

# Unit 1 Review

Key

Find the DOMAIN for problems 1 - 4. Write in interval notation.

1.  $f(x) = \frac{x}{x^2 - 9}$       2.  $f(x) = \sqrt{2-x}$       3.  $f(x) = 4x + 3$       4.  $f(x) = \frac{\sqrt{x+2}}{x^2 + 2x - 3}$   $[-2, 1) \cup (1, \infty)$   
 $(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$        $(-\infty, 2]$        $(-\infty, \infty)$

5. The graph of a function  $f$  is known. Then the graph of  $y = f(x-2)$  may be found by move r + 2.  
 6. The graph of a function is known. Then the graph of  $y = f(-x)$  may be obtained by a reflection about the y-axis.

7. True or False:

- T a) The graph of  $y = -f(x)$  is the reflection about the x-axis of the graph of  $y = f(x)$ .  
F b) To obtain the graph of  $y = f(x+2) - 3$ , shift the graph of  $y = f(x)$  horizontally to the right 2 units and vertically down 3 units.  $\leftarrow$  left

8. Find the function that is finally graphed after the following transformations are applied to the graph of  $y = \sqrt{x}$ .

- a) 1. Shift up 2 units.      b) 1. Reflect about the x-axis      c) 1. Reflect about the y-axis.  
 2. Reflect about the x-axis.      2. Shift up 2 units.      2. Vertically stretch by 3.  
 3. Shift left 3 units.      3. Shift down 2 units.  
 4. Shift right 4 units.

$f(x) = \underline{-\sqrt{x} + 2}$        $f(x) = \underline{-\sqrt{x+3} + 2}$        $f(x) = \underline{3\sqrt{-(x-4)} - 2}$

9. USE GRAPH PAPER. Draw the parent graph and then show each transformation..

a)  $f(x) = x^3 + 4$       b)  $f(x) = (x+4)^2$       c)  $f(x) = -\frac{1}{2}|x|$       d)  $f(x) = -2(x-3)^2 - 1$       e)  $f(x) = 2\sqrt{-x} + 1$

10. State the domain in interval notation. Then graph (on graph paper). Then use the graph to state the range.

a)  $f(x) = \begin{cases} 3x, & -2 < x \leq 1 \\ x+1, & x > 1 \end{cases}$       b)  $f(x) = \begin{cases} x, & -4 \leq x < 0 \\ 1, & x = 0 \\ 3x, & x > 0 \end{cases}$       c)  $f(x) = \begin{cases} x^2, & -2 \leq x \leq 2 \\ 2x-1, & x > 2 \end{cases}$   
 domain:  $\underline{(-2, \infty)}$       domain:  $\underline{[-4, \infty)}$       domain:  $\underline{[-2, \infty)}$   
 range:  $\underline{(-6, \infty)}$       range:  $\underline{[-4, 0) \cup (0, \infty)}$       range:  $\underline{[0, \infty)}$

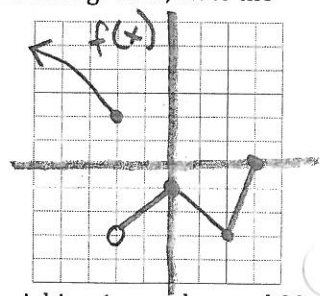
11. Find  $\frac{f(a+h)-f(a)}{h}$ , where  $h \neq 0$ , for the following two functions.

a)  $f(x) = 2x + 3$       b)  $f(x) = x^2 - 2$  2a+h

12. Evaluate the piecewise function for  $f(-2)$ ,  $f(1)$ , and  $f(4)$ .  $f(x) = \begin{cases} x^2 - 2x, & \text{if } x \leq 1 \\ 3x + 1, & \text{if } x > 1 \end{cases}$   
 $0 \leftarrow -1 \leftarrow 13$

13. Use the following graph to evaluate certain values and to find out when it is increasing and decreasing. Also, state the domain and range.

$f(-2) = \underline{2}$        $f(1) = \underline{-2}$        $f(x) = 0$  when  $x = \underline{3}$   
 domain  $\underline{(-\infty, 3]}$       Range  $\underline{[-3, 0] \cup [2, \infty)}$   
 increasing  $\underline{(-2, 0) \cup (2, 3)}$       decreasing  $\underline{(-\infty, -2) \cup (0, 2)}$



14. The domestic postage rate for first class letters weighing 12 oz or less is 33 cents for a letter weighing 1 oz or less and 22 cents for each additional ounce (or part of an ounce). Express the postage  $P$  as a function of the weight  $x$  of a letter, with  $0 < x \leq 12$ .

$P = \begin{cases} .33 & 0 < x \leq 1 \\ .55 & 1 < x \leq 2 \\ .77 & 2 < x \leq 3 \\ .99 & 3 < x \leq 4 \\ 1.21 & 4 < x \leq 5 \\ 1.43 & 5 < x \leq 6 \\ 1.65 & 6 < x \leq 7 \\ \text{etc.} & \end{cases}$

