

Math 3 Unit 1 QR Code Review Answers

Function Notation:

$$1c) f(x) = 3x^2 - x$$

$$\begin{aligned} f(-2) &= 3(-2)^2 - (-2) \\ &= 3(4) + 2 \\ &= 12 + 2 \\ &= 14 \end{aligned}$$

$$2f) f(x) = \frac{2}{x}$$

$$f(a+1) = \frac{2}{a+1} \quad a \neq -1$$

$$4b) f(x) = \sqrt{2x+3}$$

$$\begin{aligned} f(3) &= \sqrt{2(3)+3} \\ &= \sqrt{6+3} \\ &= \sqrt{9} \\ &= 3 \end{aligned}$$

Systems of Equations:

Substitution

$$\begin{aligned} 1) \quad 4x + 3y &= -8 \\ -8x + y &= -12 \end{aligned}$$

$$\frac{+8x}{+8x} \quad \frac{+8x}{+8x}$$

$$y = 8x - 12$$

$$y = 8(1) - 12$$

$$y = 8 - 12$$

$$y = -4 \quad (1, -4)$$

$$4x + 3(8x - 12) = -8$$

$$4x + 24x - 36 = -8$$

$$28x - 36 = -8$$

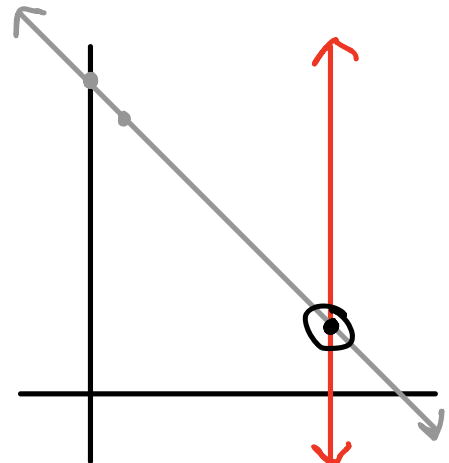
$$\frac{+36}{+36} \quad \frac{+36}{+36}$$

$$\frac{28x}{28} = \frac{28}{28}$$

$$x = 1$$

$$10) \quad x = 7 \quad y = -x + 9$$

$$(7, 2)$$



Elimination

$$\begin{aligned} 6) \quad -15x + 9y &= 27 \\ (-5x - y = 17) \cdot 3 \end{aligned}$$

$$-5x - (-2) = 17$$

$$-5x + 2 = 17$$

$$\frac{-2}{-2} \quad \frac{-2}{-2}$$

$$\frac{-5x}{-5} = \frac{15}{-5}$$

$$x = -3$$

$$-15x + 9y = 27$$

$$15x + 3y = -51$$

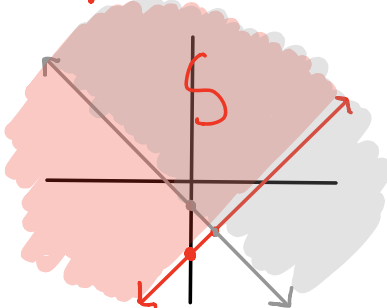
$$\frac{12y}{12} = \frac{-24}{12}$$

$$y = -2$$

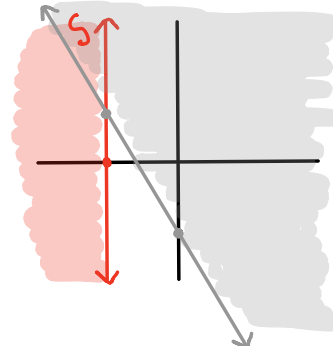
$$(-3, -2)$$

System of Inequalities:

$$4) \quad y \geq x - 3 \quad y \geq -x - 1$$

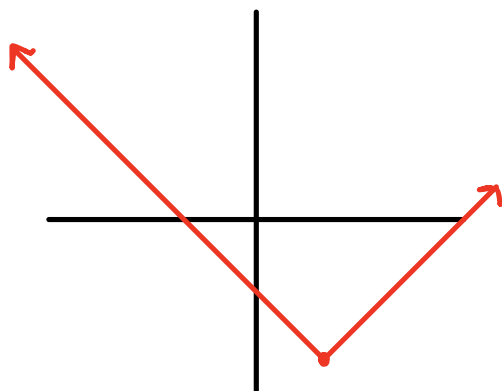


$$5) \quad x \leq -3 \quad 5x + 3y \geq -9 \rightarrow y \geq -\frac{5}{3}x - 3$$

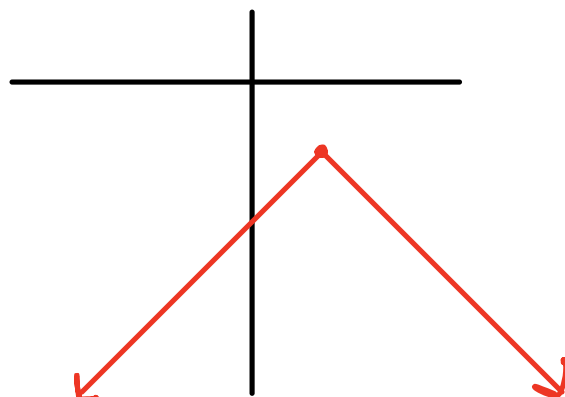


Graphing Absolute Value Functions:

$$1) y = |x - 2| - 4$$



$$7) y = -|x - 2| - 2$$

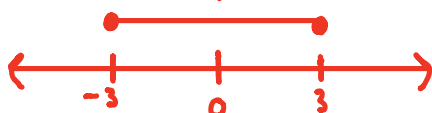


Solving Absolute Value Inequalities:

$$15) |p| + 3 \leq 0$$

$$|p| \leq 3$$

$$p \leq 3 \quad | \quad p \geq -3$$



$$17) |b - 8| + 10 > 22$$

$$|b - 8| > 12$$

$$\begin{array}{l|l} b - 8 > 12 & b - 8 < -12 \\ \hline b > 20 & b < -4 \end{array}$$



Piecewise Functions:

$$f(x) = \begin{cases} -2|x + 1|, & x \leq 1 \\ 3, & 1 < x < 3 \\ 6 - 2x, & x \geq 3 \end{cases}$$

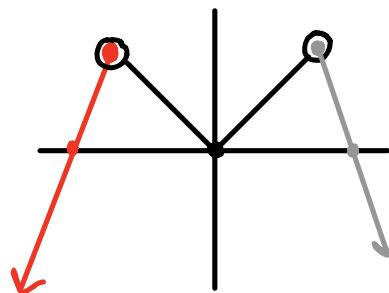
$$4) f(10) = 6 - 2(10) = 6 - 20 = -14$$

$$5) f(2) = 3$$

$$6) f(0) = -2|0 + 1| = -2|1| = -2(1) = -2$$

ii).

$$f(x) = \begin{cases} 3x + 12, & x \leq -3 \rightarrow (-3, 3) | \bullet | \frac{3}{7} \\ |x|, & -3 < x < 3 \rightarrow (-3, 3) (3, 3) | \circ \\ -3x + 12, & x \geq 3 \rightarrow (3, 3) | \bullet | \frac{-3}{7} \end{cases}$$



Inverse Functions:

$$9) f(x) = \sqrt[3]{x} - 3$$

$$y = \sqrt[3]{x} - 3$$

$$x = \sqrt[3]{y} - 3$$

$$\frac{x+3}{+3} = \frac{(\sqrt[3]{y})^3}{+3}$$

$$(x+3)^3 = y$$

$$f^{-1}(x) = (x+3)^3$$

$$11) f(x) = 2x^3 + 3$$

$$y = 2x^3 + 3$$

$$x = \sqrt[3]{\frac{y-3}{2}}$$

$$\frac{x-3}{2} = \frac{\sqrt[3]{y-3}}{2}$$

$$\sqrt[3]{\frac{x-3}{2}} = \sqrt[3]{\frac{y-3}{2}}$$

$$\sqrt[3]{\frac{x-3}{2}} = y$$

$$f^{-1}(x) = \sqrt[3]{\frac{x-3}{2}}$$

$$17) f(x) = -1 - \frac{1}{5}x$$

$$y = -1 - \frac{x}{5}$$

$$\frac{x+1}{+1} = \frac{-\frac{y}{5}}{5}$$

$$5(x+1) = \left(\frac{-y}{5}\right) \cdot 5$$

$$\frac{5(x+1)}{-1} = \frac{-y}{-1}$$

$$-5(x+1) = y$$

$$f^{-1}(x) = -5(x+1)$$

Function Compositions:

$$f(x) = 2x - 1 \quad g(x) = 3x \quad h(x) = x^2 + 1$$

$$5) h(g(f(5)))$$

$$f(5) = 2(5) - 1 = 10 - 1 = 9$$

$$g(9) = 3(9) = 27$$

$$h(27) = (27)^2 + 1 = 729 + 1 = \underline{730}$$

$$9) h(x-2)$$

$$= (x-2)^2 + 1$$

$$= (x-2)(x-2) + 1$$

	x	-2
x	x ²	-2x
-2	-2x	4

$$= x^2 - 4x + 4 + 1$$

$$= \underline{x^2 - 4x + 5}$$

$$f(x) = -3x + 7 \quad g(x) = 2x^2 - 8$$

$$11). (g \circ f)(x) = g(f(x))$$

$$= 2(-3x+7)^2 - 8$$

$$= 2(-3x+7)(-3x+7) - 8$$

	-3x	7
-3x	9x ²	-21x
7	-21x	49

$$\rightarrow = 2(9x^2 - 42x + 49) - 8$$

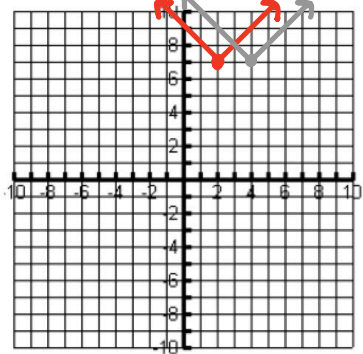
$$= 18x^2 - 84x + 98 - 8$$

$$= \underline{18x^2 - 84x + 90}$$

Extra Problems:

$f(x) = |x-2|+7$ (2, 7)

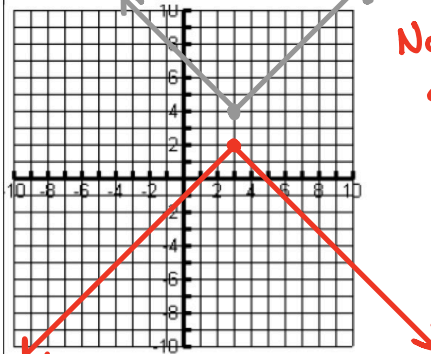
$f(x) = |x-4|+7$ (4, 7)



No
Solution

$f(x) = -|x-3|+2$

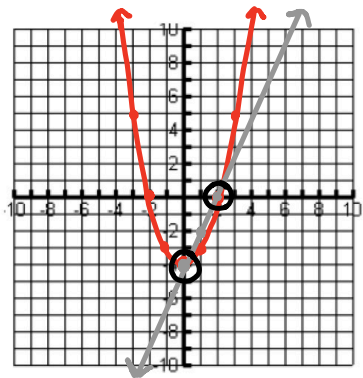
$f(x) = |x-3|+4$



No
Solution

$f(x) = x^2 - 4$

$f(x) = 2x - 4$



(0, -4)
(2, 0)

$y - 2 > -x^2$

