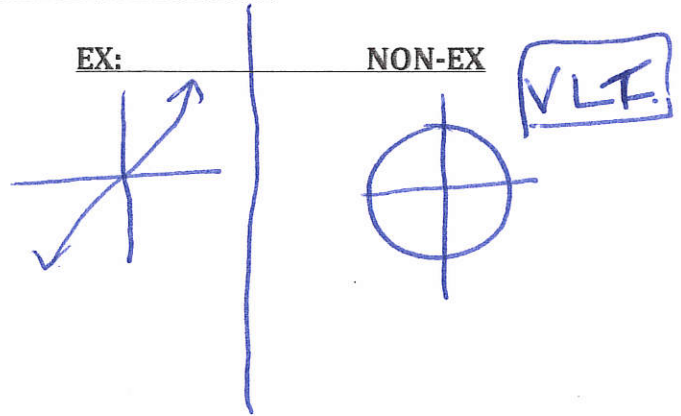


# U2L1 PC FUNCTIONS & Function Notation DATE: \_\_\_\_\_ Key

Brainstorm – Write down everything you know about functions!

no 2 different  
y's are assigned  
to same x.



**Define:**

Domain: {x's} Lower bound, Upperbound

Range: {y's} Low to high

Function notation:  $f(x) =$   
"y" output

1., Swine flu is attacking the North Pole. The function below determines how many elves have swine flu where  $t$  = time in days and  $S$  = the number of people in thousands.

$$S(t) = 9t - 4$$

a. Find  $S(4)$ .  $= 9(4) - 4 = 32$

b. What does  $S(4)$  mean?

# elves w/ flu after  
4 days.

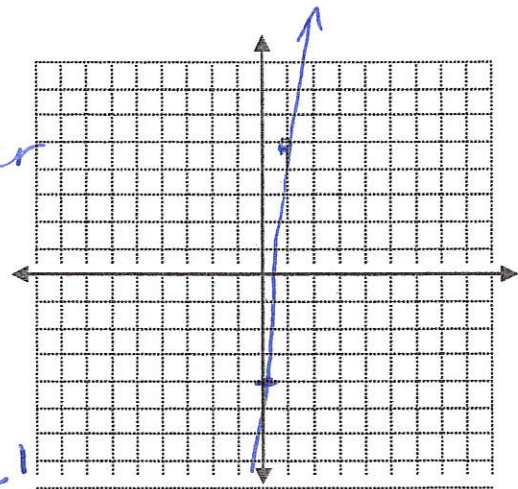
c. Find  $t$  when  $S(t) = 23$ .

$$23 = 9t - 4 \quad t = 3$$

$$27 = 9t \quad \therefore 3000$$

d. What does  $S(t) = 23$  mean?

3000 elves had flu!



e. Graph the function.

2. A manufacturer of fax machines find that the cost (in dollars) generated by manufacturing  $x$  units per week is given by the function  $C(x) = 0.15x^2 - 39x + 4500$ .

A. What does  $C(100)$  represent? *Cost of making 100 units per week.*

3.  $f(x) = (20 - 2x)(16 - 2x)(x)$  represents the volume of an open box.

A. What are the dimensions of the rectangular piece of cardboard used to construct the box?

*20 x 16*

B. What does  $f(4)$  represent?

*Volume of Box of height 4.*

4. Determine the Domain and range of the following functions by using a table of values or a gc. Determine if the equation is a function.

A.  $f(x) = \sqrt{x}$

*D:  $[0, \infty)$*

*R:  $[0, \infty)$*

B.  $f(x) = \sqrt{-x}$

*D:  $(-\infty, 0]$*

*R:  $[0, \infty)$*

C.  $f(x) = \sqrt{x+1}$

*$x \geq -1$*

*so  
D:  $[-1, \infty)$*

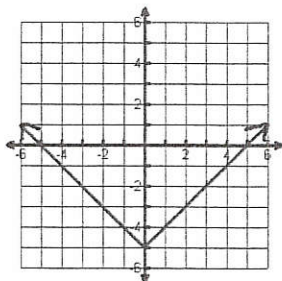
*R:  $[0, \infty)$*

D.  $f(x) = \sqrt{x-1} + 5$

*$x \geq 1$*

*D:  $[1, \infty)$*

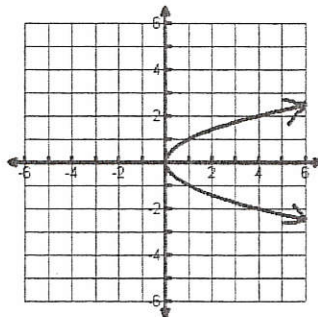
*R:  $[5, \infty)$*



E.

*D:  $(-\infty, \infty)$*

*R:  $[-5, \infty)$*



F.

*D:  $[0, \infty)$*

*R:  $(-\infty, \infty)$*

# Pre-Calc: Unit 2 D1 Function Notation and Operations

Use the functions below to answer the given questions:

Key

A. To evaluate a function, simply replace the variable with the INPUT (what's in the ( )s).

$$g(x) = 2x^2 + 5$$

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

$$p(x) = x^2 - 2x$$

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

A. Evaluate:

1)  $g(-1)$

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

$$= 2(1) + 5$$

$$= 7$$

2)  $g(x-4)$

$$= 2(x-4)^2 + 5$$

$$= 2(x^2 - 8x + 16) + 5$$

$$= 2x^2 - 16x + 37$$

3)  $f(x+2)$

$$3(x+2) - 4$$

$$= 3x + 6 - 4$$

$$= 3x + 2$$

4)  $p(-2x)$

$$(-2x)^2 - 2(-2x)$$

$$= 4x^2 + 4x$$

5)  $h(5x-3)$

$$|3 - 2(5x-3)| - 5$$

$$= |3 - 10x + 6| - 5$$

$$= |-10x + 9| - 5$$

B. FUNCTION OPERATIONS: Recall,  $(f + g)(x) = f(x) + g(x)$ .

OPTIONS:

1)  $(h+g)(3)$

$$h(3) + g(3)$$

$$= -2 + 23$$

$$= 21$$

2)  $(f-p)(-1)$

$$f - p = 3x - 4 - (x^2 - 2x)$$

$$= -x^2 + 5x - 4$$

$$-(-1)^2 + 5(-1) - 4$$

$$-1 - 5 - 4 = -10$$

3)  $(f \cdot g)(2)$

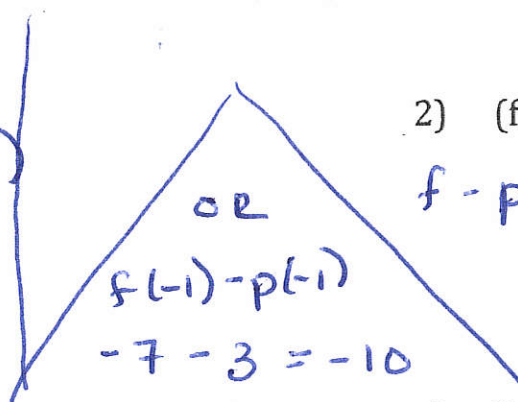
$$f(2) \cdot g(2)$$

$$= 2 \cdot 13$$

$$= 26$$

4)  $(h/p)(5)$

$$\frac{h(5)}{p(5)} = \frac{2}{15}$$





### C. FUNCTION COMPOSITION: $f(g(x)) =$ \_\_\_\_\_

Work inside out!

$$g(x) = 2x^2 + 5$$

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

5.  $f(g(3)) =$

$$\begin{aligned} & f(23) \\ & = 3(23) - 4 \\ & = 69 - 4 = 65 \end{aligned}$$

7.  $f(g(x)) =$

$$\begin{aligned} & \downarrow \\ & f(2x^2 + 5) \\ & = 3(2x^2 + 5) - 4 \\ & = 6x^2 + 11 \end{aligned}$$

### D. $k \cdot f(x)$ = multiplication by a constant

9.  $3f(x)$

$$\begin{aligned} & 3[3x - 4] \\ & = 9x - 12 \end{aligned}$$

### E. Evaluating functions from graphs:

10. Given this graph of the functions  $f(x)$  and  $G(x)$

Find:

a.  $f(-4) =$

$$2$$

b.  $G(-4) =$

$$4$$

c.  $G(f(-4)) =$

$$\begin{aligned} & \downarrow \\ & G(2) \\ & = -2 \end{aligned}$$

d.  $G(f(0)) =$

$$G(0) = 0$$

e.  $x$  when  $f(x) = -2$

$$-2 = \text{output (y value)}$$

$$x = 2$$

f.  $x$  when  $f(x) = 0$

$$\begin{aligned} & f(x) = 0 \\ & \text{output (y is 0)} \end{aligned}$$

$$x = 0$$

