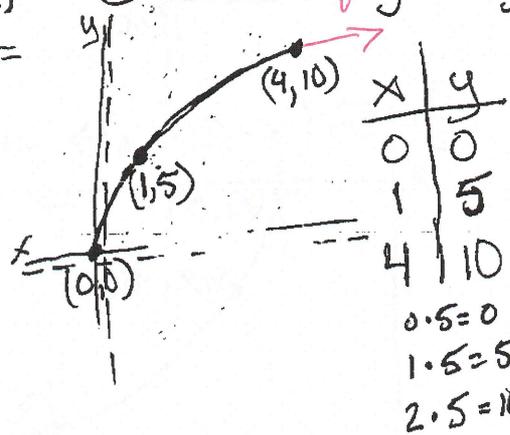


① $g(x) = 5\sqrt{3x-21} - 2$

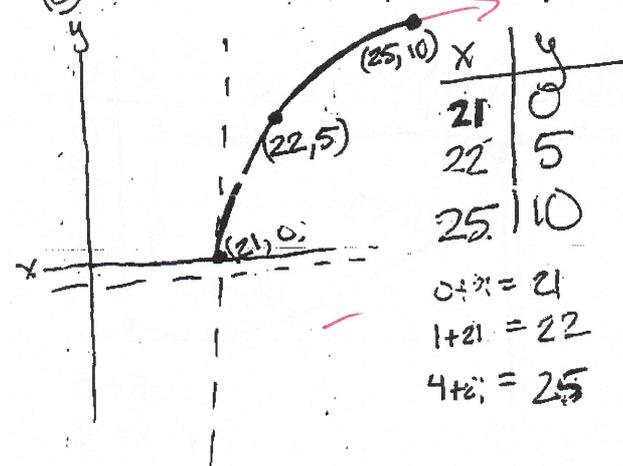
The function keeps going $x \rightarrow \infty$!



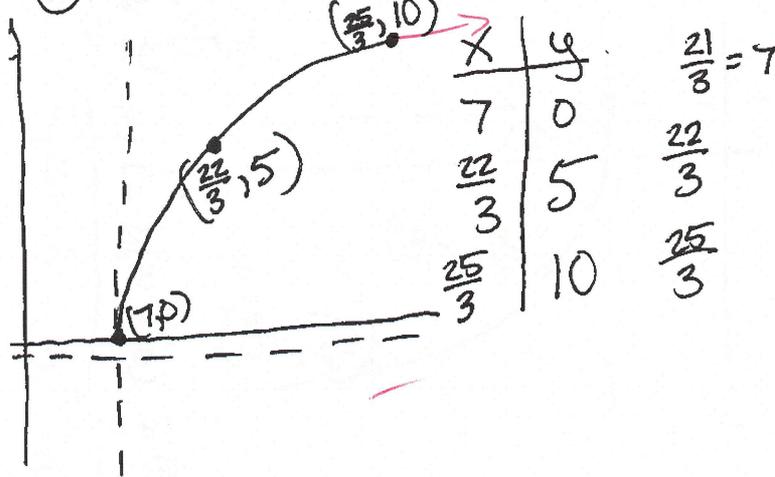
② $5f(x)$ $y \mapsto 5y$



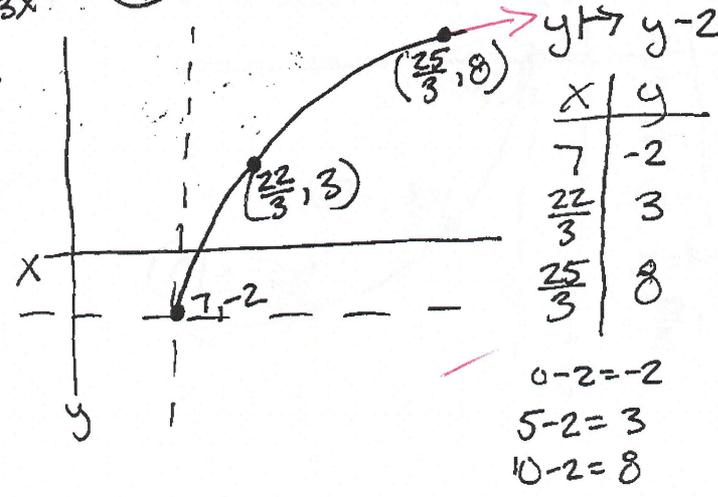
③ $5f(x-21)$, $x \mapsto x+21$



④ $5f(3x-21) = 5\sqrt{3x-21}$ $x \mapsto \frac{1}{3}x$

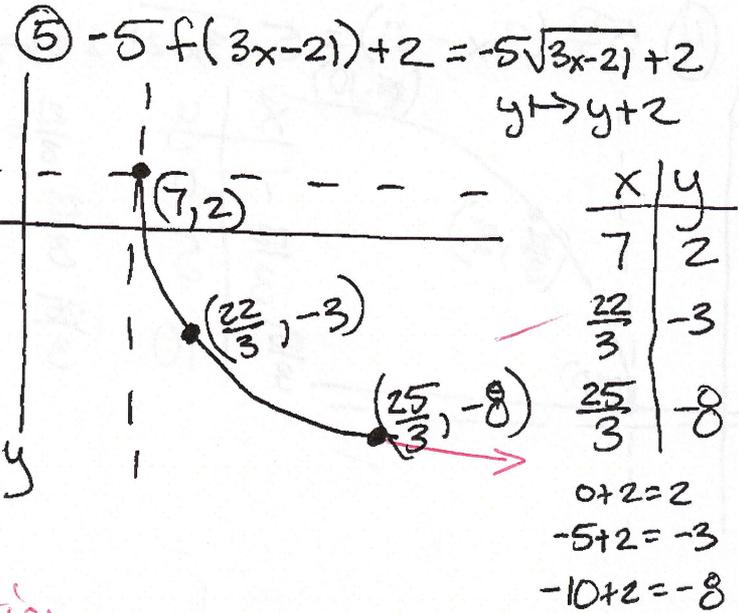
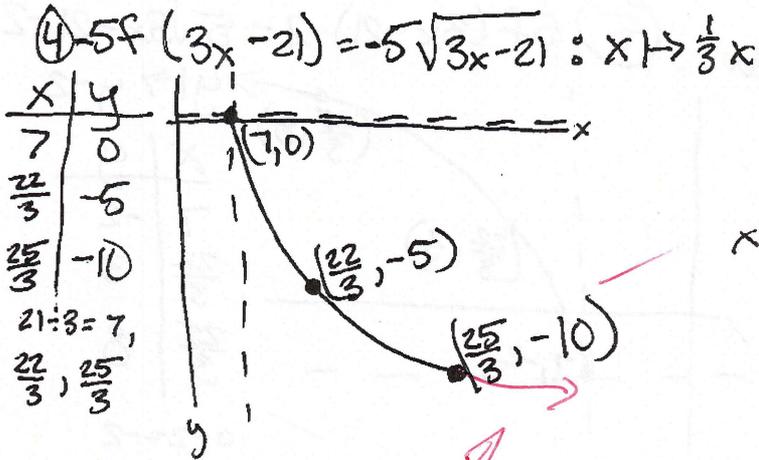
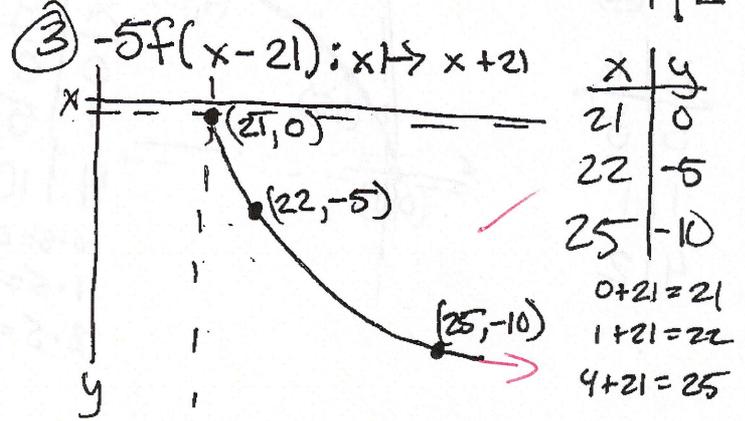
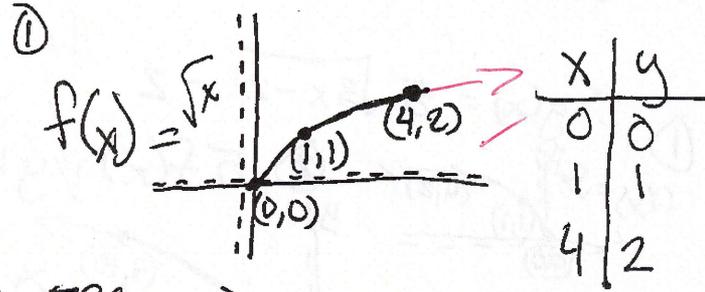
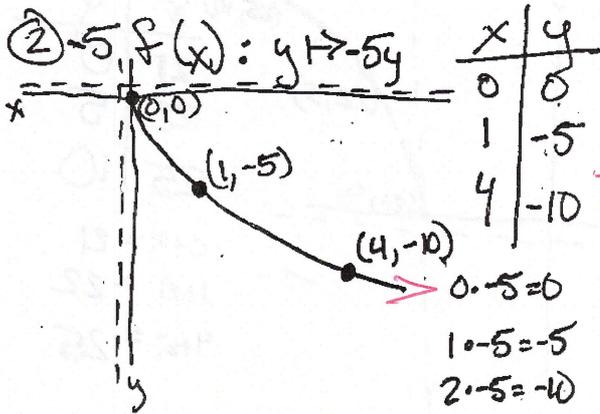


⑤ $5f(3x-21) - 2 = 5\sqrt{3x-21} - 2$



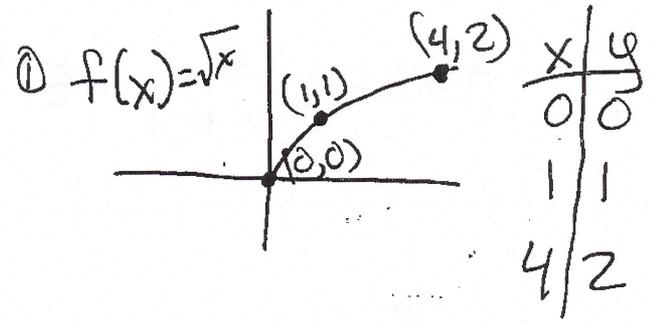
45.5 nice!

$g(x) = -5\sqrt{3x-21} + 2$

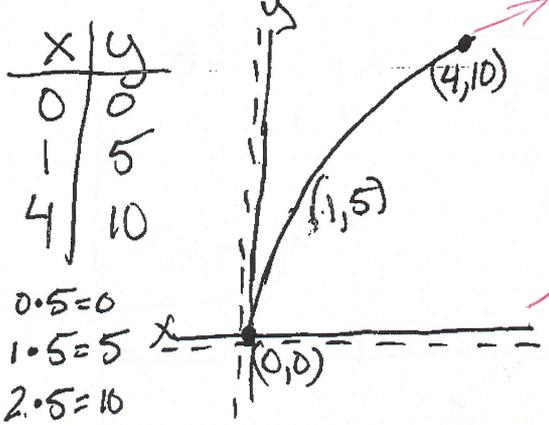


Show that the function keeps going. $x \rightarrow \infty$

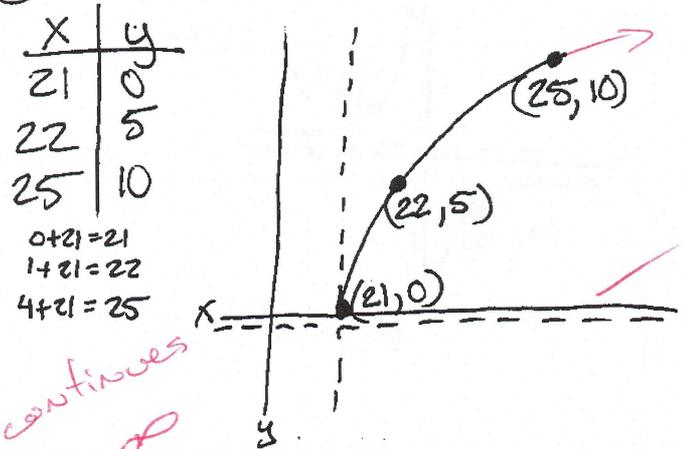
$$g(x) = 5\sqrt{-3x-21} - 11$$



② $5f(x): y \mapsto 5y$

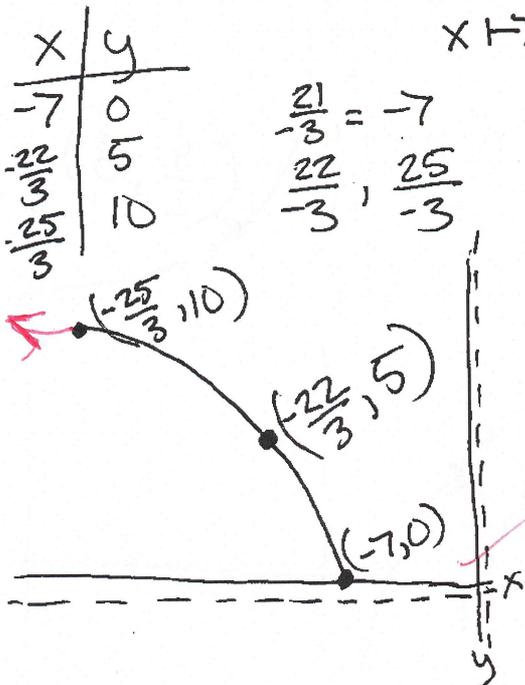


③ $5f(x-21): x \mapsto x+21$

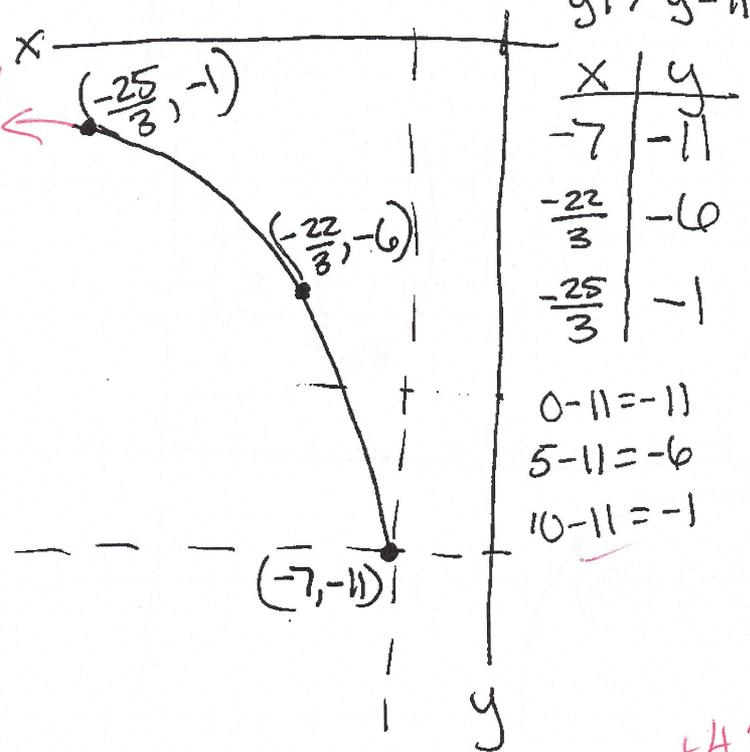


Function continues to $x \rightarrow -\infty$

④ $5f(-3x-21) = 5\sqrt{-3x-21}$
 $x \mapsto -\frac{1}{3}x$

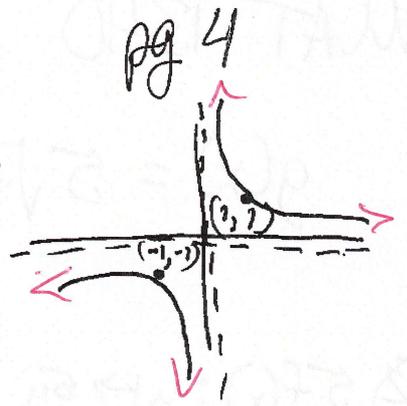


⑤ $5f(-3x-21) - 11 = 5\sqrt{-3x-21} - 11$
 $y \mapsto y - 11$



$$g(x) = \frac{3}{(-2x+8)^3} + 5$$

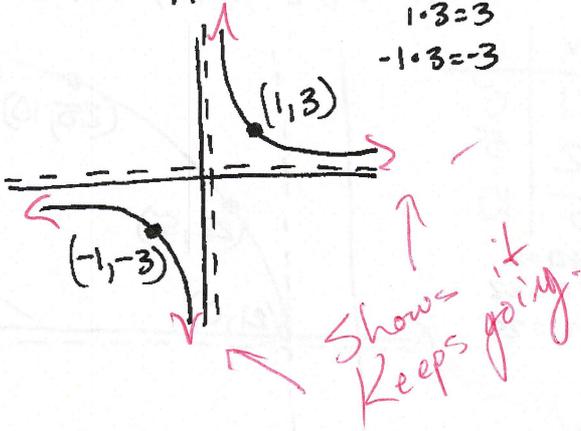
$$\textcircled{1} f(x) = \frac{1}{x^3}$$



$$\textcircled{2} f(x) = \frac{3}{x^3} : y \mapsto 3y$$

$$1 \cdot 3 = 3$$

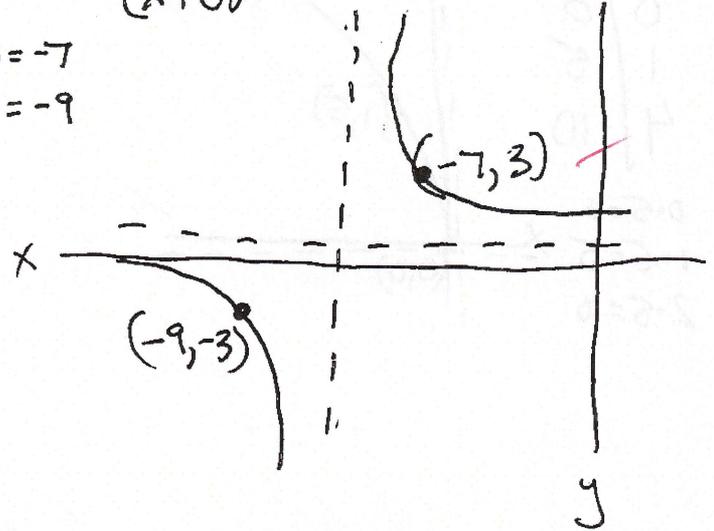
$$-1 \cdot 3 = -3$$



$$\textcircled{3} f(x) = \frac{3}{(x+8)^3} : x \mapsto x-8$$

$$1-8 = -7$$

$$-1-8 = -9$$

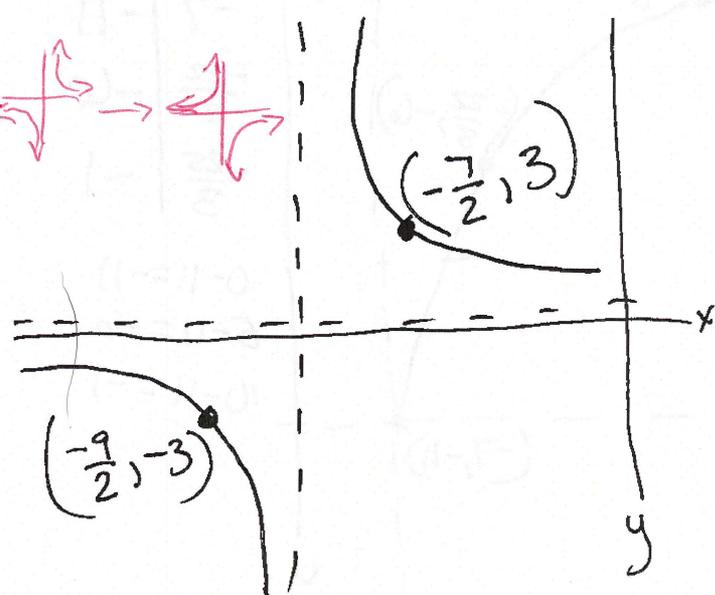


$$\textcircled{4} f(x) = \frac{3}{(-2x+8)^3} : x \mapsto \frac{1}{2}x$$

$$-7 \mapsto \frac{-7}{2}$$

$$-9 \mapsto \frac{-9}{2}$$

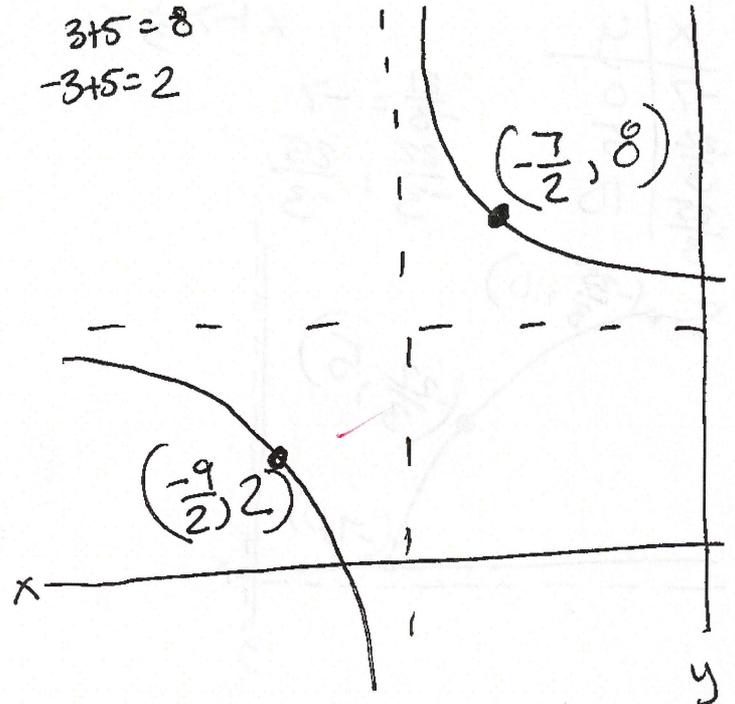
"-2x" → h-flip!



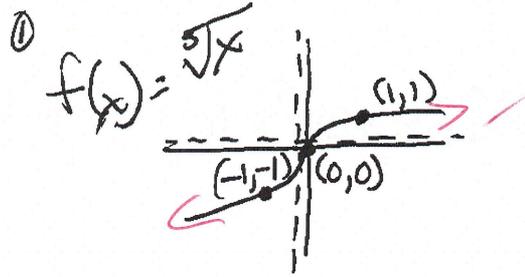
$$\textcircled{5} \frac{3}{(-2x+8)^3} + 5 : y \mapsto y+5$$

$$3+5 = 8$$

$$-3+5 = 2$$



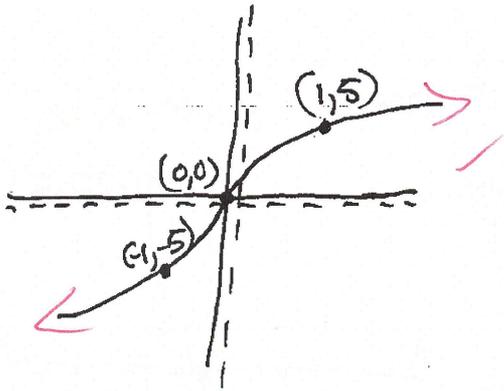
$$g(x) = 5\sqrt[5]{3x+21} - 6$$



② $5f(x): y \mapsto 5y$

x	y
-1	-5
0	0
1	5

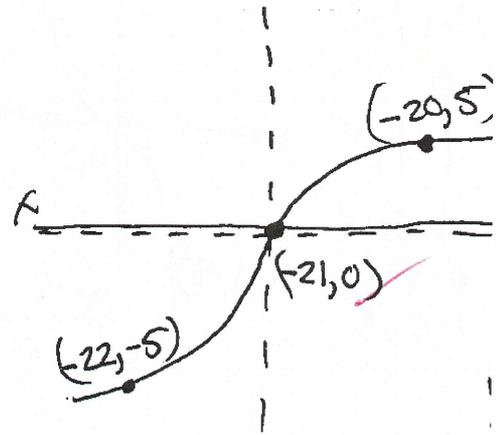
$-1 \cdot 5 = -5$
 $0 \cdot 5 = 0$
 $1 \cdot 5 = 5$



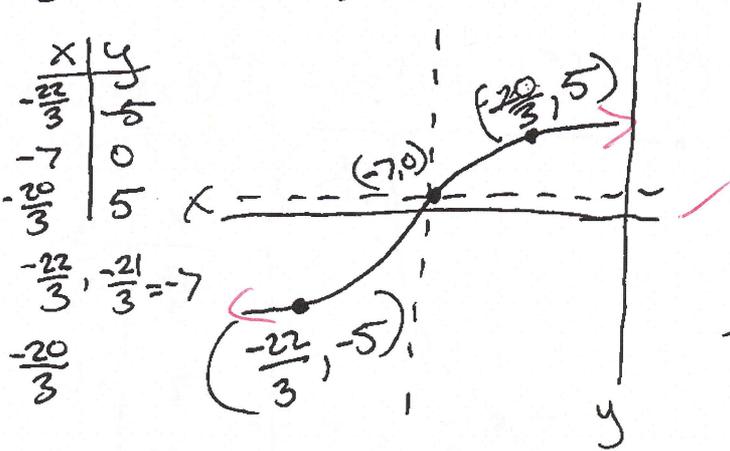
③ $5f(x+21): x \mapsto x-21$

x	y
-22	-5
-21	0
-20	5

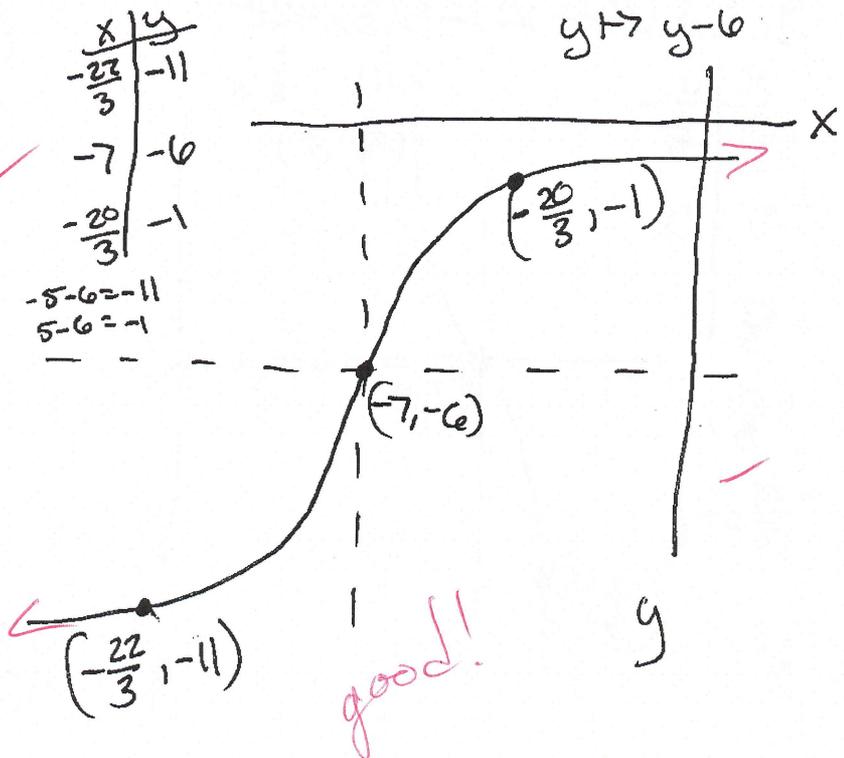
$-1-21 = -22$
 $0-21 = -21$
 $1-21 = -20$



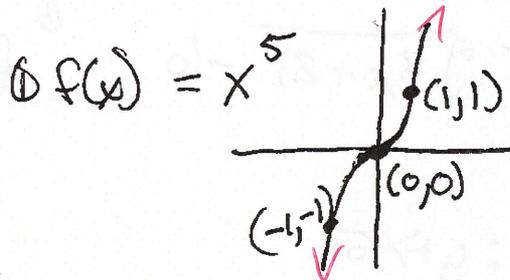
④ $5f(3x+21) = 5\sqrt[5]{3x+21}: x \mapsto \frac{1}{3}x$



⑤ $5f(3x+21) - 6 = 5\sqrt[5]{3x+21} - 6$

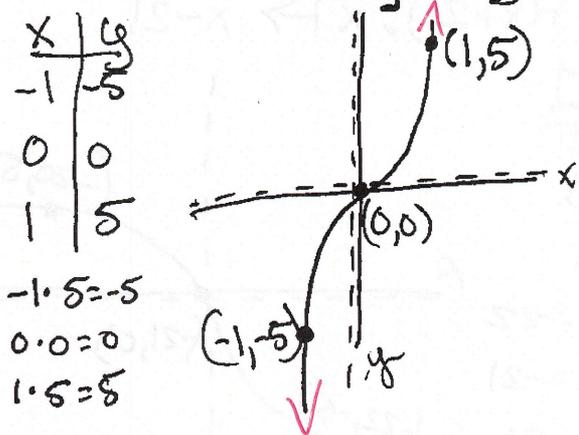


$$g(x) = 5(3x+2)^5 - 6$$

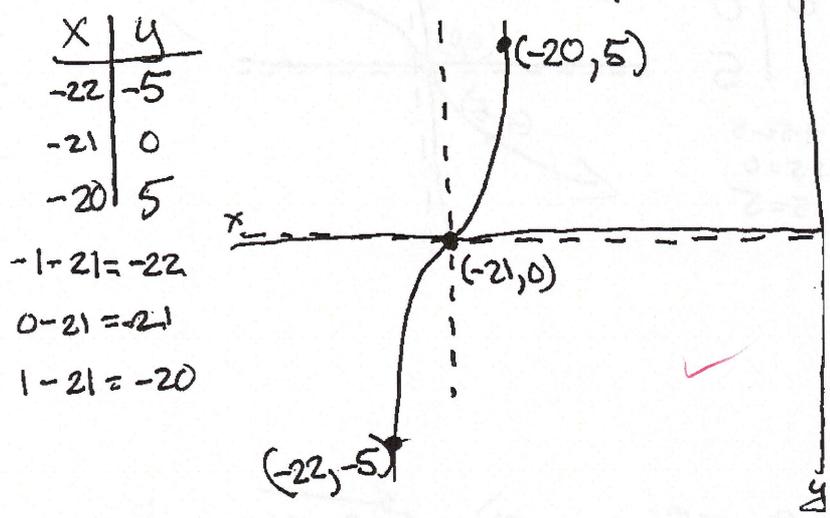


x	y
-1	-1
0	0
1	1

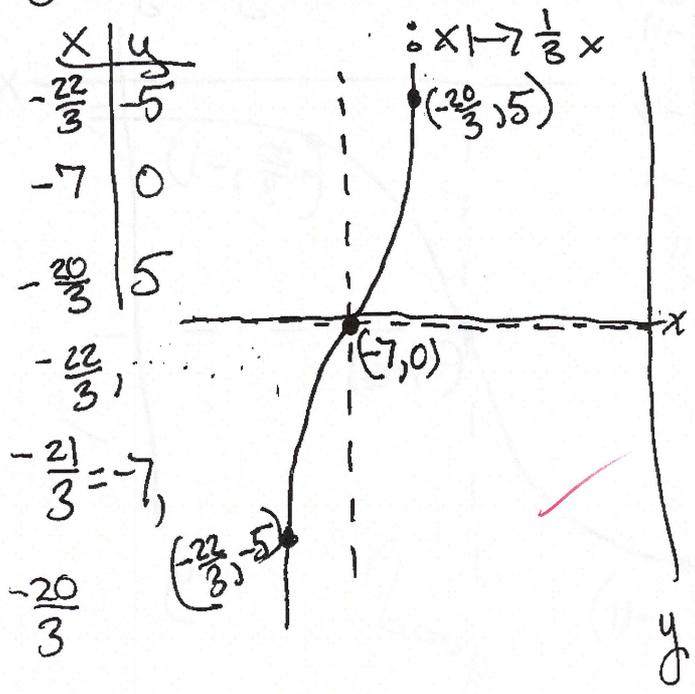
② $5f(x^5) = 5x^5: y \mapsto 5y$



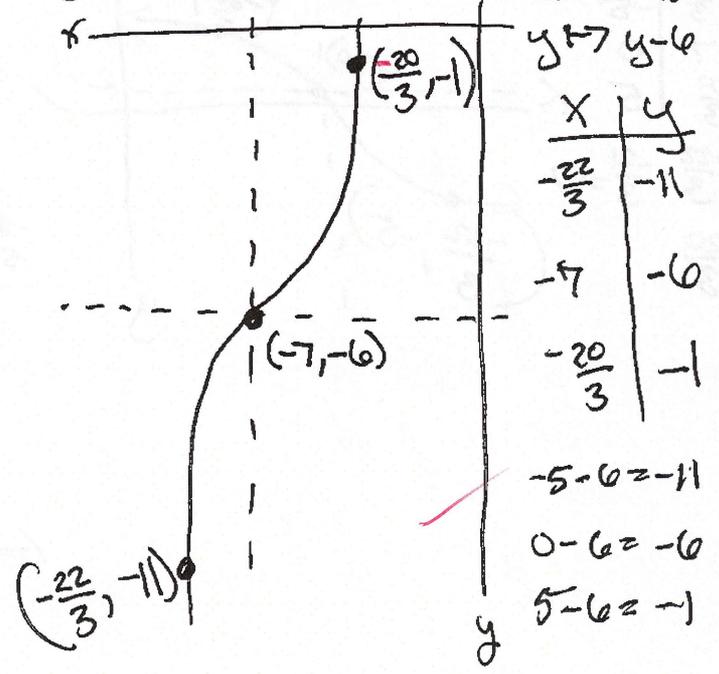
③ $5f(x+21) : x \mapsto x-21$



④ $5f(3x+21) = 5(3x+21)^5$



⑤ $5f(3x+21) - 6 = 5(3x+21)^5 - 6$



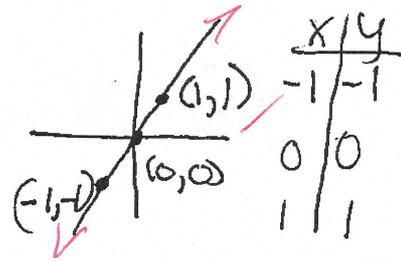
+5

MA 1340

pg. 17

$$g(x) = 3(x+5) - 7$$

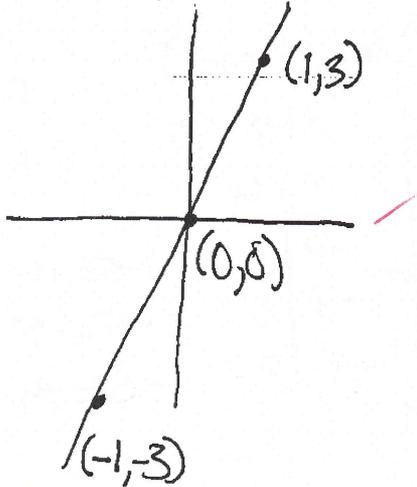
$$f(x) = x$$



② $3f(x) = 3x : y \mapsto 3y$

x/y
-1/-3
0/0
1/3

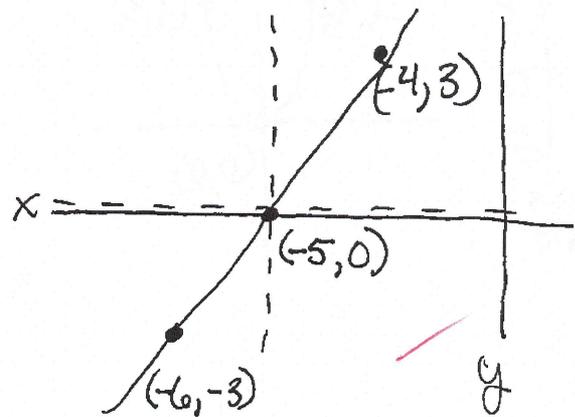
$-1 \cdot 3 = -3$
 $0 \cdot 3 = 0$
 $1 \cdot 3 = 3$



③ $3f(x+5) = 3(x+5) : x \mapsto x-5$

x/y
-6/-3
-5/0
-4/3

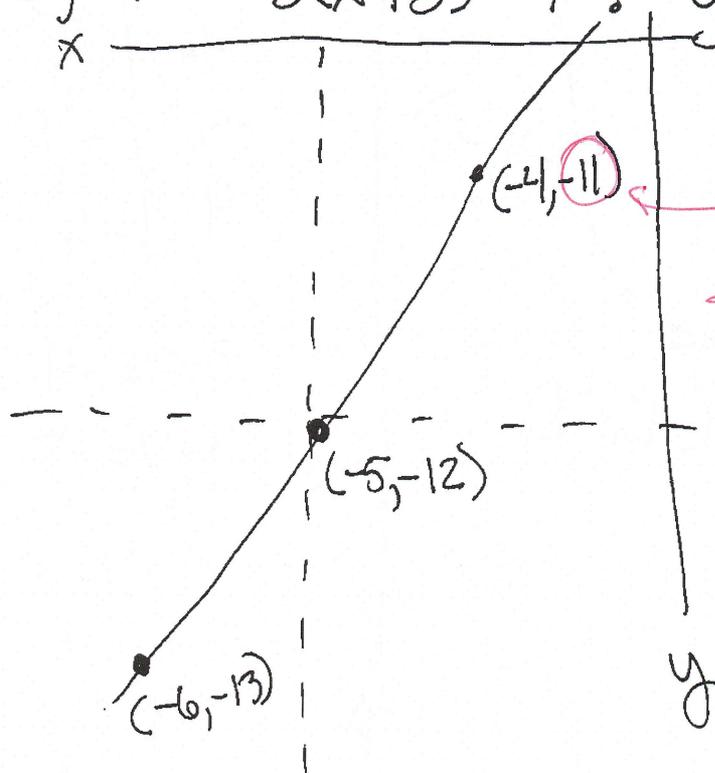
$-1-5 = -6$
 $0-5 = -5$
 $1-5 = -4$



④ $3f(x+5) - 7 = 3(x+5) - 7 : y \mapsto y-7$

x/y
-6/-13
-5/-12
-4/-11

$-6-7 = -13$
 $-5-7 = -12$
 $-4-7 = -11$

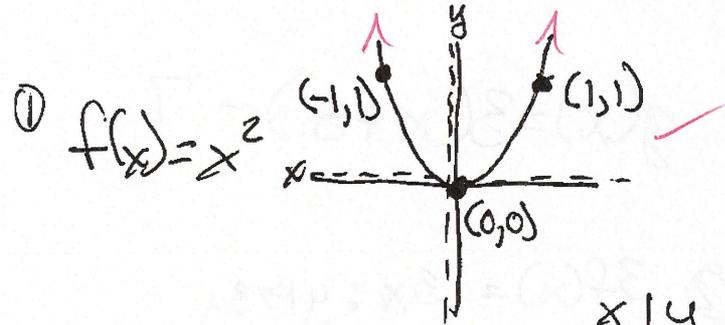


$3-7 = -4$

Shifted down a bit too far.

+AS

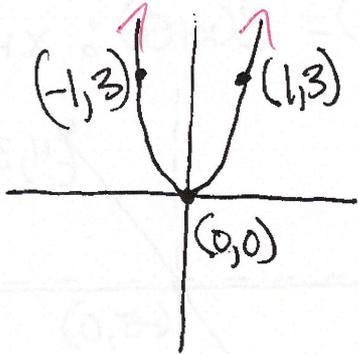
$$g(x) = 3(x+5)^2 - 7$$



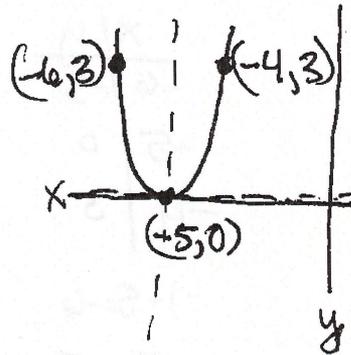
② $3f(x) = 3x^2 : y \mapsto 3y$

x	y
-1	3
0	0
1	3

1·3=3
0·3=0



③ $3f(x+5)$ aka $3(x+5)^2$



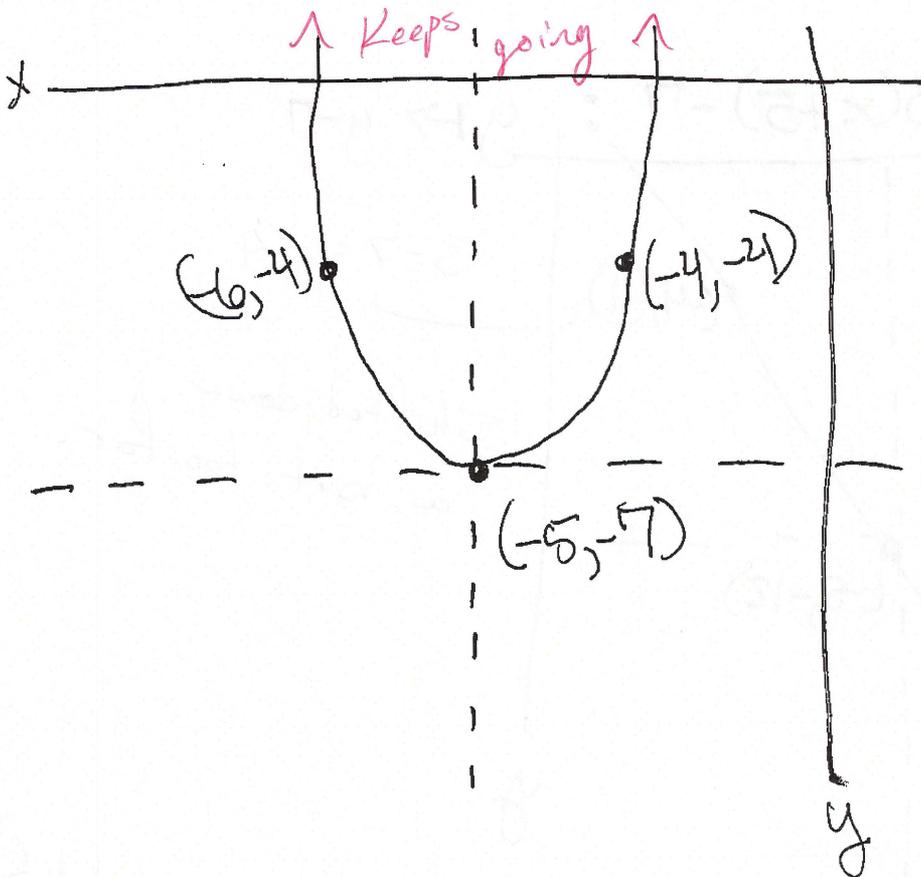
$x \mapsto x-5$

x	y
-6	3
-5	0
-4	3

-1-5 = -6
0-5 = -5
1-5 = -4

x	y
-1	1
0	0
1	1

④ $3f(x+5) - 7 = 3(x+5)^2 - 7 : y \mapsto y-7$



x	y
-6	-4
-5	-7
-4	-4

3-7 = -4
0-7 = -7

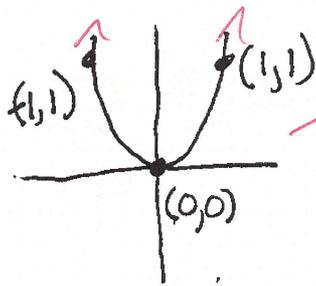
$$g(x) = x^2 - 4x - 7$$

$$\left(\frac{b}{2}\right)^2 = \left(\frac{-4}{2}\right)^2 = 2^2$$

$$x^2 - 4x + 2^2 - 4 - 7$$

$$\underline{\underline{(x-2)^2 - 11 = g(x)}}$$

① $f(x) = x^2$

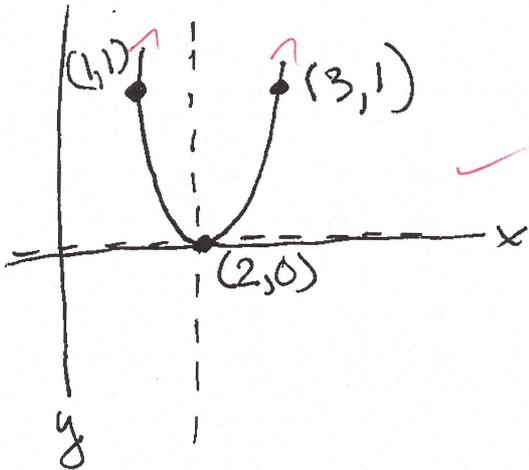


x	y
-1	1
0	0
1	1

② $f(x-2) = (x-2)^2 : x \mapsto x+2$

x	y
1	1
2	0
3	1

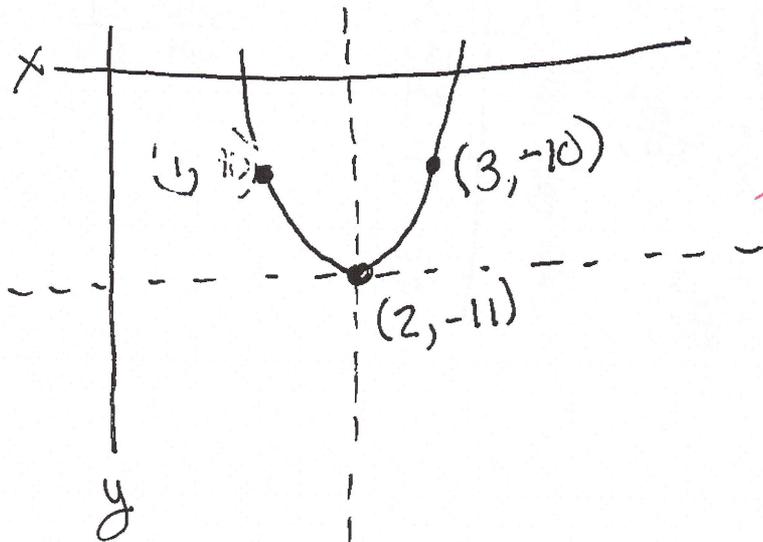
-1+2=1
0+2=2
1+2=3



③ $f(x-2) - 11 = (x-2)^2 - 11 : y \mapsto y-11$

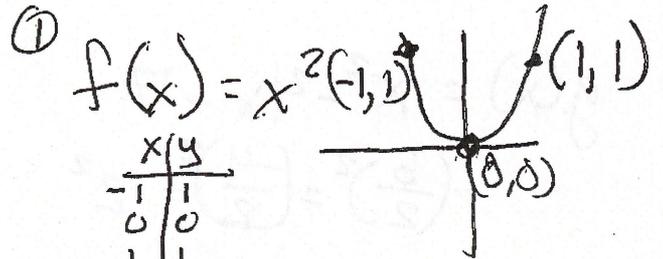
x	y
1	-10
2	-11
3	-10

1-11=-10
0-11=-11
1-11=-10



+5

$$g(x) = \frac{4x^2 + 5x + 17}{4}$$



$$\frac{g(x)}{4} = x^2 + \frac{5}{4}x + \frac{17}{4}$$

$$\left(\frac{b}{a}\right)^2$$

$$\left(\frac{5/4}{2}\right)^2 = \frac{(5/4)^2}{2^2} \Rightarrow \frac{25}{16} \Rightarrow \frac{25}{16 \cdot 4} \Rightarrow \frac{25}{64}$$

$$\frac{g(x)}{4} \left(x^2 + \frac{5}{4}x + \frac{25}{64}\right) - \frac{17}{4} + \frac{25}{64}$$

LEM: 64

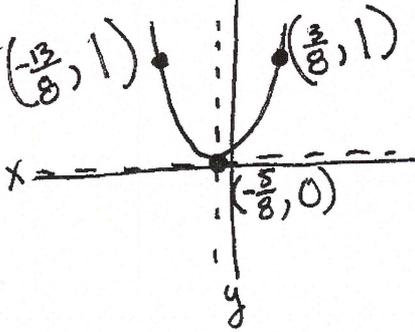
$$\frac{17 \cdot 16}{4 \cdot 16} = \frac{-272}{64} + \frac{25}{64} = \frac{-247}{64}$$

$$\left(x + \frac{5}{8}\right)^2 - \frac{247}{64} = g(x)$$

Very close

$$g(x) = 4\left(x + \frac{5}{8}\right)^2 + \frac{247}{16}$$

② $f\left(x + \frac{5}{8}\right) = \left(x + \frac{5}{8}\right)^2 : x \mapsto x - \frac{5}{8}$



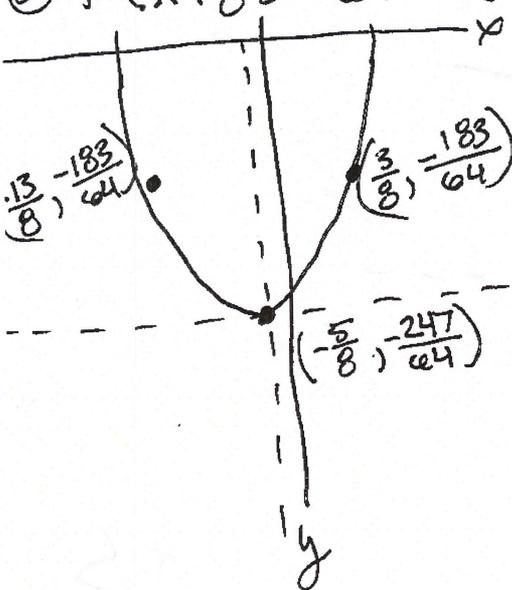
x	y
-13/8	1
-5/8	0
3/8	1

$$\frac{0}{8} - \frac{0}{8} = \frac{-13}{8}$$

$$\frac{0}{8} - \frac{0}{8} = \frac{3}{8}$$

this is what steered you wrong.

③ $f\left(x + \frac{5}{8}\right) - \frac{247}{64} = \left(x + \frac{5}{8}\right)^2 - \frac{247}{64} : y \mapsto y - \frac{247}{64}$



x	y
-13/8	-183/64
-5/8	-247/64
3/8	-183/64

$$\frac{64}{64} - \frac{247}{64} = \frac{-183}{64}$$