Sept. 7, 2017

Warmup:

$$\frac{3x^2-4x-4}{4x^2-9}$$

m: -12
a: -4
-6, 2

$$= \frac{3x^2-6x+2x-4}{(2x-3)(2x+3)}$$

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

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

$2x - 3 \neq 0$

$2x \neq 3$

$\boxed{x \neq 3/2}$

$2x + 3 \neq 0$

$\frac{2x}{2} \neq -\frac{3}{2}$

$\boxed{x \neq -3/2}$

p. 2 #4c) $y = mx + b$

slope m, y-int b

$m = -4$

$(x, y) = (7, 3)$

$$3 = (-4)(7) + b$$

$$3 = -28 + b$$

$$\boxed{b = 31}$$

$$\boxed{y = -4x + 31}$$

5c

x	y	f.d.	s.d.
-4	-12		
		7	
-3	-5		-2
		5	
-2	0		-2
		3	
-1	3		-2
		1	
0	4		-2
		-1	
1	3		-2
		-3	
2	0		

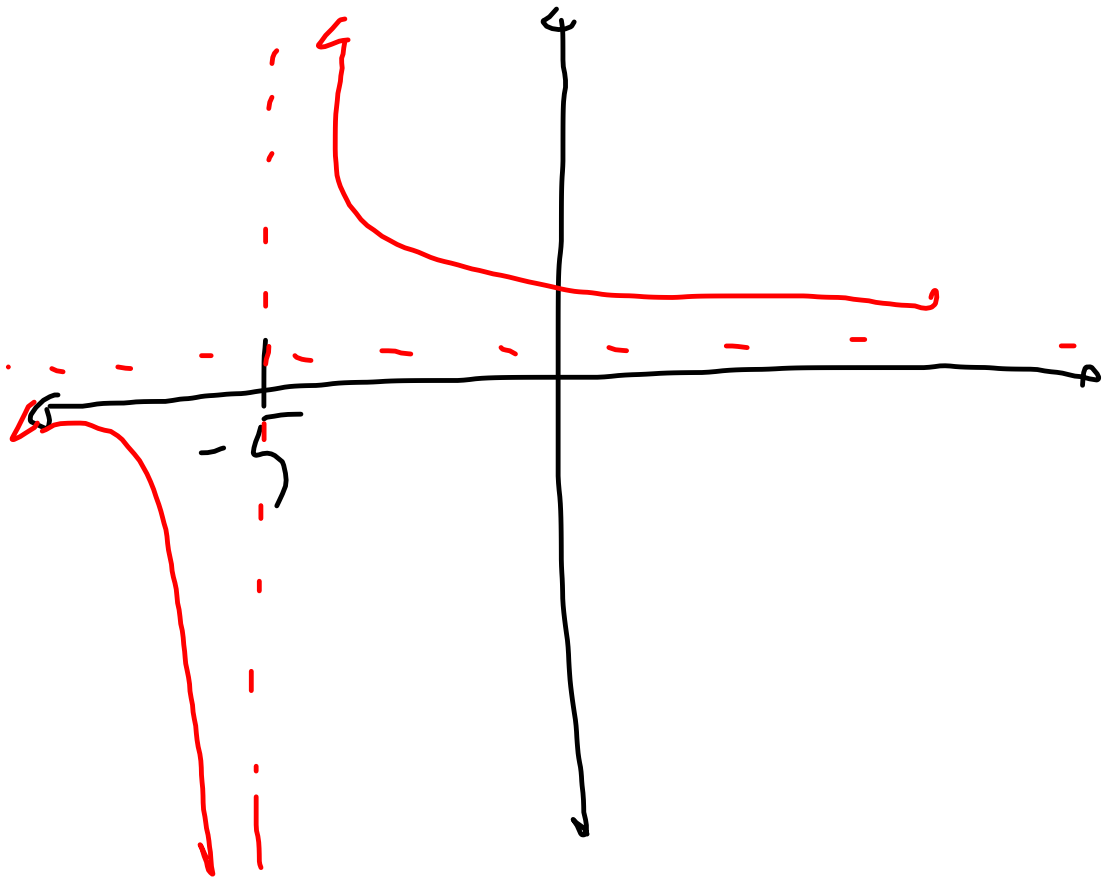
6b $f(x) = \frac{1}{x+5}$

$x \neq -5$

$d: \{x \mid x \neq -5, x \in \mathbb{R}\}$

$x \in (-\infty, -5) \cup (-5, \infty)$

$r: \{y \mid y \neq 0, y \in \mathbb{R}\}$



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Inverses

Ex. 1:

a) Graph $f(x) = 2x^2 - 4x - 9$ using x-int, vertex, y-int and state domain/range.

b) Graph $f^{-1}(x)$, find domain/range and find the equation of $f^{-1}(x)$.

vertex

$y = 2x^2 - 4x - 9$

$= 2(x^2 - 2x) - 9$

$\left(\frac{-2}{2}\right)^2 = (-1)^2 = \boxed{1}$

put the boxed term into the equation.

$= 2(x^2 - 2x + 1 - 1) - 9$

$= 2(x^2 - 2x + 1) - 2 - 9$

$= 2(x - 1)^2 - 11$

vertex: $(1, -11)$

opens: up

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roots:

$$0 = 2x^2 - 4x - 9$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{4 \pm \sqrt{(-4)^2 - 4(2)(-9)}}{2(2)}$$

$$= \frac{4 \pm \sqrt{16 + 72}}{4}$$

$$= \frac{4 \pm \sqrt{88}}{4}$$

$\boxed{x = 3.35}$ or $\boxed{x = -1.35}$

$(3.35, 0)$ $(-1.35, 0)$

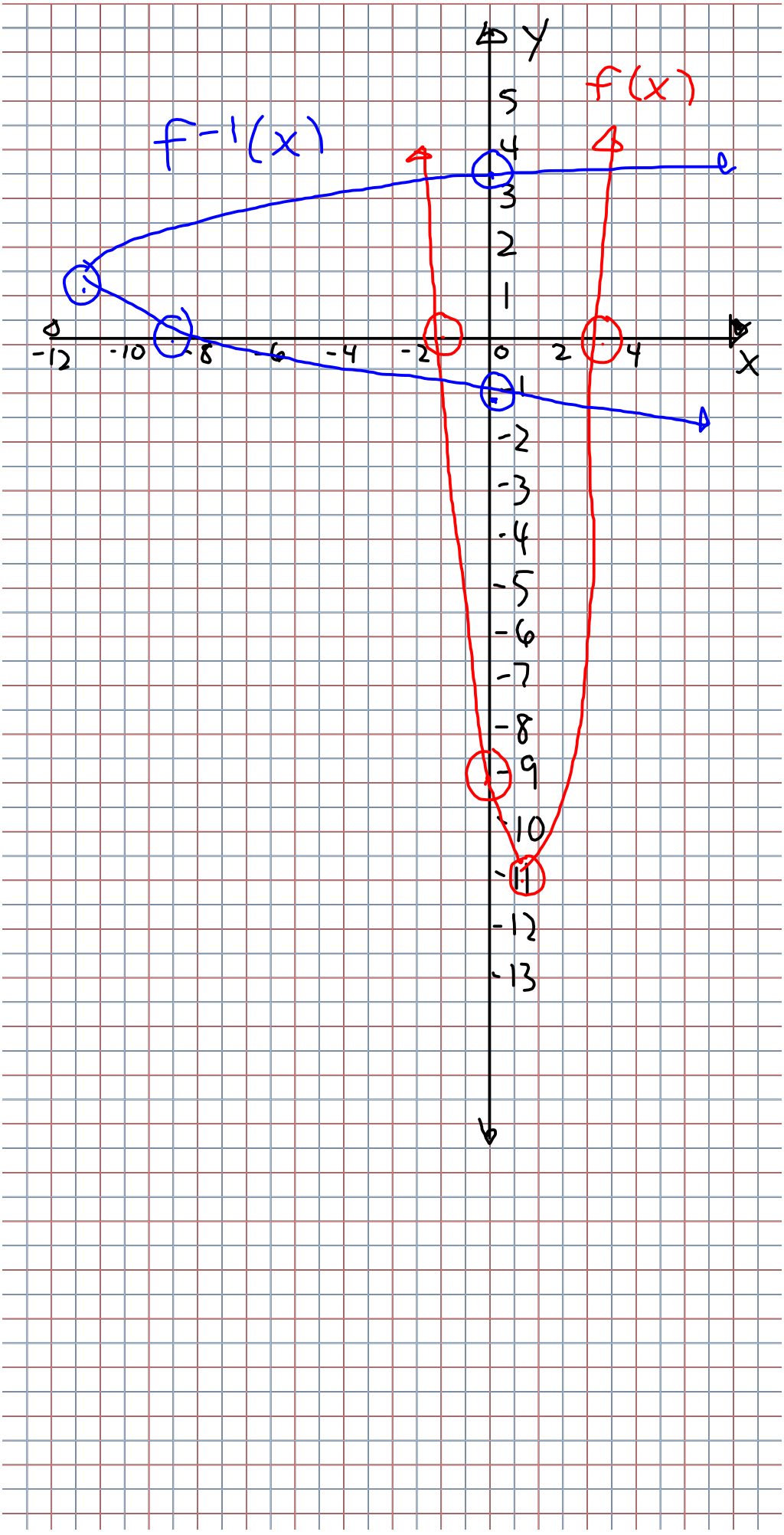
y-int: $y = 2x^2 - 4x - 9$

$= 2(0)^2 - 4(0) - 9$

$\boxed{y = -9}$

y-int $(0, -9)$

vertex $(1, -11)$


y
x
f(x)
f⁻¹(x)
5
4
3
2
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
-13
-12
-10
-8
-6
-4
-2
0
2
4

Domain/Range

$d: \{x \mid x \in \mathbb{R}\}$

$r: \{y \mid y \geq -11, x \in \mathbb{R}\}$

HW: p. 2

do #8, 11, 12

(0, -1.35)

(0, 3.35)

(-11, 1)

(-9, 0)

Inverses

This is when the inputs (x) are switched with the outputs (y).

$f(x)$	$f^{-1}(x)$
$(-1.35, 0)$	$(0, -1.35)$
$(3.35, 0)$	$(0, 3.35)$
$(1, -11)$	$(-11, 1)$
$(0, -9)$	$(-9, 0)$

$f(x)$

$d: \{x \mid x \in \mathbb{R}\}$

$r: \{y \mid y \geq -11, x \in \mathbb{R}\}$

$f^{-1}(x)$

$d: \{x \mid x \geq -11, x \in \mathbb{R}\}$

$r: \{y \mid y \in \mathbb{R}\}$

$$\frac{\frac{x+11}{2}}{4} \qquad \frac{x+11}{8}$$

$$f(x) = 2(x-1)^2 - 11$$

inverse

$$y = 2(x-1)^2 - 11$$

$$x = 2(y-1)^2 - 11$$

$$x + 11 = 2(y-1)^2$$

$$\frac{x+11}{2} = (y-1)^2$$

$$\pm\sqrt{\frac{x+11}{2}} = y - 1$$

$$1 \pm \sqrt{\frac{x+11}{2}} = f^{-1}(x)$$

$$\frac{\frac{2}{3}}{2}$$

$$= \frac{2}{3} \div 2$$

$$= \frac{2}{3} \cdot \frac{1}{2}$$

$$= \frac{2}{6} = \frac{1}{3}$$

$$\left(\frac{1}{3}\right)^2 = \boxed{\frac{1}{9}}$$