Name: _____ Date: _____ **Unit 3 Class Work**

Writing and Evaluating Functions Class Work

☞ **Objective:** You will be able to model situations by writing functions, analyze functions, and evaluate functions for specific inputs.

***One of the equations below is a function.**
Work with your partner to determine which equation is a function.

$y = \pm\sqrt{(x+5)}$ $\qquad$ $y = 3x - 2$ $\qquad$ $x = 1$

2 outputs for each x

vertical line

x=1 gives ∞ outputs

*Another notation that we can use to represent this function is...

f(x) = y

f(input) = output

f(x) "f of x" the output when x is input

Why use this notation?! to work with many functions at once

*What is the difference between y = 3x + 2 and f(x) = 3x + 2?

Only notation

f(6) = 20 → (6,20) is a point on graph

☞ Consider the function f(x) = 3x + 2.

1. Evaluate when x = 6. plug in 6 for x

f(6) = 3(6)+2
= 18+2 = 20

2. What happens when x = (w + 1)? Replace x with (w+1)

f(w+1) = 3(w+1)+2
= 3w+5 is the output

3. Evaluate each.

a. f(-2) = 4 represents the point (-2,-4)

b. f(m²) f(m²) = 3m²+2

c. f(q − 2) 3q − 6 + 2
3q − 4

d. 2f(-3)

/ 1

d. 2f(-3) means 2 times f(-3)

f(x) = 3x+2

2 f(-3) = 3(-3)+2
= -7

2f(-3) = 2(-7)
= -14

* find f(-3)

* then multiply by 2

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f(x)

"f of x"

☆ f(x) = y ☆

☆ f(input) = output ☆

"inside" "outside"

( ) indicate input → They tell us what to replace the variable with

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$p(x) = \frac{3}{x} + 4$ $\qquad$ $q(b) = 3b^2 - 2b + 1$ $\qquad$ $j(k) = -\frac{1}{4}k + \frac{3}{4}$ $\qquad$ $h(d) = \frac{2}{3}(d+2)^2$

1. p(0) $\qquad$ 2. q(6x) $\qquad$ 3. h(1)

*replace x with 0

p(0) = 3/0 + 4

undefined

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13. h(d + 2)

replace d with d+2

just notation

$h(d) = 2/3(d+2)^2$

$h(d+2) = 2/3(d+2+2)^2$

$h(d+2) = 2/3(d+4)^2$

$h(d+2) = 2/3(d+4)(d+4)$

$h(d+2) = 2/3(d^2+8d+16)$

$h(d+2) = 2/3d^2 + \frac{2}{3}(\frac{8d}{1}) + \frac{2}{3}(\frac{16}{1})$

$h(d+2) = 2/3d^2 + 16/3d + 32/3$

Function Notation:

f(x) is read as…

We use this notation to represent function rules. Be aware that functions can be named with ANY letter, not always f! For example, circumference of a circle may be given as c(r), since it is a function of the radius of the circle.

COMMON ERROR ANALYSIS:

Given h(x) = $2x^2 - x + 3$, a student claims that h(n^2) simplifies to h·n^2. This student applied his/her knowledge of parentheses in mathematics incorrectly. Describe and correct the students' error.

Practice Evaluating Functions

Provided with the following functions, determine each.

$p(x) = \frac{3}{x} + 4$ $\quad q(b) = 3b^2 - 2b + 1$ $\quad j(k) = -\frac{1}{4}k + \frac{3}{4}$ $\quad h(d) = \frac{2}{3}(d+2)^2$

1. p(0)
2. p(6x)
3. h(1)
4. q(x^3)
5. 3j(20)
6. 2p(-18)

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$p(x) = \frac{3}{x} + 4$ $\quad q(b) = 3b^2 - 2b + 1$ $\quad j(k) = -\frac{1}{4}k + \frac{3}{4}$ $\quad h(d) = \frac{2}{3}(d+2)^2$

7. q(m + 1)
8. j(-½k)
9. 3p(3)
10. q(-1)
11. q($2c^2$)
12. j(4^3)
13. h(d + 2)
14. h(-8)
15. Choose a value for x that would result in p(x) = 3

Evaluating Functions (from graphs)

Remember, _____ = _____

*If f(x) = $2x^2$, then f(-5) is…

This means that…

2. $108x^2 - 12x + 1$

3. 6

4. $3x^6 - 2x^3 + 1$

5. $-12\frac{3}{4}$

6. $-7\frac{2}{3}$

7. $3m^2 + 4m + 2$

8. $\frac{1}{8}k + \frac{3}{4}$

9. 15

10. 6

11. $12c^4 - 4c^2 + 1$

12. $-\frac{61}{4}$

14. 24

15. $x = -3$

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If you know n(x),

~ to find n(4r), you would...

replace every x with

~ to find 2n(0), you would...

find n(0) then multiply by 2

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