16th October

Completed Exercises from the lecture on

〈Linear Functions〉

1. Easy, Page 2-11;

2. Medium, Page 12;

Can be found below.

ID: 84664a7c

The front of a roller-coaster car is at the bottom of a hill and is 15 feet above the ground. If the front of the roller-coaster car rises at a constant rate of 8 feet per second, which of the following equations gives the height h, in feet, of the front of the roller-coaster car s seconds after it starts up the hill?

A. $h = 8s + 15$

B. $h = 15s + \frac{335}{8}$

C. $h = 8s + \frac{335}{15}$

D. $h = 15s + 8$

$s = 0 \Rightarrow h = 15$

$s = 1 \Rightarrow h = 23$ (+8)

$s = 2 \Rightarrow h = 31$ (+8)

$s = 3 \Rightarrow h = 39$ (+8)

$\vdots \quad \Rightarrow \quad \vdots$

$\Rightarrow h = 15 + s \cdot 8$

ID: 06fc1726

If f is the function defined by $f(x)=\frac{2x-1}{3}$, what is the value of $f(5)$?

A. $\frac{4}{3}$

B. $\frac{7}{3}$

C. 3

D. 9

$$f(5)=\frac{2\cdot 5-1}{3}=3$$

ID: bf36c815

The function g is defined by $g(x) = -x + 8$.

What is the value of $g(0)$?

A. -8

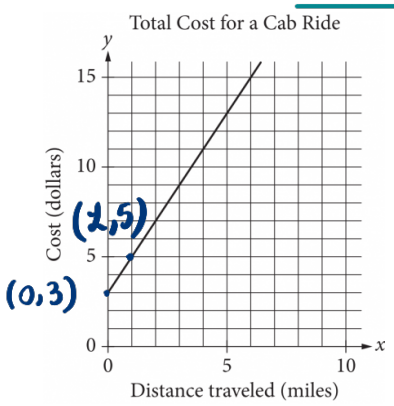
B. 0

C. 4

D. 8

ID: 3f5375d9

The line graphed in the *xy*-plane below models the total cost, in dollars, for a cab ride, *y*, in a certain city during nonpeak hours based on the number of miles traveled, *x*.



$(2,5) = (x_2, y_2)$

$(0,3) = (x_1, y_1)$

$y = mx + 3$

$m = \frac{5-3}{2-0} = \frac{2}{1} = 2$

According to the graph, what is the cost for each additional mile traveled, in dollars, of a cab ride?

A. $2.00

B. $2.60

C. $3.00

D. $5.00

$m = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$; $y(0) = C$

ID: 12983c1e

x	$f(x)$
1	5
3	13
5	21

$$m = \frac{\text{Change in } y}{\text{Change in } x} = \frac{y_2 - y_1}{x_2 - x_1} \quad ; \quad y(0) = C$$

Some values of the linear function f are shown in the table above.

Which of the following defines f ?

A. $f(x) = 2x + 3$

B. $f(x) = 3x + 2$

C. $f(x) = 4x + 1$

D. $f(x) = 5x$

x	$f(x)$	
0	1	$+1$
1	5	$+4$
3	13	$+8$
5	21	$+8$
		$+2$
		$+2$

$$m = 4 = \frac{8}{2}$$

ID: a1696f3e

The function g is defined as $g(x) = 5x + a$, where a is a constant. If $g(4) = 31$, what is the value of a ?

A. 30

B. 22

C. 11

D. -23

$$m = \frac{\text{Change in } y}{\text{Change in } x} = \frac{y_2 - y_1}{x_2 - x_1} \quad ; \quad y(0) = C$$

$$g(x) = 5x + a$$

$$5 \cdot 4 + a = g(4) = 31$$

$$20 + a = 31$$

ID: de6fe450

On January 1, 2015, a city's minimum hourly wage was $9.25. It will increase by $0.50 on the first day of the year for the next 5 years. Which of the following functions best models the minimum hourly wage, in dollars, x years after January 1, 2015, where $x = 1, 2, 3, 4, 5$?

A. $f(x) = 9.25 - 0.50x$

B. $f(x) = 9.25x - 0.50$

C. $f(x) = 9.25 + 0.50x$

D. $f(x) = 9.25x + 0.50$

$$m = \frac{\text{Change in } y}{\text{Change in } x} = \frac{y_2 - y_1}{x_2 - x_1} \quad ; \quad y(0) = C$$

ID: 2eef7e61

The graph of the function f is a line in the xy-plane. If the line has slope $\frac{3}{4}$ and $f(0)=3$, which of the following defines f?

A. $f(x)=\frac{3}{4}x-3$

B. $f(x)=\frac{3}{4}x+3$

C. $f(x)=4x-3$

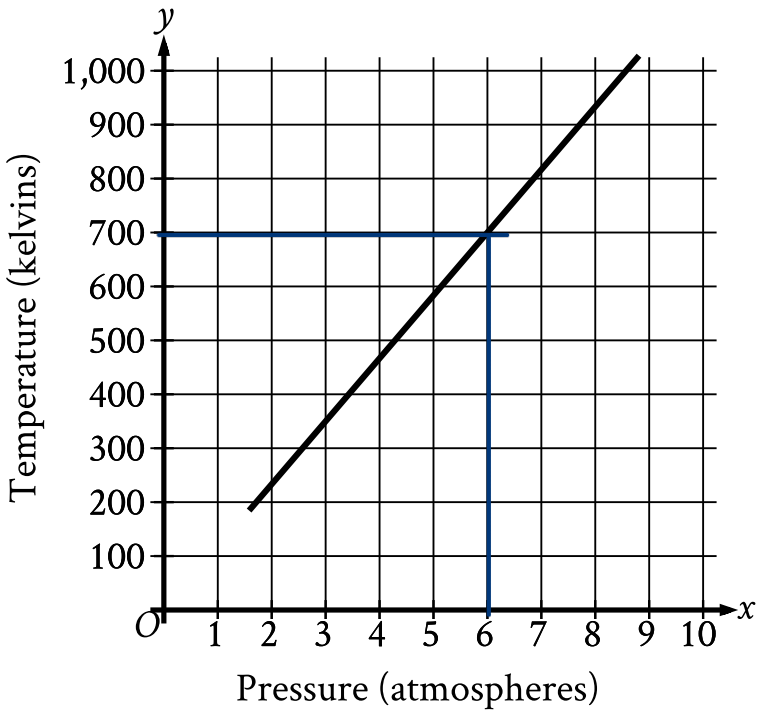
D. $f(x)=4x+3$

$$m = \frac{\text{Change in } y}{\text{Change in } x} = \frac{y_2 - y_1}{x_2 - x_1} \quad ; \quad y(0) = C$$

$$y = mx + C$$

ID: 0ea7ef01

Oxygen gas is placed inside a tank with a constant volume. The graph shows the estimated temperature y, in kelvins, of the oxygen gas when its pressure is x atmospheres.



What is the estimated temperature, in kelvins, of the oxygen gas when its pressure is 6 atmospheres?

A. 6

B. 60

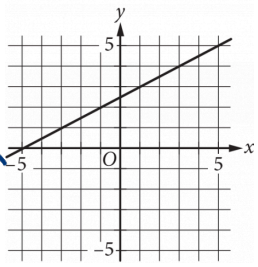
C. 700

D. 760

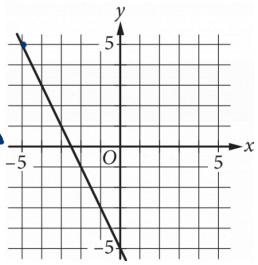
ID: a8e6bd75

Which of the following is the graph of the equation $y = 2x - 5$ in the xy-plane?

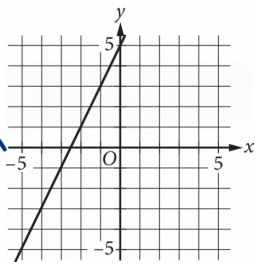
A.



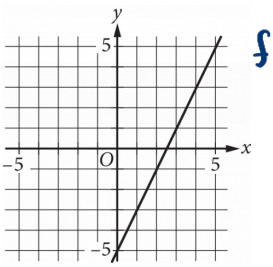
B.



C.



D.



$f(5) = 5$

$m = \frac{\text{Change in } y}{\text{Change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$; $y(0) = C$

$2x - 5$

ID: 4fe4fd7c

$c(x) = mx + 500$

A company's total cost $c(x)$, in dollars, to produce x shirts is given by the function above, where m is a constant and $x > 0$. The total cost to produce 100 shirts is $800. What is the total cost, in dollars, to produce 1000 shirts? (Disregard the $ sign when gridding your answer.)

$$m = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1} \quad ; \quad y(0) = C$$

$m = 3$

$C(x) = 3 \cdot x + 500$

$C(1000) = 3 \cdot 1000 + 500 = 3500.$

$\rightarrow C(100) = 800$

$mx + 500 = C(x)$

$\Rightarrow C(100) = m \cdot 100 + 500$

$m \cdot 100 + 500 = 800$