

I. State the domain of the following (find algebraically):

1. $y = 5x$

$(-\infty, \infty)$

2. $y = 2\sqrt{x+2} - 3$
 $x+2 \geq 0$
 $x \geq -2$

$[-2, \infty)$

3. $y = \frac{2x}{4x-2}$
 $4x-2 \neq 0$
 $4x \neq 2$
 $x \neq \frac{1}{2}$

$(-\infty, \frac{1}{2}) \cup (\frac{1}{2}, \infty)$

4. $y = \frac{1}{\sqrt{2x+6}}$
 $2x+6 > 0$
 $2x > -6$
 $x > -3$

$(-3, \infty)$

II. State the range of the following:

5. $y = 1 - 2x^2$

$(-\infty, 1]$

6. $y = -\sqrt{x+4}$

$(-\infty, 0]$

7. $y = x^3 - 3x + 2$

$(-\infty, \infty)$

8. $y = x^2 + 6$

$[6, \infty)$

9. $y = -|x-1|$

$(-\infty, 0]$

10. $y = 2\sqrt{x-3}$

$[0, \infty)$

11. $y = 2x - 3$

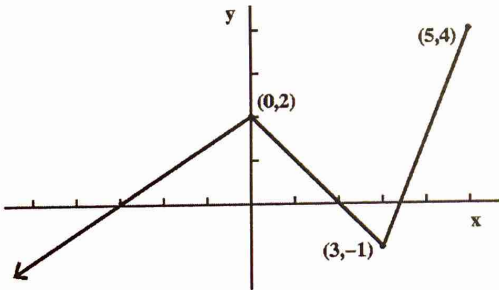
$(-\infty, \infty)$

12. $y = |x+3| + 2$

$[2, \infty)$

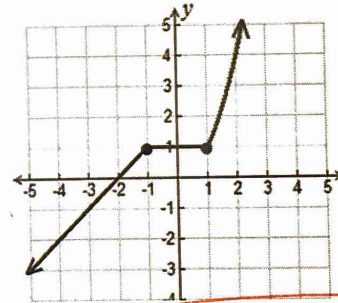
III. State the intervals on which the graph is increasing, decreasing, and constant.

13.



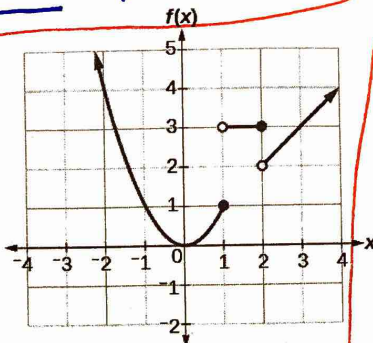
Inc: $(-\infty, 0)$ $(3, 5)$
Dec: $(0, 3)$
Constant: N/A

14.



Inc: $(-\infty, -1)$ $(1, \infty)$
Dec: N/A
Constant: $(-1, 1)$

15.



Inc: $(0, 1)$ $(2, \infty)$
Dec: $(-\infty, 0)$
Constant: $(1, 2)$

IV. Evaluate the given piecewise functions:

$$16. f(x) = \begin{cases} -3x - 4, & x \leq -2 \\ x + 1, & x > -2 \end{cases}$$

a. $f(6) =$

$$(6) + 1$$

$$7$$

b. $f(-2) =$

$$-3(-2) - 4$$

$$2$$

c. $f(0) =$

$$0 + 1$$

$$1$$

d. $f(4) =$

$$4 + 1$$

$$5$$

$$17. f(x) = \begin{cases} -x + 3, & x \leq -1 \\ 4, & -1 < x \leq 1 \\ x^2 - 1, & x > 1 \end{cases}$$

a. $f(1) =$

$$4$$

b. $f(-4) =$

$$-(-4) + 3$$

$$7$$

c. $f(0) =$

$$4$$

d. $f(8) =$

$$8^2 - 1$$

$$63$$