

3.3 Explain - Function Notation - Notes

Essential Question: How can you use function notation to represent a function?

Main Ideas/ Questions	Notes/Examples
<p>What You Will Learn</p>	<ul style="list-style-type: none"> To use function notation to evaluate and interpret functions To use function notation to solve and graph functions To solve real-life problems using function notation
<p>What is function notation?</p>	<p>Old way $\rightarrow y = mx + b$ (x, y)</p> <p>New way $\rightarrow f(x) = mx + b$ (x, f(x))</p> <ul style="list-style-type: none"> "<u>y</u>" in the equation is replaced with "<u>f(x)</u>". f(x) represents the output and is read as: "the value of f at x" or "f of x" Letters other than f can be used to name a function, such as g or h <p>Practice: Write the following equations in function notation.</p> <p>1. y = 5x + 3 2. y = 3x - 100 3. y = 2x² + 3x - 4</p> <p>f(x) = 5x + 3 f(x) = 3x - 100 f(x) = 2x² + 3x - 4</p>

	Dependent Variable, y	Independent Variable, x
<p>Practice: Evaluate the following function given the value, and then write an order pair to represent the function.</p>		
<p>Using Function Notation to Evaluate and Solve For The....</p>	<p>Ex: $f(x) = x + 5$ given $f(2)$ $f(2)$ tells us.... $x = 2$. (Substitute 2 in for x.) $f(2) = 2 + 5$ so $f(2) = 7$ and $(2, 7)$ (y)</p>	<p>Ex: $f(x) = x + 5$ given $f(x) = -7$ $f(x) = -7$ tells us.... $y = -7$. (Substitute -7 in for <u>y</u>.) $-7 = x + 5$ so $-12 = x$ and $(-12, -7)$</p>
	<p>4. $f(x) = -4x + 7$ when $x = 2$ $f(x) = -4(2) + 7$ $f(x) = -8 + 7$ When $x = 2$, $f(x) = -1$. $f(x) = -1$ $(2, -1)$</p>	<p>6. $h(x) = -2x - 7$ when $h(x) = 2$ $2 = -2x - 7$ $+7 = -2x - 7$ $9 = -2x$ When $h(x) = 2$, $x = -\frac{9}{2}$ $-\frac{9}{2} = x$ $(-\frac{9}{2}, 2)$</p>
	<p>5. $f(x) = x^2 + 2x + 1$ given $f(-3)$ $f(x) = (-3)^2 + 2(-3) + 1$ $f(x) = 9 - 6 + 1$ $f(x) = 4$ When $x = -3$, $f(x) = 4$ $(-3, 4)$</p>	<p>7. $g(x) = \frac{2}{3}x - 5$ when $g(x) = -7$ $-7 = \frac{2}{3}x - 5$ $+5 = \frac{2}{3}x - 5$ $-2 = \frac{2}{3}x$ When $g(x) = -7$, $x = -3$ $-\frac{6}{2} = \frac{2}{3}x$ $(-3, -7)$ $-3 = x$</p>

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Interpreting Functions

Let $f(t)$ be the outside temperature ($^{\circ}\text{F}$) t hours after 6 A.M.

What do we know?

$(t, f(t)) \rightarrow$ (hours after 6 AM, outside temperature)

Explain the meaning of each statement.

8. $f(0) = 58$
 $(0, 58)$

At 6 AM the outside temperature is 58°F

9. $f(6) = n$
 $(6, n)$

6 hours after 6 AM (NOON) the outside temperature is $n^{\circ}\text{F}$

10. $f(3) < f(9)$
 $t=3$ (9 AM) $t=9$ (3 P.M.)

The temperature at 9 AM is less than the temp. at 3 PM.

Evaluating Functions Using Graphs

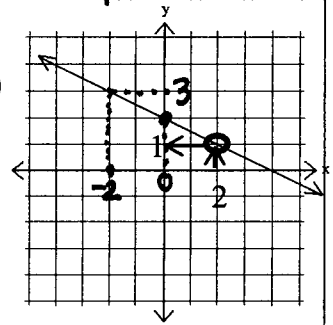
Practice: Given the following graph,

11. Find $f(2)$ - (This means find $f(x)$ when $x = 2$)

$\hookrightarrow x=2$

Put your finger on the graph where $x = 2$. What is the y value for that point? 1

So, $f(2) = \underline{1}$

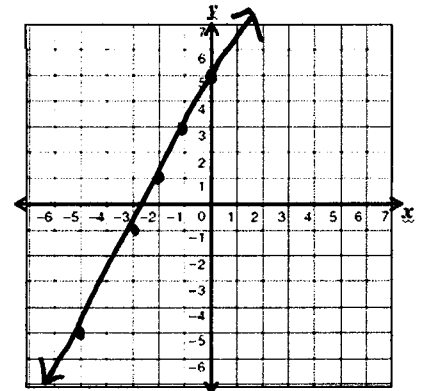


12. $f(-2) = \underline{3}$
 $\hookrightarrow x=-2$

13. Now work backwards. If $f(x) = 2$, what is x ? 0

14. a) Complete the table and graph using the function $f(x) = 2x + 5$.

x	-5	-3	-2	-1	0
$f(x)$	-5	-1	1	3	5



$2(-5)+5 = -5$

$2(-3)+5 = -1$

$2(-2)+5 = 1$

$2(-1)+5 = 3$

$2(0)+5 = 5$

b) $f(1) = 2(1)+5 = 7$

c) $f(0) = 5$

d) If $f(x) = -3$, find x . -4

$-3 = 2x + 5$

$-8 = 2x$

$-4 = x$

3.3 Function Notation

In Exercises 1–2, evaluate the function when $x = -2$, $f(0)$, and $f(5)$, and then write as ordered pairs.

1. $f(x) = x - 3$

2. $h(x) = 5 - 3x$

(,) (,)

(,) (,)

(,)

(,)

3. Let $c(t)$ be the number of customers in a department store t hours after 8 A.M. Explain the meaning of each statement.

a. $c(0) = 10$

b. $c(6) = c(7)$

c. $c(k) = 0$

d. $c(4) > c(3)$

In Exercises 5–7, find the value of x so that the function has the given value.

4. $f(x) = 6x$; $f(x) = -24$

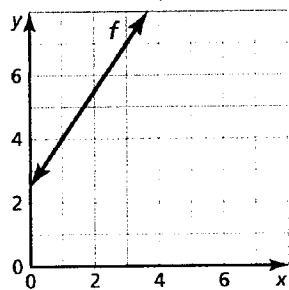
5. $f(x) = 3x - 5$; $f(x) = 4$

6. $g(x) = -10x$; $g(x) = 15$

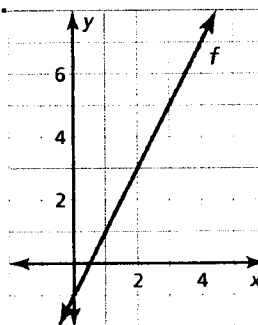
7. Write #6 as an ordered pair. (,)

In Exercises 8 and 9, find the value of x so that $f(x) = 7$.

8.



9.



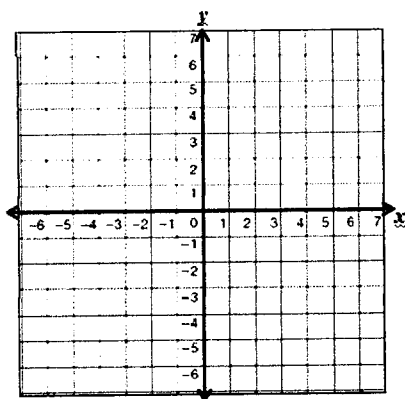
10. The function $C(x) = 29x + 54.5$ represents the cost (in dollars) of cable for x months, including the \$54.50 installation fee.

- How much would you have spent on cable after 6 months?
- How many months of cable service can you have for \$344.50?

In Exercises 11–12, make a table and graph the linear function.

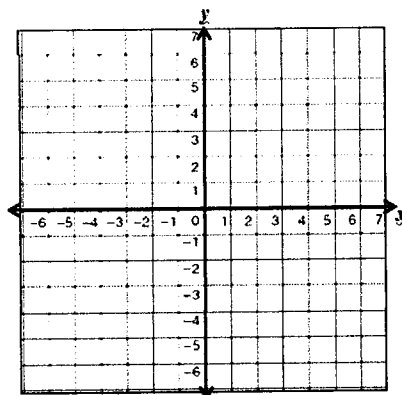
11. $r(x) = 2$

x	$f(x)$
-1	
0	
1	



12. $j(x) = -\frac{1}{3}x + 5$

x	$f(x)$
-3	
0	
	4



13. Let f be a function. Use each statement to find the coordinates of a point on the graph of f .

- $f(-2)$ is equal to 7.
- A solution of the equation $f(t) = 4$ is 2.

14. The function $C(x) = 35x + 75$ represents the labor cost (in dollars) for Bob's Auto Repair to replace your alternator, where x is the number of hours. The table shows sample labor costs from its main competitor, Budget Auto Repair. The alternator is estimated to take 5 hours of labor. Which company would you hire? Explain.

Hours	1	2	3
Cost	\$90	\$130	\$170