Algebra RH

Essential Question: What is function notation? How do we represent functions using function notation?

Do Now:

A function can be written in function form by replacing the "y" with "f(x)" read as "f of x."

Example:

- $y = 3x + 1$ is a linear function. $y = 3x + 1$ written in function notation is $f(x) = 3x + 1$.
- $y = 3x + 1$ can also be written as $g(x) = 3x + 1$ or $h(a) = 3a + 1$
- The solutions to $y = 3x + 1$ are (x, y), for $f(x) = 3x + 1$ the solutions are $(x, f(x))$

Make a table of values for $f(x) = 3x + 1$ using the domain {0,1,2,3}.

f(x) = 3x + 1

x	*f(x)*
0	1
1	4
2	7
3	10

Representing Functions Using Function Notation

Think about this:

Since not every equation in two variables is a function, we use function notation to describe functions.

$y = 2x + 3$ written in function notation is $f(x) = 2x+3$.

Input ***x***	**Function Rule** ***f*(*x*) = 2*x* + 3**	**Output** ***f*(*x*)**	**Ordered Pairs** **(*x*, f(*x*))**
-3	$f(-3) = 2(-3) + 3$	-3	$(-3,-3)$
4	$f(4) = 2(4) + 3$	11	$(4,11)$
7	$f(7) = 2(7) + 3$	17	$(7,17)$

More Functions

1. Given the following functions, answer each question

$f(x) = \frac{x-6}{2}$	$g(x) = \sqrt{2x+1}$	$h(x) = \frac{x}{3} + 7$	$a(x) = x^2 + 2x - 1$

a) $f(2) = \frac{2-6}{2}$

$\frac{-4}{2}$

-2

b) $g(4) = \sqrt{2(4)+1}$

$\sqrt{9}$

3

c) $a(2) = (2)^2 + 2(2) - 1$

7

d) $h(-9) =$

$\frac{-9}{3} + 7$

$-3 + 7$

4

e) $f(3) = \frac{3-6}{2}$

$\frac{-3}{2}$

f) $g\left(\frac{19}{2}\right) = \sqrt{2\left(\frac{19}{2}\right)+1}$

$\sqrt{20}$

$\sqrt{4}\sqrt{5}$

$2\sqrt{5}$

g) $f(a+1) =$

$\frac{a+1-6}{2}$

$\frac{a-5}{2}$

h) $g(-13) =$

$\sqrt{2(-13)+1}$

$\sqrt{-25}$

$5i$

i) $a(-4) =$

$(-4)^2 + 2(-4) - 1$

7

j) $a(x-3) =$

$(x-3)^2 + 2(x-3) - 1$

$x^2 - 6x + 9 + 2x - 6 - 1$

$x^2 - 4x + 2$

k) $h(-6a) = \frac{-6a}{3} + 7$

$-2a + 7$

l) Solve for x if $f(x) = 13$

$13 = \frac{x-6}{2}$

$26 = x - 6$

$32 = x$

m) Solve for x if $h(x) = -2$

$-2 = \frac{x}{3} + 7$

$-9 = \frac{x}{3}$

$x = -27$

n) If $b(x) = 2f(x) - 1$ then what is $b(6)$?

$= 2f(6) - 1$

$= 2\left(\frac{6-6}{2}\right) - 1$

$= 2\left(\frac{0}{2}\right) - 1 = -1$

OR $b(x) = \frac{2(x-6)}{2} - 1$

$b(x) = x - 6 - 1$

$b(x) = x - 7$

$b(6) = 6 - 7$

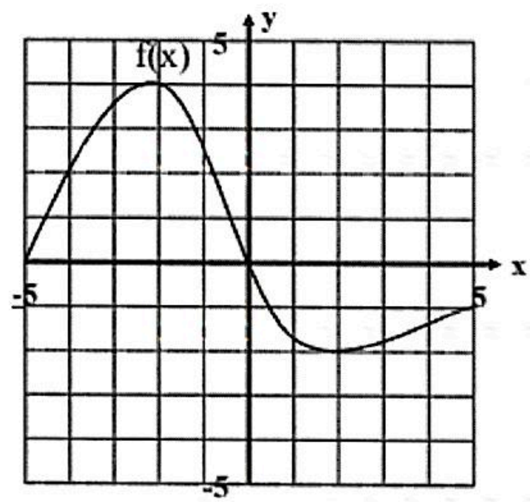
2. Find the range of the function h(x) = 2x – 5 when the domain = {-1,0,1,2,3}.

x	$h(x)$
-1	-7
0	-5
1	-3
2	-1
3	1

3. Using the graph to the right of $f(x)$

- $f(2) =$ -2
- $f(0) =$ 0
- $f(-4) =$ 2
- Find x if $f(x) = -2$ $x = 2$
- Find x if $f(x) = 0$ $x = -5, 0$

  $\{-5, 0\}$



4. Given the functions $h(x) = -3(x+1)$ and $g(x) = x^2 - 5$

- Evaluate $h(2) + g(-1)$

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

  $-9 + -4 = -13$

- Find $h(x) + g(x)$ in standard form

  $-3(x+1) + x^2 - 5$

  $-3x - 3 + x^2 - 5 \longrightarrow x^2 - 3x - 8$

- Find $h(2a) + g(a)$

  $-3(2a+1) + (a)^2 - 5$

  $-6a - 3 + a^2 - 5 \longrightarrow a^2 - 6a - 8$

- True or False? $g(2.5) < h(-1.5)$

  $(2.5)^2 - 5 < -3(-1.5+1)$

  $6.25 - 5 < -3(-.5)$

  $1.25 < 1.5$ True