NOTES U1B L1 Function Notation Name: _____HR:_____

UNIT 1B **TARGET SKILL(s): Use function notation, substitute expressions into functions.**

Lesson 1

What is a function?

A relation in which each input maps to exactly 1 output value.

Ex: $y = 3x + 2$

$y = 3x + 2$

$x = 0$ find $y = ?$

$y = 3 \cdot 0 + 2$

$y = 2$

Ordered Pairs: (0,2) (2,8) (1,5)

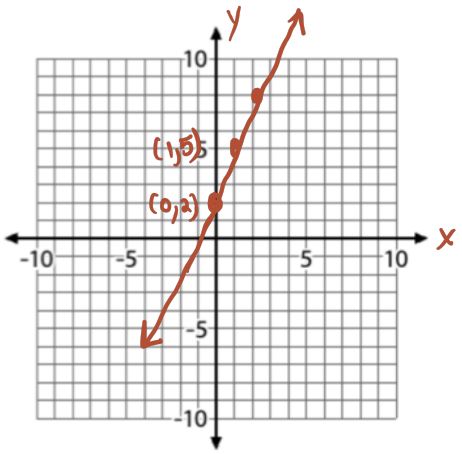
$y = 3(1) + 2$

$= 3 + 2$

$= 5$

Equation: $y = 3x + 2$

Graph:



Not a function

OR

Definition: **FUNCTION**: any input to output mapping where each input pairs with only one output.

EQUATION

x-value

y-values

If an equation represents a function (each x pairs with only one y value), then mathematicians use a special notation:

Function Notation: $y = f(x)$

I'm a function

▶ Instead of writing $y = 3x + 2$,

write: $f(x) = 3x + 2$

Name of function — Input of function — Function

▶ Read as: $f(x) = 3x + 2$

"f of x" is $3x + 2$

Function Notation	$f(x) = \lvert 3x \rvert - 5$	$g(x) = 4x^2 + 10$	$h(x) = \frac{3}{4}x + 5$
Question	$f(-2)$ "What is f value when x = -2"	$g(-3)$	$h(-12)$
Input:	$x = -2$	$x = -3$	-12
Evaluating Function:	$f(x) = \lvert 3x \rvert - 5$ $f(-2) = \lvert 3(-2) \rvert - 5$ $= \lvert -6 \rvert - 5$ $= 6 - 5$ $f(-2) = 1$ $(-2, 1)$	$g(x) = 4x^2 + 10$ $g(-3) = 4(-3)^2 + 10$ $= 4(9) + 10$ $= 36 + 10$ $g(-3) = 46$ $(-3, 46)$ calc	$h(x) = \frac{3}{4}x + 5$ $h(-12) = \frac{3}{4}(-12) + 5$ $= -4$

U1B L1 Function Notation Name: _____HR:_____

DOWNLOAD: DESMOS TEST MODE And DESMOS

You Try: Directions: Evaluate the functions at the given INPUT value.

1. If $f(x) = 2x + 3$, find $f(4)$.

$f(4) = 2(4)+3$

$= 11$

2. If $g(x) = -3x + 7$, find $g(-2)$.

$g(-2) = -3(-2)+7$

$= 6 + 7$

$g(-2) = 13$

$(-2, 13)$

3. If $h(x) = \frac{1}{2}x - 5$, find $h(10)$.

$h(10) = \frac{1}{2}(10) - 5$

$= 5 - 5$

$= 0$

INPUTS can be Variable Expressions.

Function Notation	$f(x) = \lvert x \rvert - 5$	$g(x) = 4x^2 + 10$	$h(x) = \frac{3}{4}x + 5$
Question	$f(x+4)$	$g(x-5)$	$h(8x)$
Input:	$x+4$	$x-5$	$8x$
Evaluating Function:	$f(x) = \lvert x \rvert - 5$ $f(x+4) = \lvert x+4 \rvert - 5$	$g(x) = 4x^2 + 10$ $g(x-5) = 4(x-5)^2 + 10$	$h(x) = \frac{3}{4}x + 5$ $h(8x) = \frac{3}{4}(8x) + 5$ $h(8x) = 6x + 5$

$\frac{3}{4} \cdot 8x = \frac{24x}{4} = 6x$

You Try: Input the variable expression and simplify any linear expressions.

4. If $f(x) = x^2 + 6$, find $f(x+1)$.

$f(x+1) = (x+1)^2 + 6$

Make sure you leave the SQUARED

5: If $g(x) = 3x - 2$, find $g(x+1)$.

$g(x+1) = 3(x+1) - 2$ (3·x, 3·1)

$= 3x + 3 - 2$

$g(x+1) = 3x + 1$

6. If $h(x) = \frac{1}{2}x + 7$, find $h(4x)$.

$h(4x) = \frac{1}{2}(4x) + 7$

$h(4x) = 2x + 7$

7. If you have \$60 in savings and you add \$25 dollars per week to your savings, write a function to determine your savings: S = savings(\$) and w = # of weeks

FLAT Amt: \$60 Rate \$25/week

S(w) =

$S(w) = 60 + 25w$

8: If your phone bill each month is \$40 plus \$10 per gigabyte of data use, write a function to determine the monthly bill: B = monthly Bill (\$) and d = amount of data used (Gb).

FLAT Fee: \$40 Rate: \$10/GB

B(d) = $40 + 10d$

10. a. Use your answer from 7 to find the S(52) and explain what it means.

$S(w) = 60 + 25w$

$S(52) = 60 + 25(52)$

$= 1360$

\$1360 saved in 52 weeks (1 year)

b. Use your answer from 8 to find the B(12.8) and explain what it means.

$B(d) = 40 + 10d$

$B(12.8) = 40 + 10(12.8)$

$= 168$

\$168 for 12.8Gb of DATA