F'19

Honors Math 3

Unit 1 - Functions TEST Review

1. **Solve. Be sure to check for extraneous solutions when necessary.**

a) $|2 + 6x| = 4$ $\{x \mid x = -1 \text{ or } x = \frac{1}{3}\}$

b) $8 - |-2x - 4| > 4$ $\{x \mid -4 < x < 0\}$

c) $6\left|\frac{x}{3} + \frac{1}{5}\right| - 2 \geq 4$ $\{x \mid x \leq -\frac{18}{5} \text{ or } x \geq \frac{12}{5}\}$

d) $5 + |x - 8| \geq 3$ $\{x \mid x = \mathbb{R}\}$

e) $\sqrt{2x + 6} = -3 + \sqrt{-3 - 4x}$ $\{x \mid x = -3\}$

f) $(x^2 + 4)^{\frac{2}{3}} = 25$ $\{x \mid x = \pm 11\}$

g) $\sqrt{2x^2 - 25} = x$ $\{x \mid x = 5\}$

h) $(9x)^{\frac{3}{4}} + 5 = 13$ $\{x \mid x = \frac{16}{9}\}$

i) $n - \sqrt{8n + 1} = -2$ $\{n \mid n = 1, 3\}$

j) $\sqrt{x + 4} - \sqrt{x - 1} = 1$ $\{x \mid x = 5\}$

2. State the domain.

a) $f(x) = \frac{1}{\sqrt{2x-5}}$ $\{x \mid x > \frac{5}{2}\}$

b) $f(x) = \sqrt{3-2x}$ $\{x \mid x \leq \frac{3}{2}\}$

c) $f(x) = |x-3|$ $\{x \mid x = \mathbb{R}\}$

d) $f(x) = \frac{1}{x^2-3}$ $\{x \mid x \neq \pm\sqrt{3}\}$

e) $f(x) = \frac{x+1}{x^2+4}$ $\{x \mid x = \mathbb{R}\}$

f) $f(x) = \frac{1}{x^2+2x-35}$ $\{x \mid x \neq -7, 5\}$

3. Let $f(x) = 1 - x^2$ and $g(x) = 2x - 3$, find:

a) $f(g(\frac{1}{2})) = -3$

b) $g(f(-4)) = -33$

c) $f(g(-2a)) = -16a^2 - 24a - 8$

d) $g(4y+3) = 8y + 3$

e) $\frac{f(x+h)-f(x)}{h} = -2x - h$

f) $\frac{g(x+h)-g(x)}{h} = 2$

Let $f(x) = x - 2$ and $g(x) = 6x + 2$, find:

a) $\frac{f(g(a-1))}{4} = \frac{3a-3}{2}$

b) $f(g(x)) = 6x$

c) $g(f(x)) = 6x - 10$

d) $f(x) + g(x) = 7x$

e) $g(x) \cdot f(x) = 6x^2 - 10x - 4$

f) $2g(f(x)) = 12x - 20$

5. State whether the following functions are even, odd or neither. If the function is even or odd, explain why.

a) $y = -|x| + 2$ even

b) $y = |x + 3| - 2$ neither

c) $y = -2x^3$ odd

d) $y = x^3 - 5$ neither

6. List the steps in a correct order needed to graph AND graph on your own graph paper:

a) $f(x) = -2\sqrt{3x+9} - 1 = -2\sqrt{3(x+3)} - 1$ ROXA, vert. stretch 2, horiz. comp. 1/3, Left 3 down 1

b) $g(x) = -2\left(\frac{1}{2}x - 4\right)^2 - 3 = -2\left(\frac{1}{2}(x-8)\right)^2 - 3$.

c) $h(x) = 4|10 - 5x| + 3 = 4|-5(x-2)| + 3$; vert. stretch 4, ROYA, horiz. comp. 1/5, right 2, up 3

d) $p(x) = \frac{1}{2}(2x)^3$

SEE GRAPHS ATTACHED...

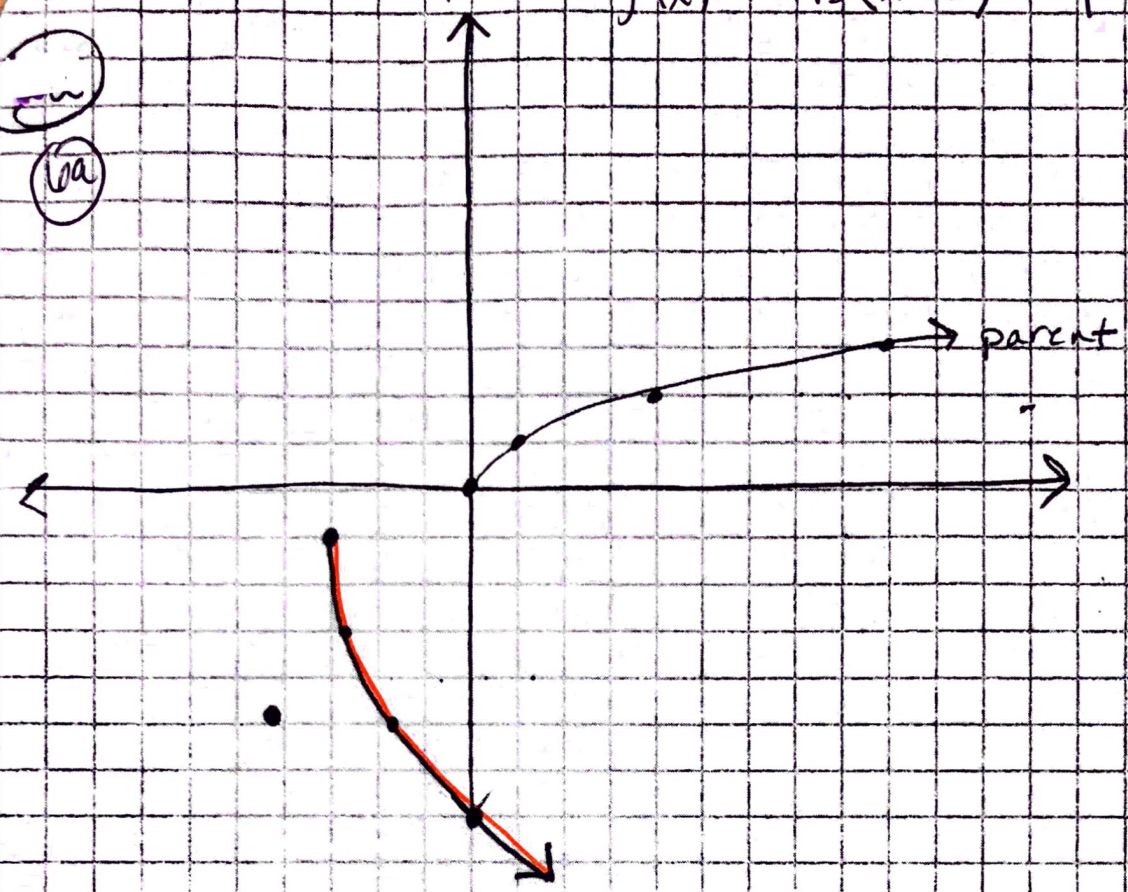
a) $f(x) = \begin{cases} x & -3 \le x \le 0 \\ 2 & 0 < x < 1 \\ \sqrt{x} & 1 \le x < 4 \end{cases}$

b) $f(x) = \begin{cases} x + 1 & -3 \le x < 0 \\ x^2 & 0 \le x \le 2 \end{cases}$

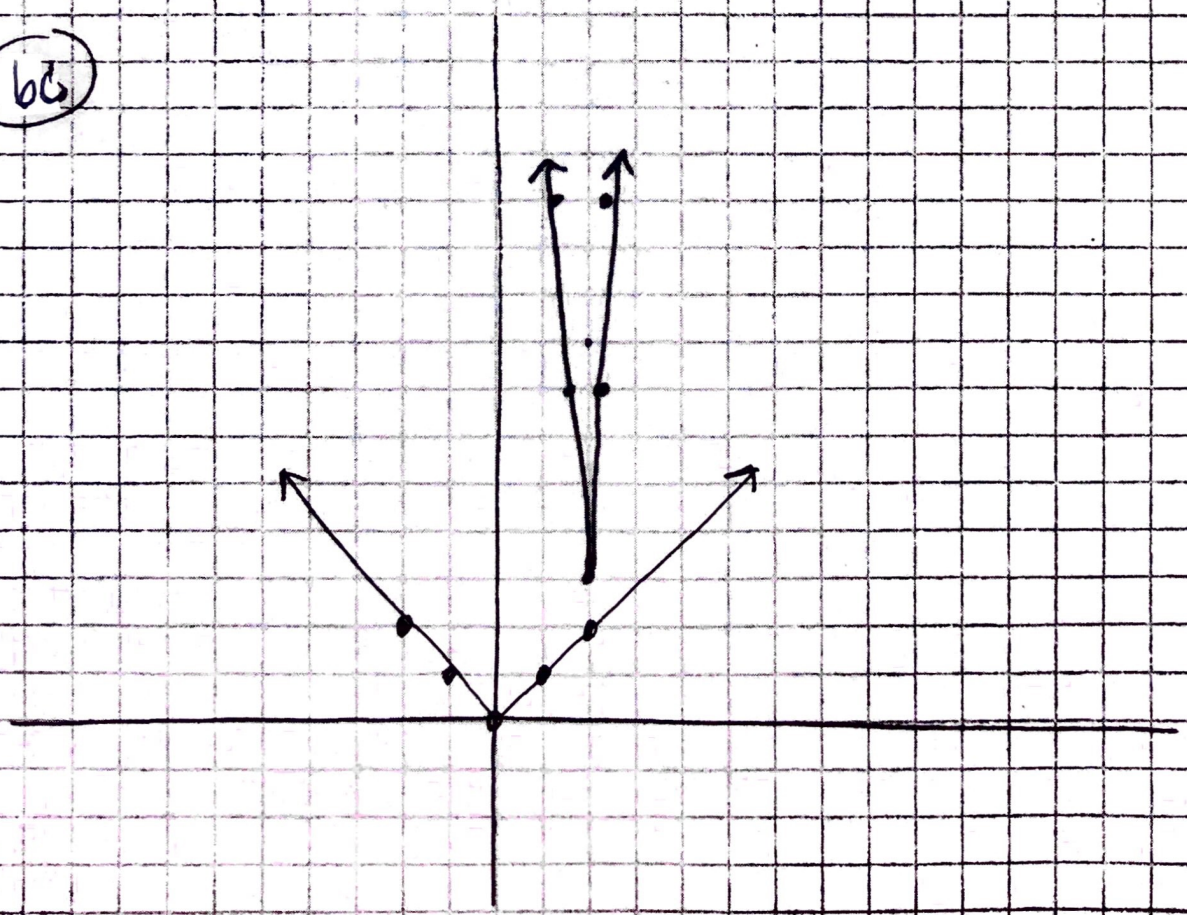
c) $f(x) = \begin{cases} 2, & -6 \le x < -2 \\ |x| - 2, & -2 \le x \le 2 \\ -x + 6, & 3 < x \le 6 \end{cases}$

$f(x) = -2\sqrt{3(x+3)} - 1$

6a



6b



(b. $g(x) = -2\left[\frac{1}{2}(x+8)^2\right] - 3$

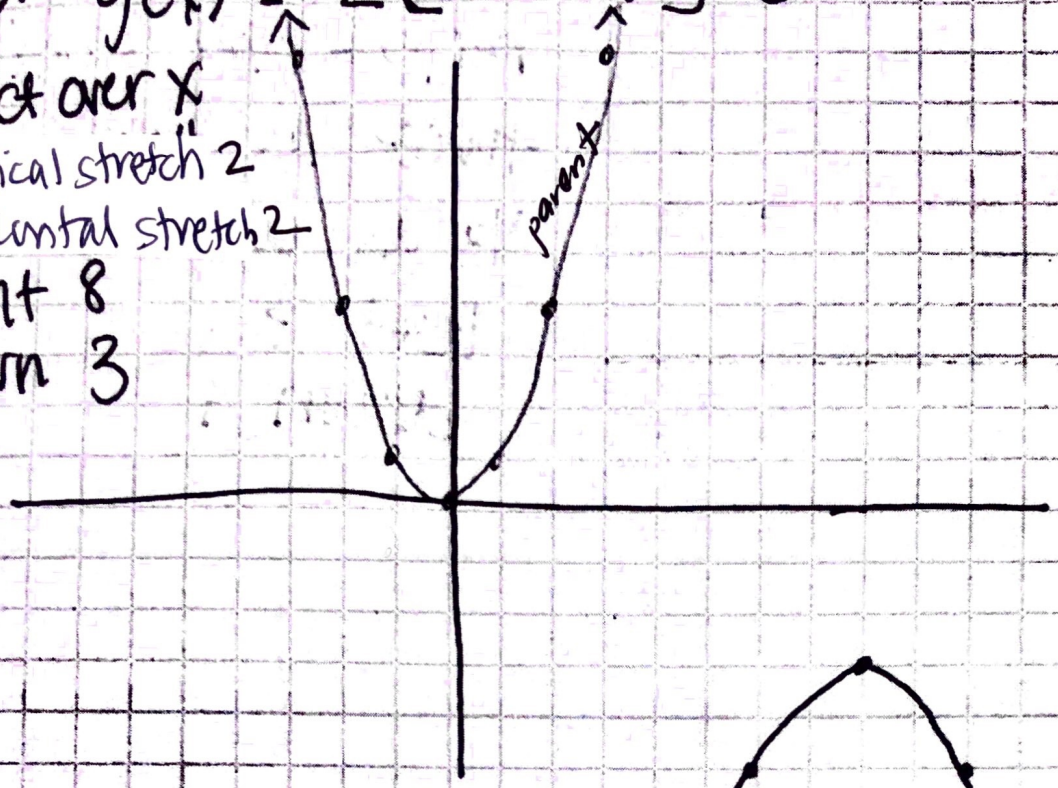
reflect over x

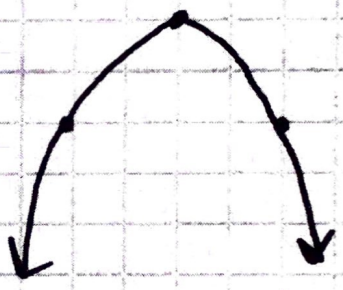
vertical stretch 2

horizontal stretch 2

right 8

down 3

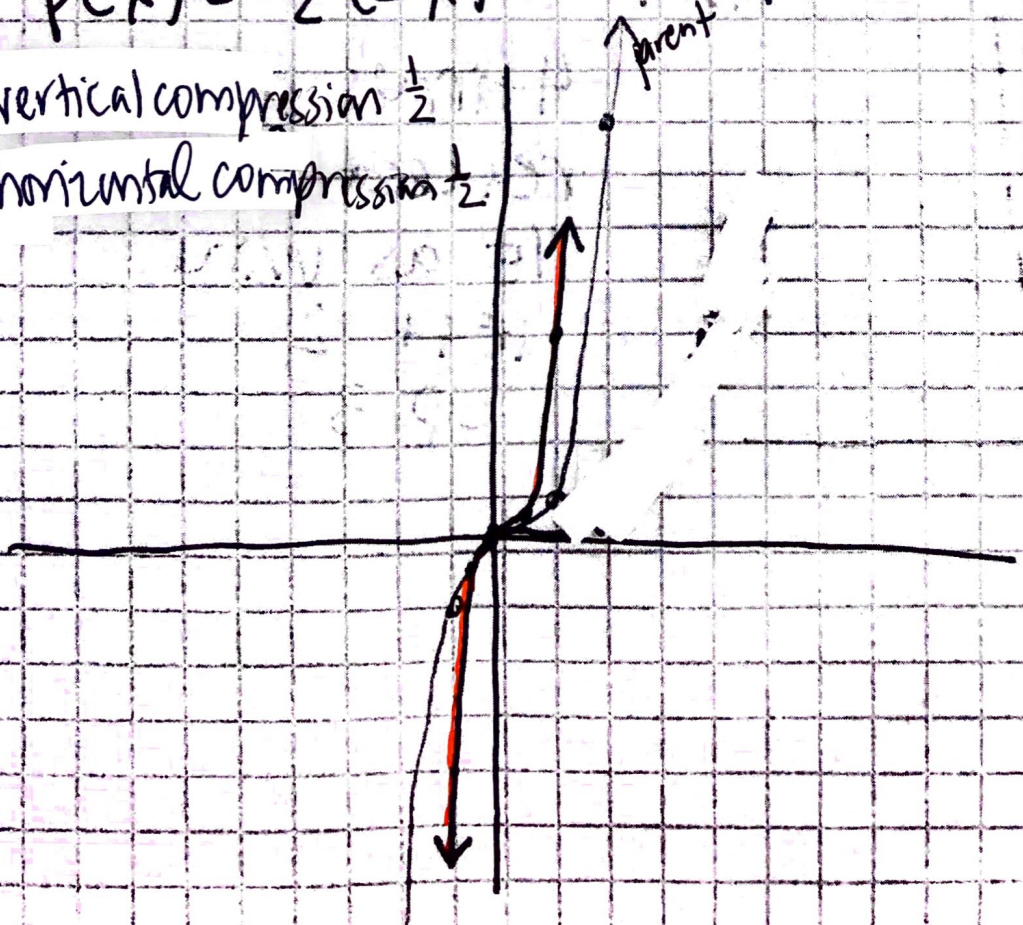




(d. $p(x) = \frac{1}{2}(2x)^3$

vertical compression $\frac{1}{2}$

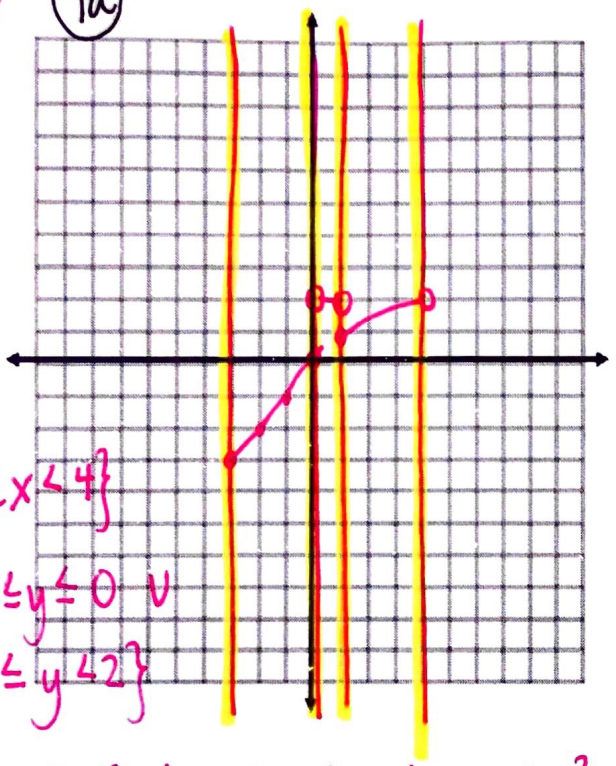
horizontal compression $\frac{1}{2}$



Coordinate Planes

9a

x	x
-3	-3
-1	-1
0	0

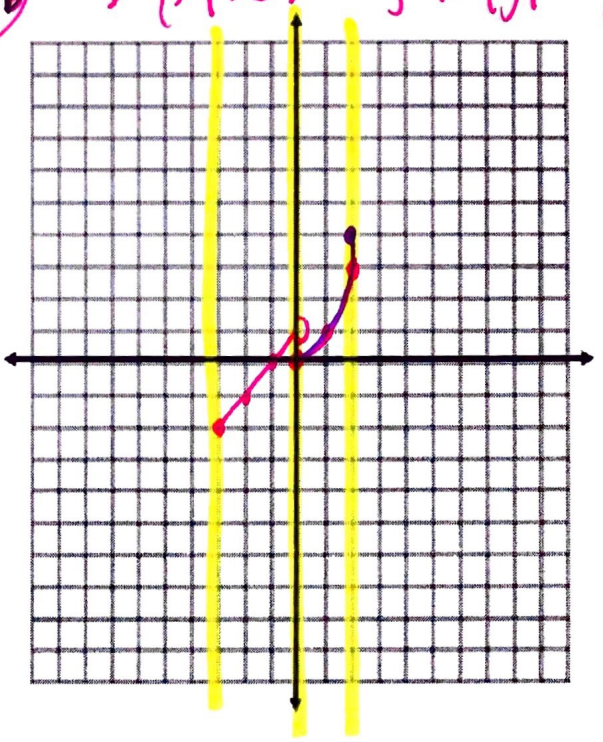


$D: \{x \mid 3 \leq x < 4\}$

$R: \{y \mid -3 \leq y \leq 0 \text{ U } 1 \leq y < 2\}$

9b

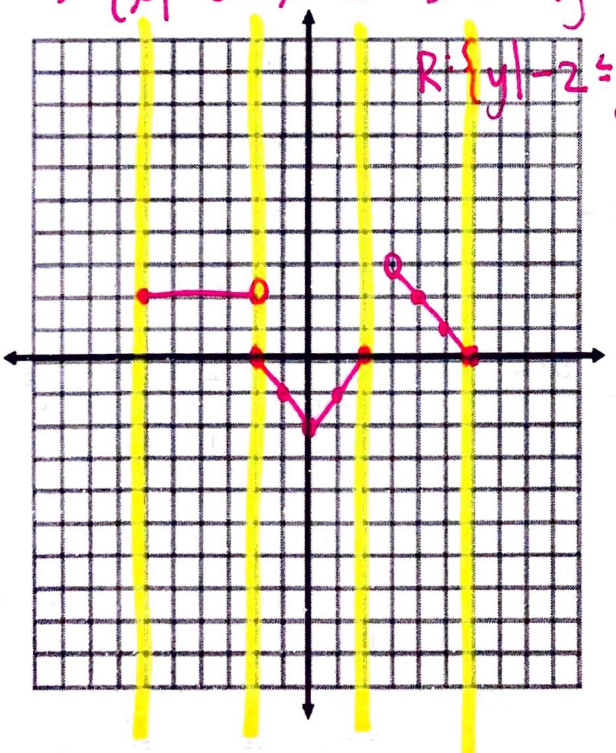
$D: \{x \mid -3 \leq x \leq 2\}$ $R: \{y \mid -2 \leq y \leq 4\}$

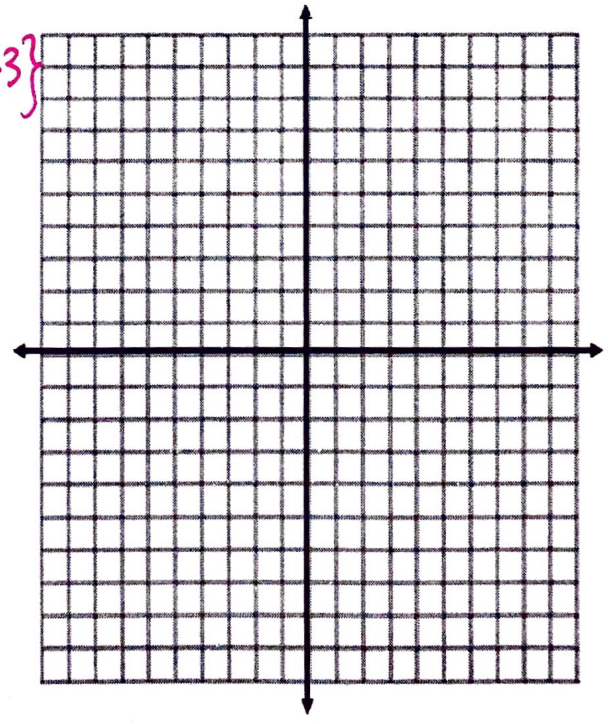


9c

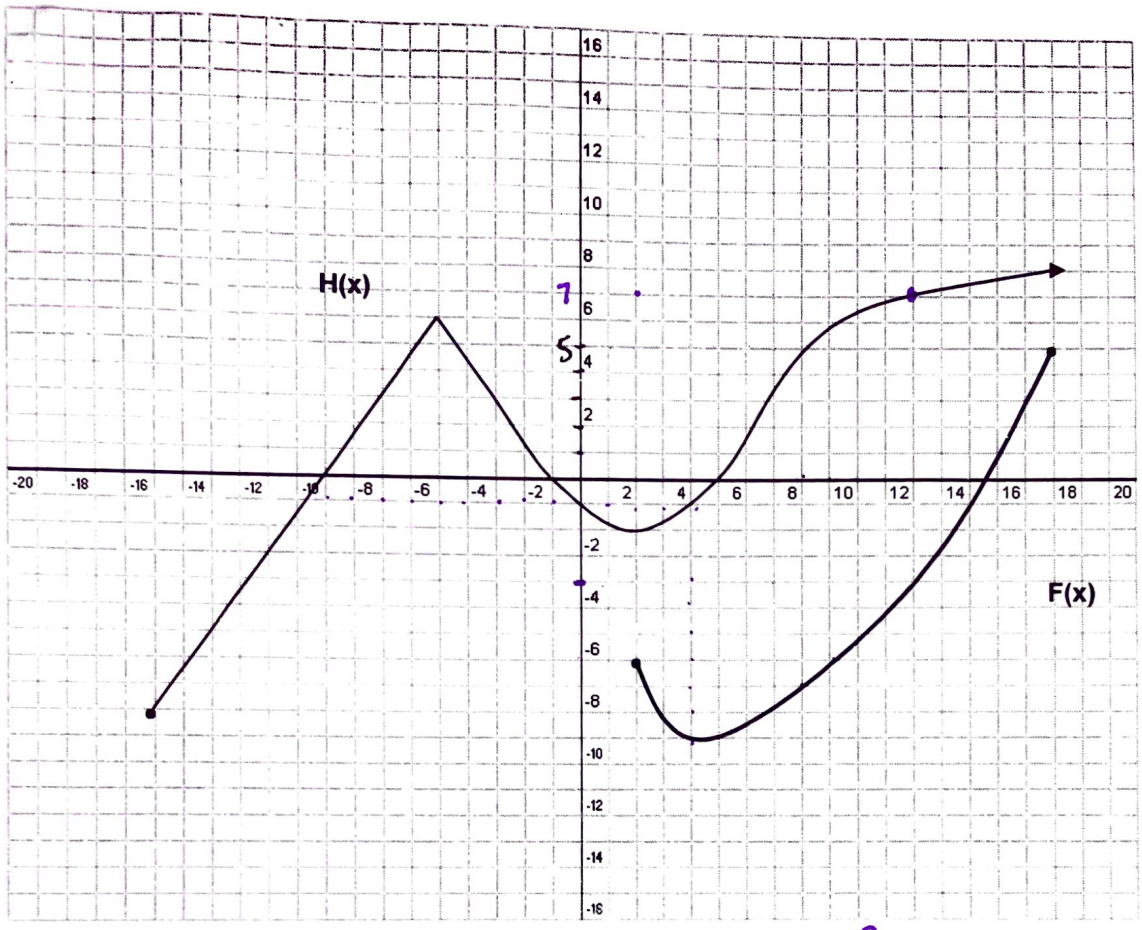
$D: \{x \mid -6 \leq x \leq 2 \text{ U } 3 < x \leq 6\}$

$R: \{y \mid -2 \leq y < 3\}$





11.



a) State the domain and range of H(x). D: $\{x \mid x \geq -15\}$ R: $\{y \mid y \geq -9\}$

b) State the domain and range of F(x). D: $\{x \mid 2 \leq x \leq 17\}$ R: $\{y \mid -10 \leq y \leq 5\}$

c) H(8) = 5 F(8) = -8 F(7) = -9 H(0)= -1

d) H(12) = 7 F(12) = −4 H(-15) = -9 F(17) = 5

e) H(0) = −1 or H(≈ -10) = −1 or H(4) = −1

F(2) = −7 F(9) −7

f) For what x values will H(x) = 0? For what x values will F(x) = 0?

(5,0) (-1,0) (-9,0) / (14.5,0)

These are called the roots or x-intercepts.

g) a. F(4) + H(-5) = -4 b. H(-13) ÷ F(14) = 6

-10 + 6 -6/-1