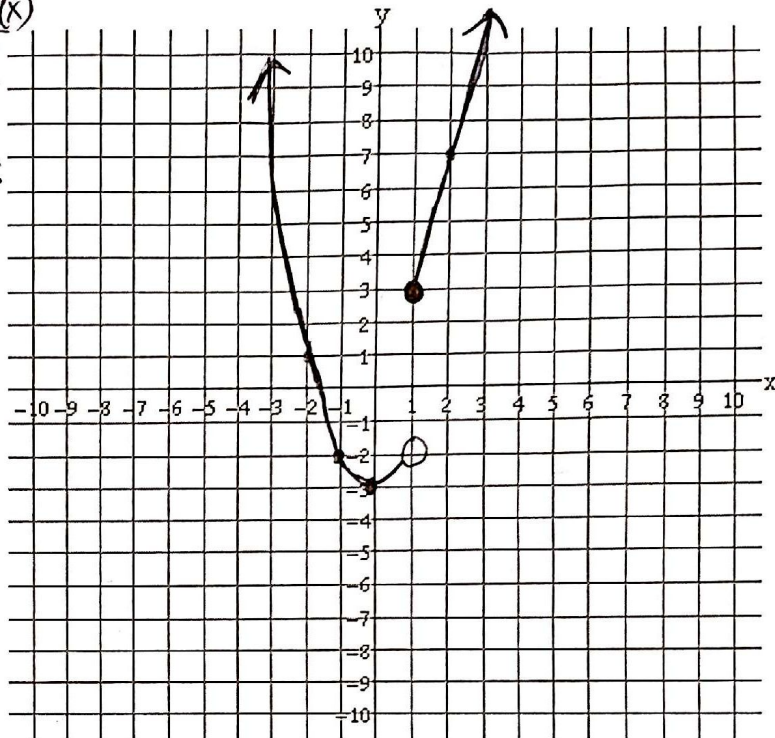


Graph each piecewise function and then answer the questions.

1.) $f(x) = \begin{cases} x^2 - 3 & x < 1 \\ 4x - 1 & x \geq 1 \end{cases}$

x	f(x)
0	-3
-1	-2
-2	1

x	f(x)
1	3
2	7
3	11
4	15



$f(1) = \underline{3}$

$f(-2) = \underline{1}$

$f(4) = \underline{15}$

Domain: $\underline{(-\infty, \infty)}$

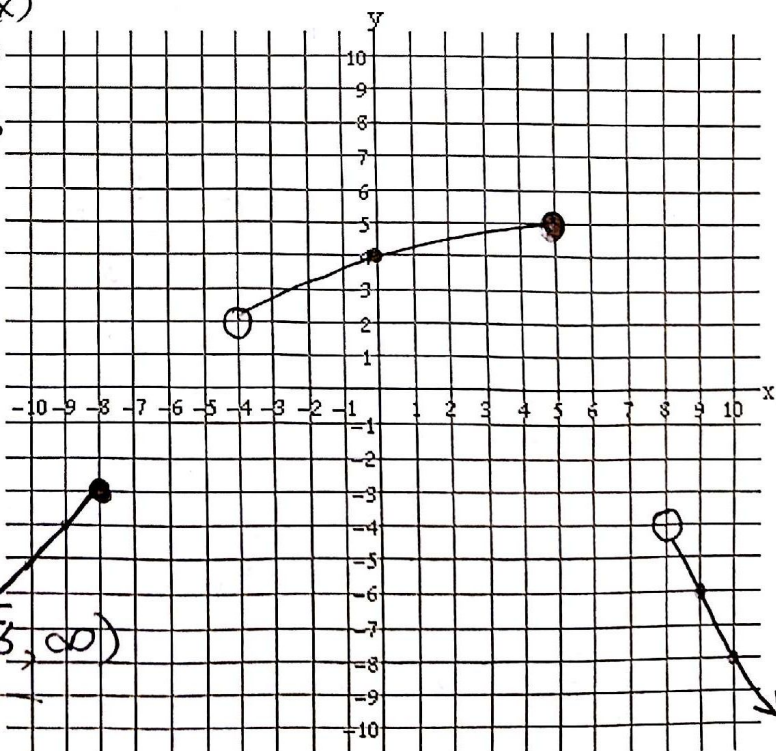
Range: $\underline{[-3, \infty)}$

2.) $f(x) = \begin{cases} x + 5 & x \leq -8 \\ \sqrt{x + 4} + 2 & -4 < x \leq 5 \\ -2|x - 6| & x > 8 \end{cases}$

x	f(x)
-4	2
0	4
5	5

x	f(x)
8	-4
9	-6
10	-8

x	f(x)
-8	-3
-9	-4
-10	-5



$f(-9) = \underline{-4}$

$f(0) = \underline{4}$

$f(9) = \underline{-6}$

Domain: $\underline{(-\infty, -8] \cup (-4, 5] \cup (8, \infty)}$

Range: $\underline{(-\infty, -3] \cup (2, 5]}$

$$3.) f(x) = \begin{cases} \frac{1}{4}x^3 & x < 0 \\ \sqrt{x+4} + 3 & 0 \leq x < 5 \\ x-10 & x \geq 6 \end{cases}$$

$$f(0) = \underline{5}$$

$$f(7) = \underline{-3}$$

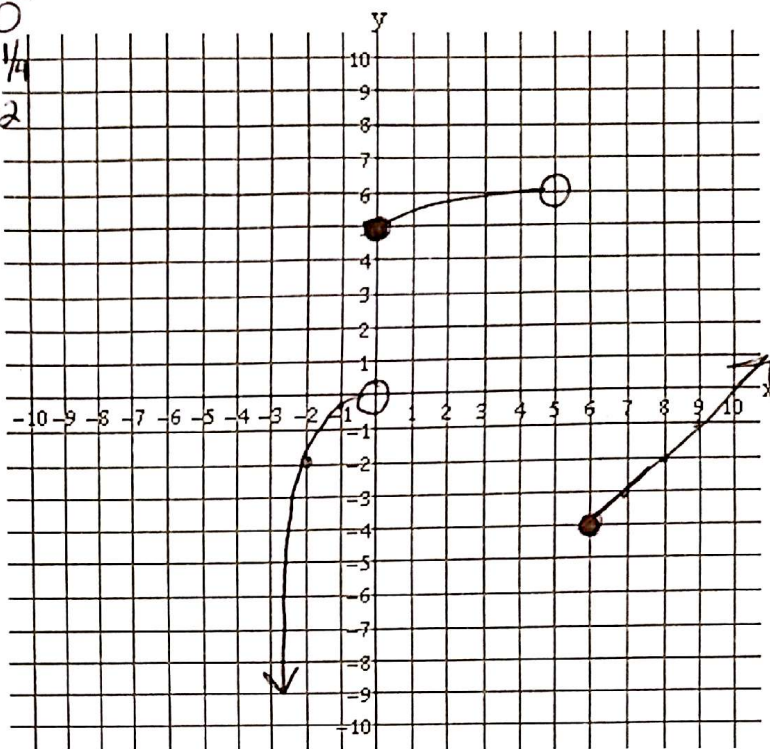
$$f(-2) = \underline{-2}$$

$$\begin{array}{r|l} x & f(x) \\ \hline 0 & 5 \\ 0.5 & 6 \end{array}$$

$$\begin{array}{r|l} x & f(x) \\ \hline 6 & -4 \\ 7 & -3 \\ 8 & -2 \end{array}$$

$$\text{Domain: } \underline{(-\infty, 5) \cup [6, \infty)}$$

$$\text{Range: } \underline{(-\infty, \infty)}$$



$$4.) f(x) = \begin{cases} 2x+4 & x < -3 \\ -\frac{1}{2}x^2+2 & x \geq 2 \end{cases}$$

$$f(-5) = \underline{-6}$$

$$f(4) = \underline{-6}$$

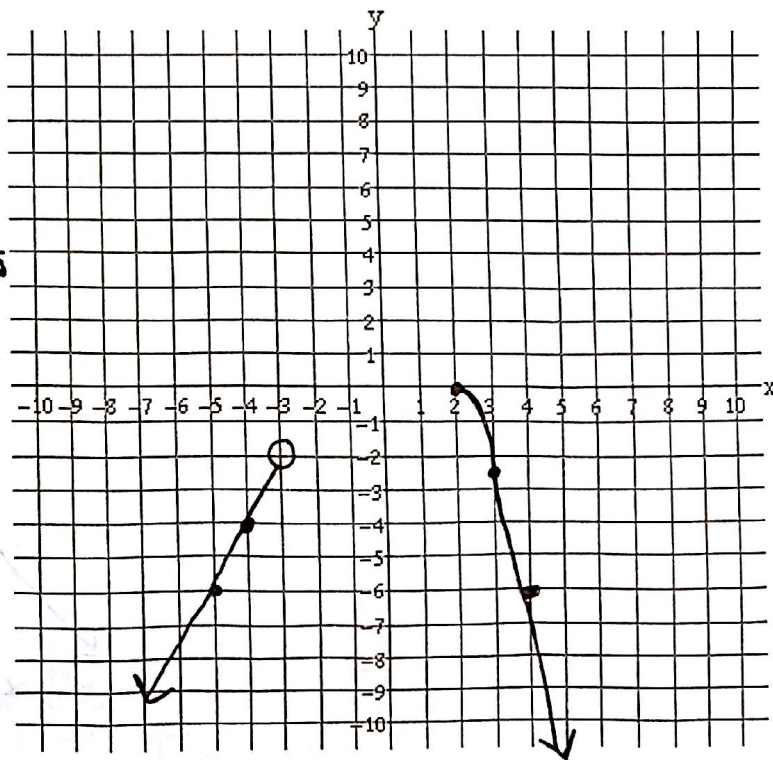
$$f(0) = \underline{\text{DNE}}$$

$$\begin{array}{r|l} x & f(x) \\ \hline 0 & -2 \\ -1 & -4 \\ -5 & -6 \end{array}$$

$$\begin{array}{r|l} x & f(x) \\ \hline 2 & 0 \\ 3 & -2.5 \\ 4 & -6 \end{array}$$

$$\text{Domain: } \underline{(-\infty, 3) \cup [2, \infty)}$$

$$\text{Range: } \underline{(-\infty, 0]}$$



$$5.) f(x) = \begin{cases} -|x+1|-4 & -4 < x \leq 4 \\ \sqrt{x} & x > 4 \end{cases}$$

$$f(4) = \underline{-9}$$

$$f(-4) = \underline{DNE}$$

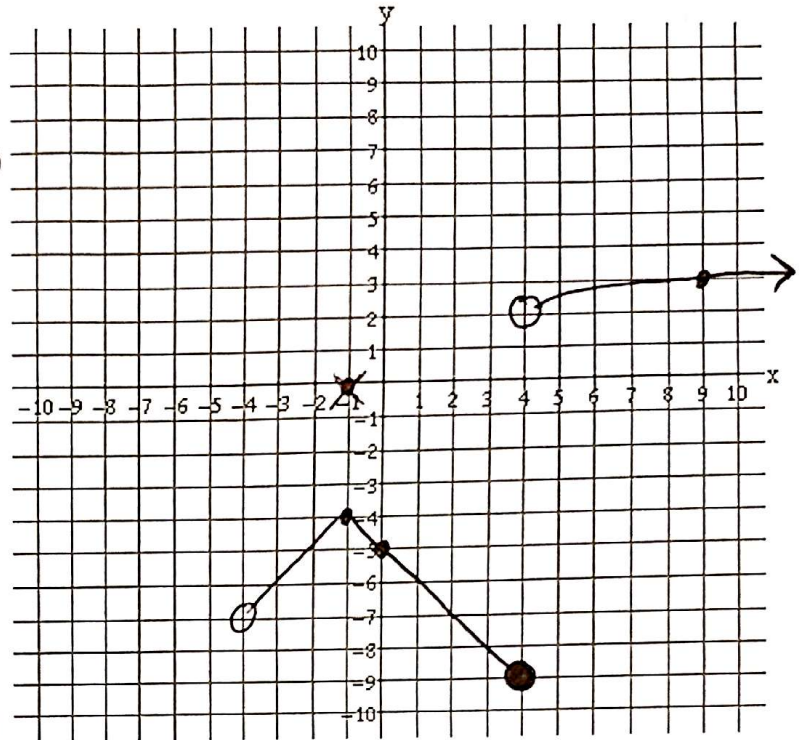
$$f(9) = \underline{3}$$

x	f(x)
-4	-7
0	-4
4	-9

x	f(x)
4	2
9	3

$$\text{Domain: } \underline{(-4, \infty)}$$

$$\text{Range: } \underline{[-9, -4] \cup (2, \infty)}$$



$$6.) f(x) = \begin{cases} |x+7|-3 & x < -5 \\ x^2+3 & -2 \leq x < 2 \end{cases}$$

$$f(2) = \underline{DNE}$$

$$f(-7) = \underline{-3}$$

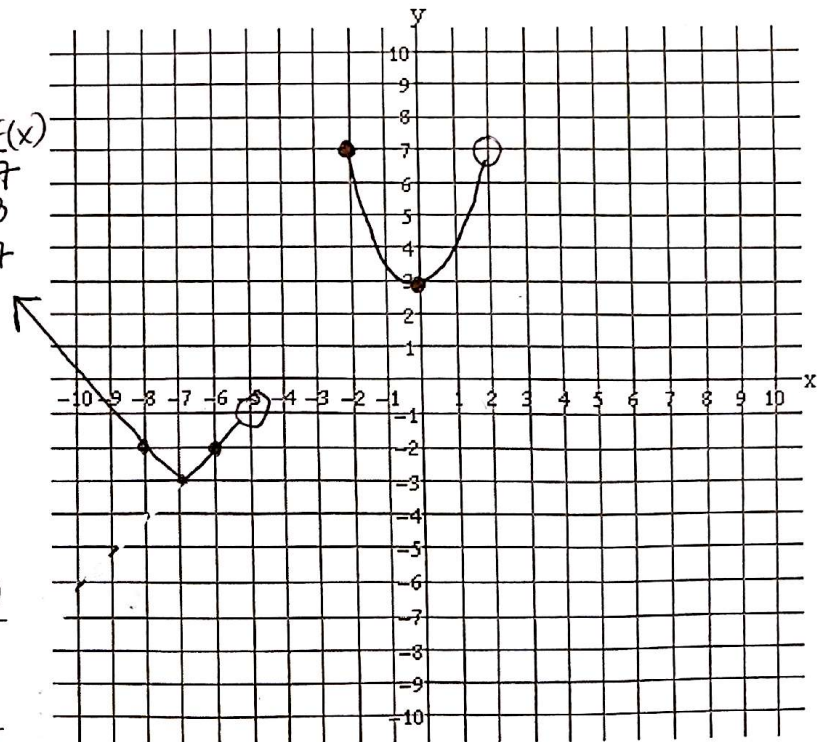
$$f(1) = \underline{4}$$

x	f(x)
-5	-1
-6	-2
-7	-3
-8	-2

x	f(x)
-2	7
0	3
2	7

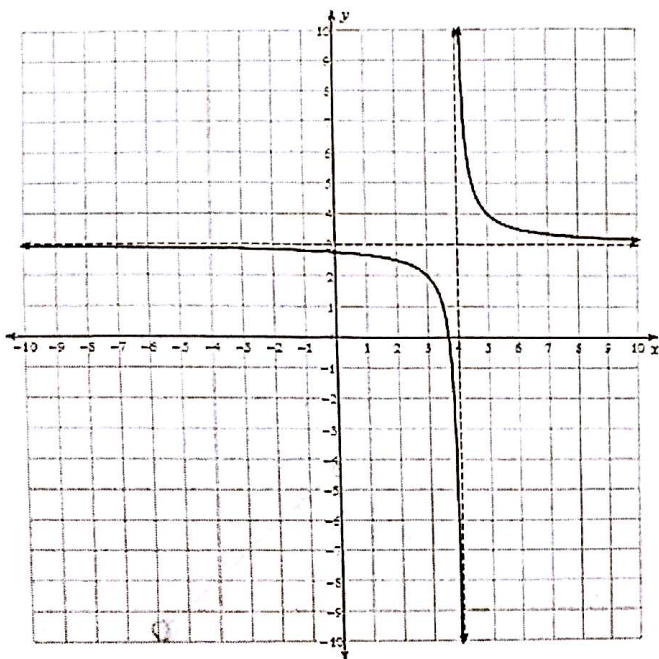
$$\text{Domain: } \underline{(-\infty, -5) \cup [-2, 2)}$$

$$\text{Range: } \underline{[-3, \infty)}$$



State in interval notation when each function is increasing or decreasing.

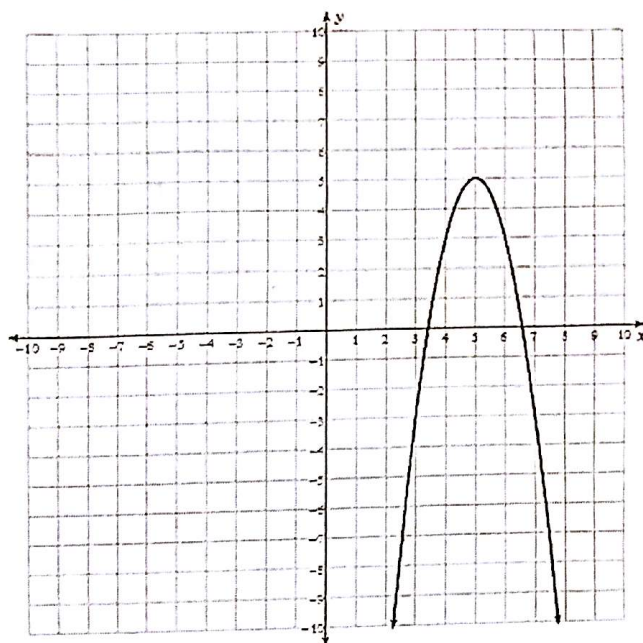
7.)



Increasing Interval: /

Decreasing Interval: $(-\infty, 4) \cup (4, \infty)$

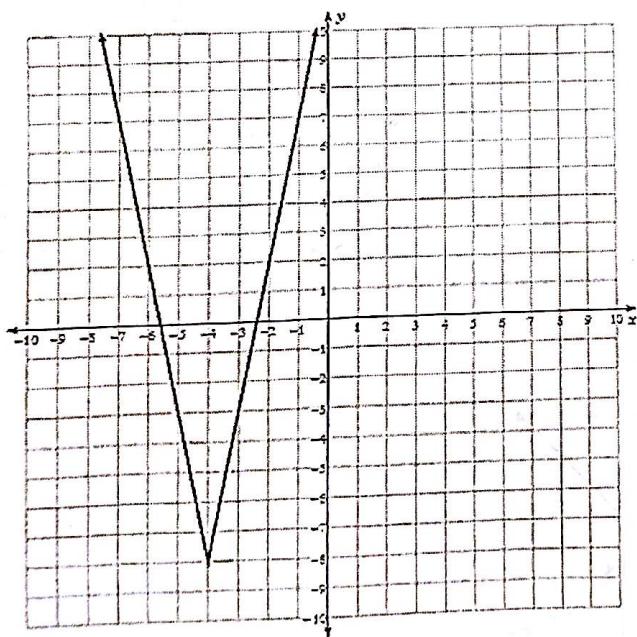
8.)



Increasing Interval: $(-\infty, 5)$

Decreasing Interval: $(5, \infty)$

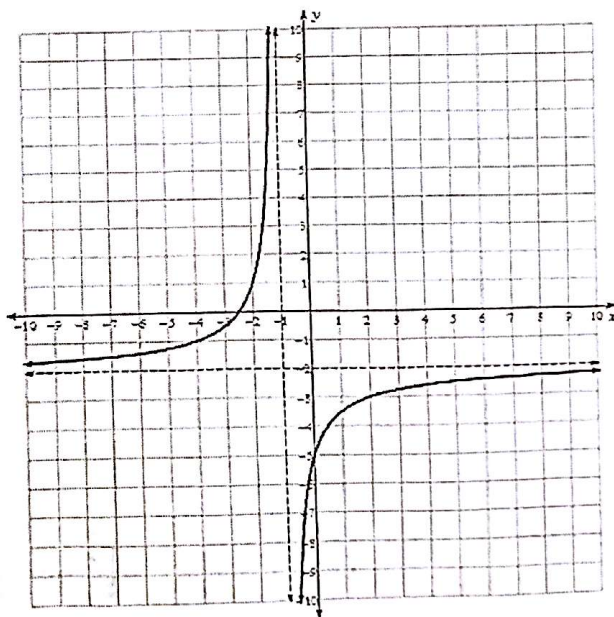
9.)



Increasing Interval: $(-4, \infty)$

Decreasing Interval: $(-\infty, -4)$

10.)



Increasing Interval: $(-\infty, -1) \cup (-1, \infty)$

Decreasing Interval: ~~$(-\infty, -1) \cup (-1, \infty)$~~ /