

Solve:

Unit 1 Practice

① $\frac{3}{5} |x - 1| + 2 = 11$

② $-2 |x - 4| + 3 < -11$

③ Jane has 600 quarters and dimes in his piggy bank which totals to ~~\$123.75~~ \$120.60. How many quarters and dimes does he have?

④ The perimeter of a rectangle is 34 inches. If the length is 2 inches more than twice the width, find the length of the rectangle.

Graph

⑤ $3x + 2y \geq -2$
 $x + 2y \leq 2$

⑥ $f(x) = \begin{cases} -4 & x \leq -2 \\ x - 2 & -2 < x < 2 \\ -2x + 4 & x \geq 2 \end{cases}$

⑦ Given: $f(x) = 2x - 1$ and $g(x) = 12x^2$ evaluate:

a) $f(3)$

b) $g(-2)$

c) $f^{-1}(x)$

d) $g^{-1}(x)$

e) $f(g(2))$

f) $g(f(-1))$

g) $f(g(x))$

h) $g(f(x))$

Unit 1

$$1) \frac{3}{5} |x-1| + 2 = 11$$

$$\frac{3}{5} |x-1| = 9$$

$$\frac{3}{3} |x-1| = \frac{45}{3}$$

$$|x-1| = 15$$

↙

$$x-1=15 \quad \text{OR} \quad -(x-1)=15$$

$$x=16 \quad \text{OR} \quad -x+1=15$$

$$-x=14$$

$$x=-14$$

$$\{16, -14\}$$

$$2) -2|x-4| + 3 < -11$$

$$-2|x-4| < -14$$

$$|x-4| > 7$$

↙ ↘

$$x-4 > 7 \quad \text{OR} \quad -(x-4) > 7$$

$$x > 11 \quad \text{OR} \quad -x+4 > 7$$

$$\frac{-x}{-1} > \frac{3}{-1}$$

$$x > 11 \quad \text{OR} \quad x < -3$$

$$\{x \mid x < -3 \quad \text{OR} \quad x > 11\}$$

3. Let Q = Quarters.
D = Dimes.

$$Q + D = 600$$

$$.25Q + .10D = 123.75 \Rightarrow$$

$$-25Q - 25D = -15,000$$

$$25Q + 10D = 12375$$

$$-15D = -2625$$

$$D = 175$$

175 Dimes

425 Quarters

$$4) 2L + 2W = 34$$

$$L = 2W + 2$$

$$2(2W + 2) + 2W = 34$$

$$4W + 4 + 2W = 34$$

$$6W = 30$$

$$W = 5$$

Length

$$L = 2(5) + 2$$

$$L = 12$$

$$12 \text{ in} \times 5 \text{ in}$$

$$5. \quad 3x + 2y \geq -2 \quad \Rightarrow \quad \frac{2y \geq -3x - 2}{2}$$

$$x + 2y \leq 2$$

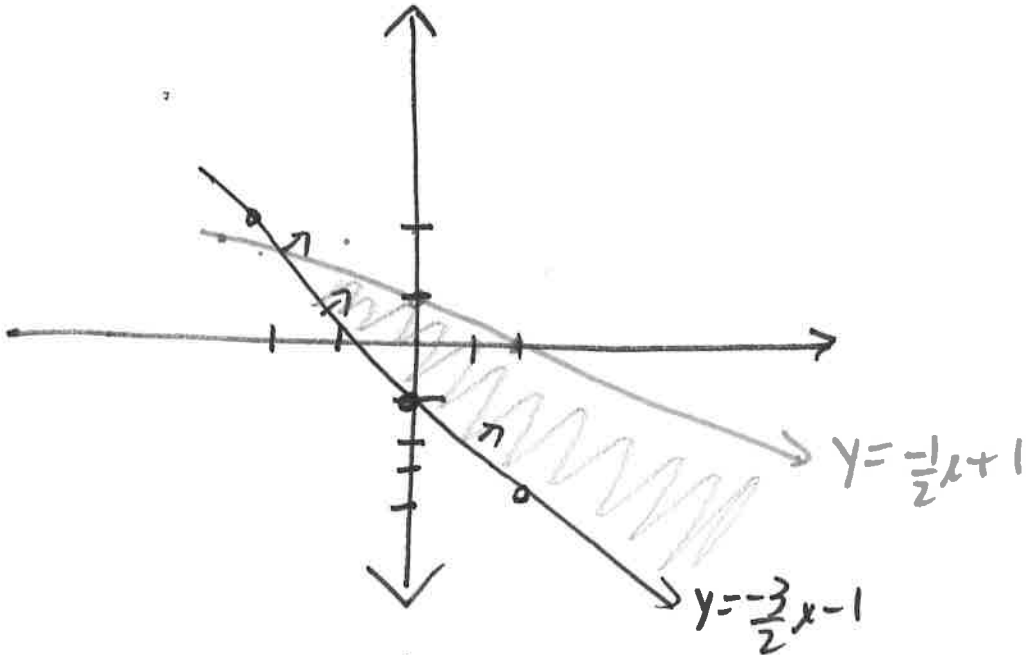
$$y \geq \frac{-3x - 2}{2}$$

$$x + 2y \leq 2$$

$$\frac{-x}{-x} \quad \frac{-x}{-x}$$

$$\frac{2y \leq -x + 2}{2}$$

$$y \leq \frac{-x + 2}{2}$$



6. $f(x) = \left\{ \begin{array}{l} \text{---} \\ \text{---} \\ \text{---} \end{array} \right.$

6. $y = -4 \quad x \leq -2$

-2	-4
-3	-4
-4	-4

↓

$y = x - 2$

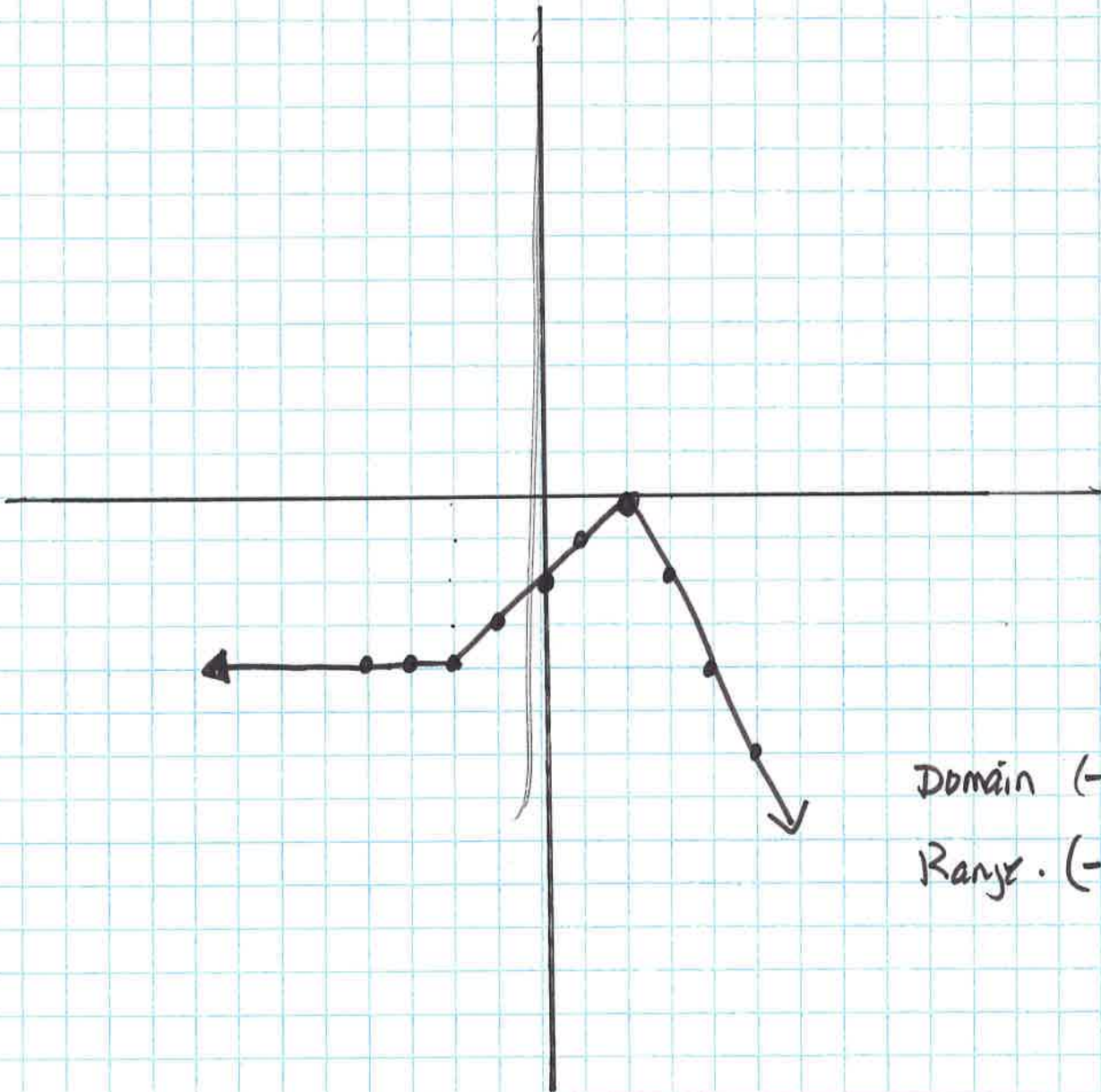
-2	-4
-1	-3
0	-2
1	-1
2	0

↓

$y = -2x + 4$

2	0
3	-2
4	-4
5	-6

↓



Domain $(-\infty, \infty)$

Range $(-\infty, 0]$

$$7. \textcircled{a} f(3) = 2(3) - 1 \\ = \boxed{5}$$

$$b. g(-2) = 12(-2)^2 \\ = 12(4) \\ = \boxed{48}$$

$$c. f^{-1}(x)$$

$$y = 2x - 1$$

$$\downarrow \quad \downarrow \\ x = 2y - 1$$

$$\frac{x+1}{2} = \frac{2y}{2}$$

$$\frac{x+1}{2} = y$$

$$\boxed{f^{-1}(x) = \frac{x+1}{2}}$$

$$d. g^{-1}(x)$$

$$y = 12x^2$$

$$\downarrow \\ x = 12y^2$$

$$\sqrt{\frac{x}{12}} = \sqrt{y^2}$$

$$\pm \sqrt{\frac{x}{12}} = y$$

$$\boxed{g^{-1}(x) = \pm \sqrt{\frac{x}{12}}}$$

$$e. f(g(2))$$

$$f[12(2)^2]$$

$$f[48]$$

$$2(48) - 1$$

$$\frac{96 - 1}{1} \\ \boxed{95}$$

$$f. g[f(-1)]$$

$$g[2(-1) - 1]$$

$$g[-3]$$

$$12(-3)^2$$

$$12(9)$$

$$\boxed{108}$$

$$h. g[f(x)]$$

$$g(2x-1)$$

$$12(2x-1)^2$$

$$12(4x^2 - 4x + 1)$$

$$\boxed{48x^2 - 48x + 12}$$