -2 \end{array}$$

- A  $x = -2$
- B  $x = \frac{10}{7}$
- C  $x = 2$
- D  $x = 4$

24. This coordinate plane shows the graph of an equation.



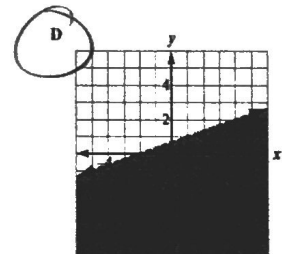
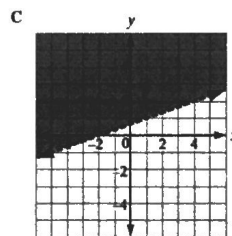
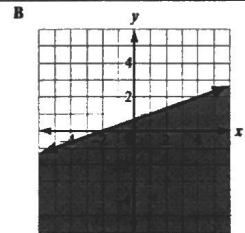
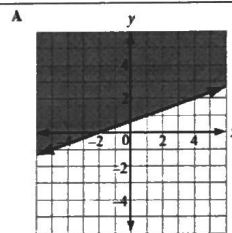
Which statement about the solutions of the equation MUST be true?

- A If the x-value of a solution is positive, then the corresponding y-value is negative.
- B If the x-value of a solution is negative, then the corresponding y-value is positive.
- C There is no solution for which both the x-value and the y-value are integers.
- D There is only one solution for which both the x-value and the y-value are integers.

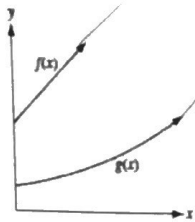
B

25. Which graph shows the solution set for the inequality  $x > 3y - 2$ ?

$$\begin{aligned} x &> 3y - 2 \\ \frac{x+2}{3} &> \frac{3y}{3} \\ y &< \frac{x+2}{3} \\ y &< \frac{1}{3}x + \frac{2}{3} \end{aligned}$$



26.. This coordinate plane shows two functions of  $x$ .



- $f(x)$  is an increasing linear function.
- $g(x)$  is an increasing exponential function.

Based on the information, which statement is true for all real values of the domain  $x \geq 0$ ?

- A  $f(x) = g(x)$  for only one value in the domain
- B  $f(x) = g(x)$  for many values in the domain
- C  $f(x) > g(x)$  for all values in the domain
- D  $f(x) < g(x)$  for all values in the domain

A.

27. These tables show points from two linear functions.

**Function 1**

**Function 2**

$x$	$f(x)$
1	5
2	7
3	9
4	11

$x$	$f(x)$
1	-1
2	2
3	5
4	8

Which of these linear functions has a slope GREATER than the slope for Function 1 and LESS than the slope for Function 2?

- A  $f(x) = 1.5x + 1$
- B  $f(x) = 2x + 2.5$
- C  $f(x) = 2.5x - 6$
- D  $f(x) = 3x + 2$

C.

28. Which table BEST describes a function with exponential decay?

**A**

$x$	$f(x)$
1	81
2	27
3	9
4	3

**B**

$x$	$f(x)$
1	80
2	70
3	50
4	20

**C**

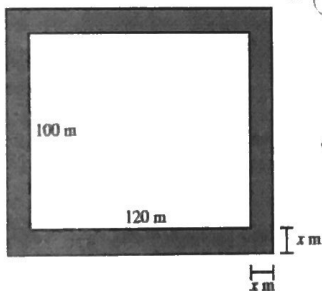
$x$	$f(x)$
1	80
2	76
3	67
4	51

**D**

$x$	$f(x)$
1	2
2	4
3	8
4	16

A.

29. A rectangular field is 100 meters in width and 120 meters in length. The dimensions of the field will be expanded by  $x$  meters in each direction, as shown in the diagram.



$$2(120 + 2x) + 2(100 + 2x)$$

$$240 + 4x + 200 + 4x$$

Which function describes the perimeter of the new field in terms of  $x$ ?

- A  $f(x) = 220 + 4x$
- B  $f(x) = 220 + 8x$
- C  $f(x) = 440 + 4x$
- D  $f(x) = 440 + 8x$

D.

$$440 + 8x$$

30. Which function shares at least one point with the function represented by the equation  $y = 2^x$ ?

$(0, 1)$

$(1, 2)$

~~✗~~

- A  $y = x$
- B  $y = -x$
- C  $y = -2^x$
- D  $y + 2 = x$

$y = x - 2$

~~✗~~

~~✗~~