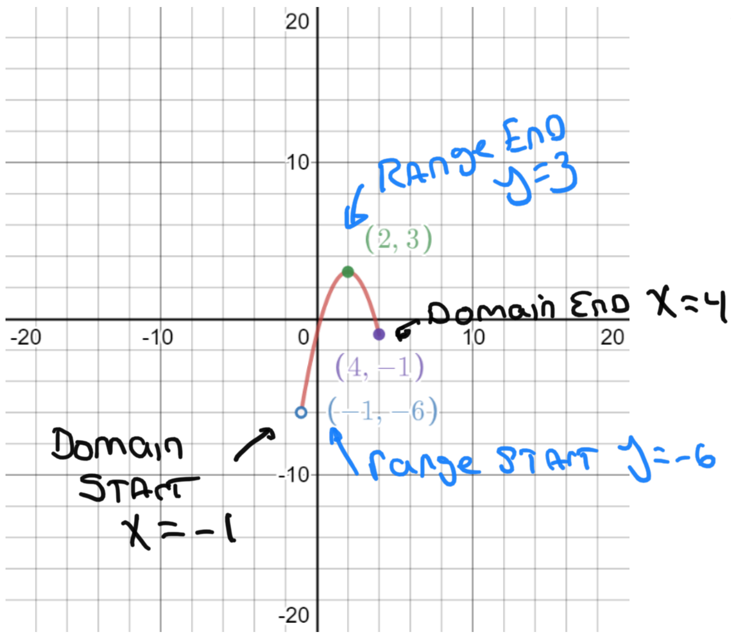
Chapter 3 Practice test

#1 –2: Determine the domain and range of each function, write your answer in interval notation when appropriate.

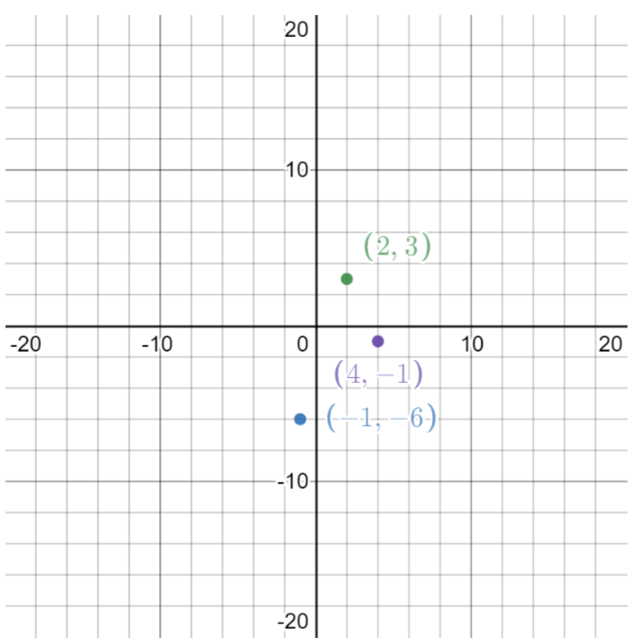
1)



Domain (-1, 4]

Range (-6, 3]

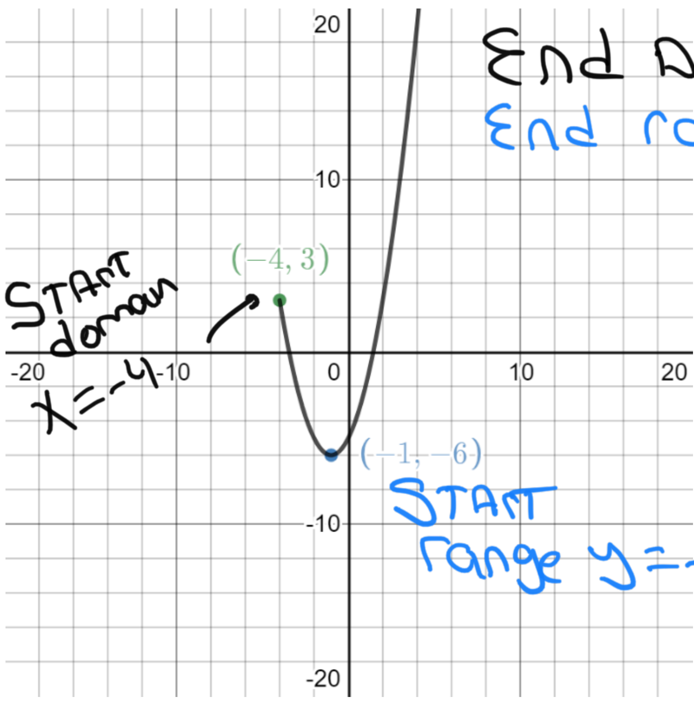
2)



Domain {-1, 2, 4}

Range {-6, -1, 3}

3)



START domain $x = -4$

START range $y = -6$

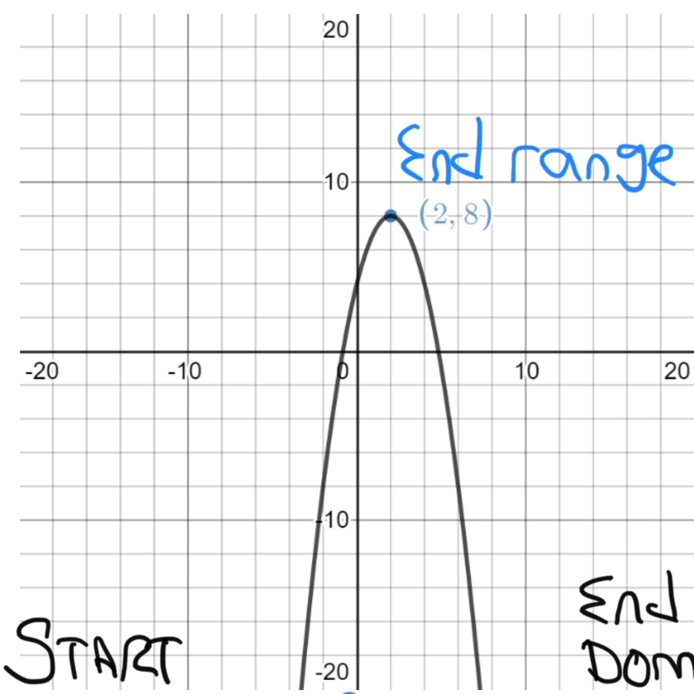
End Domain $x = +\infty$

End range $y = +\infty$

Domain $[-4, \infty)$

Range $[-6, \infty)$

4)



End range $y = 8$

Domain $(-\infty, \infty)$

Range $(-\infty, 8]$

START Domain $x = -\infty$

START Range $y = -\infty$

End Domain $x = +\infty$

#5-7: Use algebra to find the domain of each function. Write your answer in interval notation.

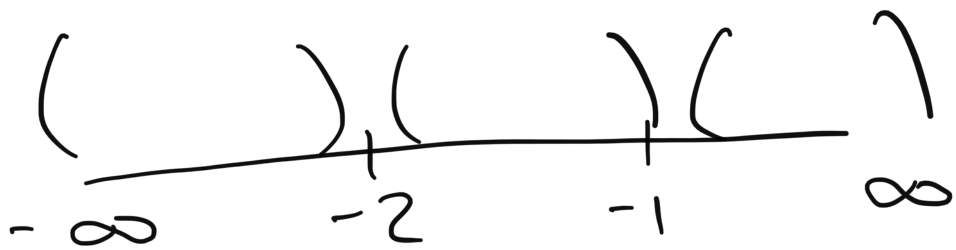
5) $f(x) = \frac{x-4}{x^2+3x+2}$

Ignore $X-4$

Solve $X^2+3X+2=0$

$(X+1)(X+2)=0$

$X=-1 \quad X=-2$



Domain $(-\infty,-2)\cup(-2,-1)\cup(-1,\infty)$

6) $f(x) = \sqrt{x-6}$

$$\begin{aligned} x - 6 &\geq 0 \\ +6 \quad & \; +6 \\ \hline x &\geq 6 \end{aligned}$$

Domain $[6, \infty)$

7) $f(x) = x^2 - 16$

no Algebra to find domain

Domain $(-\infty, \infty)$

#8– 10: let f(x) = 2x + 5 and g(x) = 3x – 1, find the following

8) $(f - g)(x)$ $= (2x+5)-(3x-1)$

$= 2x+5-3x+1$

$= 2x-3x+5+1$

$= \boxed{-x+6 \text{ OR } -1x+6}$

9) $(g \circ f)(x) = 3(2x+5)-1$

$= 6x+15-1$

$= \boxed{6x+14}$

#8– 10: let f(x) = 2x + 5 and g(x) = 3x – 1, find the following

10) (f+g)(2)

$(f+g)(x) = (2x+5)+(3x-1)$

$(f+g)(2) = (2(2)+5)+(3(2)-1)$

$= 9 + 5$

$= 14$

11) Find the difference quotient; that is find $\frac{f(x+h)-f(x)}{h}$; f(x) = 2x – 3

$2(x+h)-3$

$2x+2h-3$ $\quad$ $2x-3$

$$\frac{f(x+h)-f(x)}{h}$$

$$\frac{(2x+2h-3)-(2x-3)}{h}$$

$$= \frac{\cancel{2x}+2h-\cancel{3}-\cancel{2x}+\cancel{3}}{h}$$

$$= \frac{2h}{h} = \boxed{2}$$

12) Find the average rate of change of $f(x) = x^3 + 6x^2$ from 0 to 2

(0, 0) $(0)^3 + 6(0)^2 = 0$

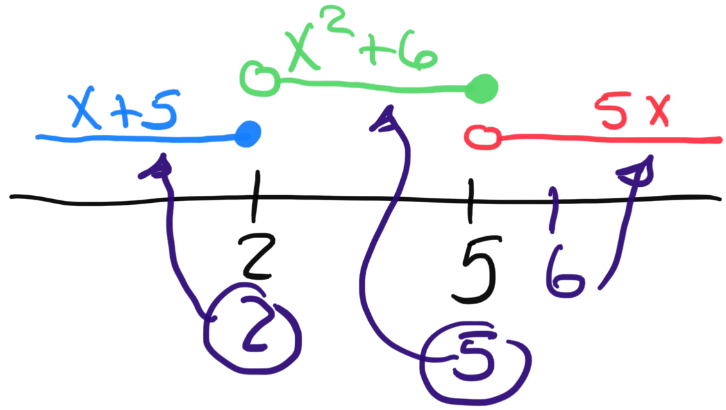
(2, 32) $(2)^3 + 6(2)^2$

$= 8 + 24$

$= 32$

Average Rate of Δ $= \dfrac{32-0}{2-0} = \dfrac{32}{2} = \boxed{16}$

13) g(x) = $\begin{cases} x+5, if\ x \le 2 \\ x^2+6, if\ 2 < x \le 5 \\ 5x\ if\ x > 5 \end{cases}$

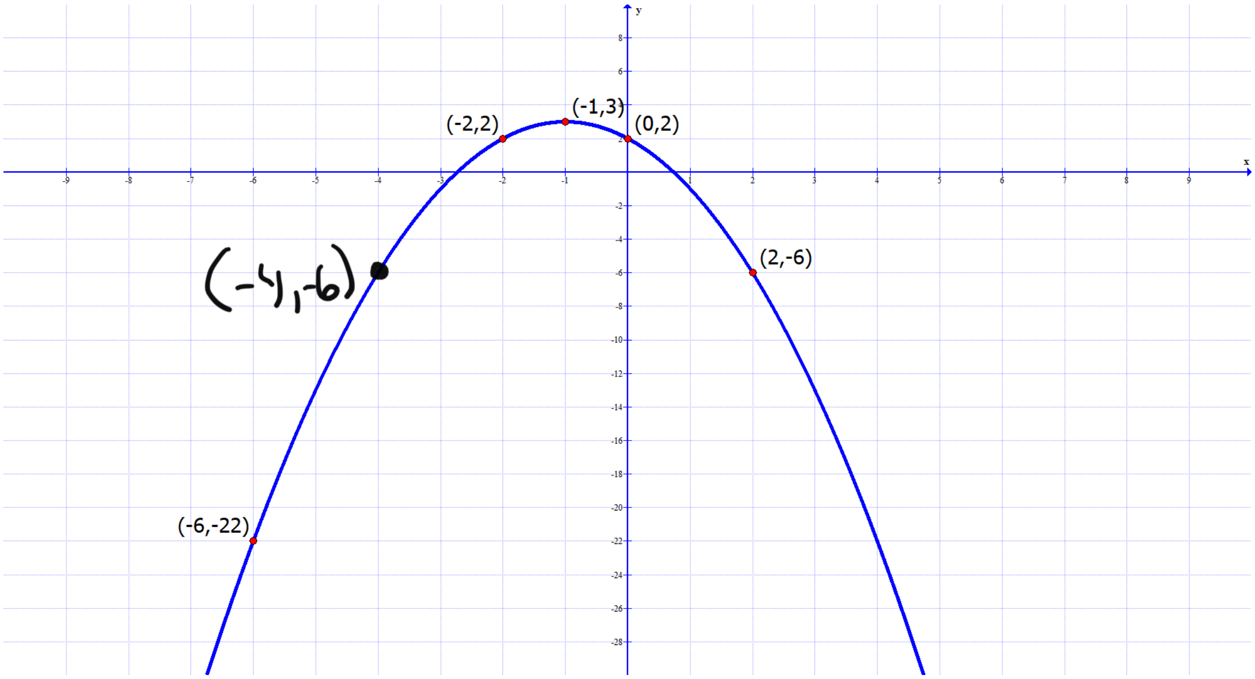


a) g(2) $= 2+5 = 7$

b) g(6) $= 5(6) = 30$

c) g(5) $= (5)^2+6 = 31$

14) Use the graph below to answer the following: (call the function graphed below f(x))



14a) Find f(2) = -6

(2, -6)

14b) Find f(-6) = -22

(-6, -22)

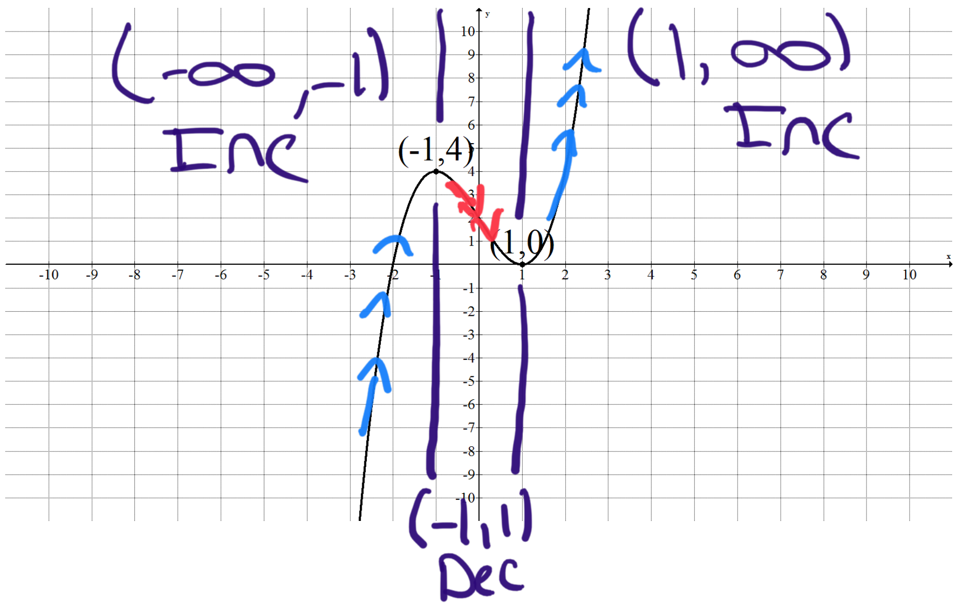
14c) Find all values of x such that f(x) = 2   x = -2, 0

(-2, 2)
(0, 2)

14d) Find all values of x such that f(x) = -6   x = 2, -4

(2, -6)
(-4, -6)

15) Use the graph below to answer question the following:



15a) the interval(s) where the function graphed is increasing

$(-\infty,-1) \cup (1,\infty)$

15b) the interval(s) where the function graphed is decreasing

$(-1,1)$

15c) ~~The values of x (if any) where the function has a local maximum~~
Find the local maximum point $(-1,4)$

15d) The local maximum value (if any) $y=4$, which occurs when $x=-1$

15e) ~~The values of x (if any) where the function has a local minimum~~
Find the local minimum point $(1,0)$

15f) The local minimum values (if any)

$y=0$ which occurs when $x=1$

#16 - 20 let $f(x) = x^2$

a) find the requested function

b) describe the transformation from the original function.

16a) $f(x-3)$ $= (x-3)^2$

16b) RIghT 3

17a) $-f(x+5)$ $-(x+5)^2$

17b) Reflect over x-axis, leFT 5

18a) $f(x) + 2$ $= x^2 + 2$

18b) Up 2

19a) $f(x + 2) - 4$ $= (x+2)^2 - 4$

19b) left 2 down 4

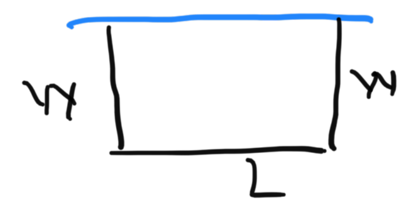
20a) $f(x - 1) + 7$ $= (x-1)^2 + 7$

20b) RT 1 up 7

21) A campground owner has 2000 meters of fencing. He wants to enclose a rectangular field bordering a river, with no fencing needed along the river, and let W represent the width of the field.

a) Write an equation for the length of the field

$$L + 2w = 2000 \qquad L = -2w + 2000$$
$$-2w \quad -2w$$



b) Write an equation for the area of the field.

$$A = LW$$
$$A = (-2w + 2000)w \qquad A$$
$$\boxed{A = -2w^2 + 2000w}$$

c) Find the value of w leading to the maximum area

$$W = \frac{-b}{2a} = \frac{-2000}{2(-2)} = 500$$

$$a = -2 \qquad b = 2000$$

$\boxed{\text{width } 500\text{m}}$

d) Find the value of L leading to the maximum area

$$L = -2w + 2000$$
$$L = -2(500) + 2000$$

$\boxed{\text{length } 1000\text{m}}$

e) Find the maximum area.

$$A = L \cdot W = (500\text{m})(1000\text{m})$$

$\boxed{\text{Area } 500{,}000 \text{ Square meters}}$

Up and down shifts	Transformation
y = f(x) + k (k>0)	Shift the graph **UP** k units
Y = f(x) – k (k>0)	Shift the graph **DOWN** k units

Left and right shifts	Transformation
y = f(x+h) (h >0)	Shift graph **LEFT** h units
y = f(x-h) (h>0)	Shift graph **RIGHT** h units

Reflections	Transformation
y= -f(x)	**REFLECTS** graph about **x-axis**
y= f(-x)	**REFLECTS** graph about **y-axis**

Compressing and stretching	Transformation
y = af(x) (a >0)	**STRETCHES** the graph when **a > 1**
	COMPRESSES graph when **0 < a < 1**