

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

$$\frac{11}{6} \div \frac{70}{6} = \frac{11}{70}$$

$$\frac{7}{6} \div \frac{42}{6} = \frac{7}{42} = \frac{1}{6}$$

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

12. Find:

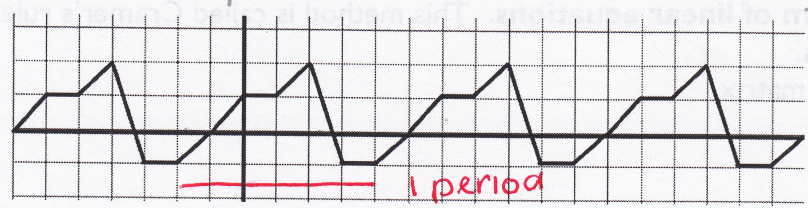
a) period 6

c) $f(45) = f(3) = -1$

b) amplitude

d) $f(-70)$

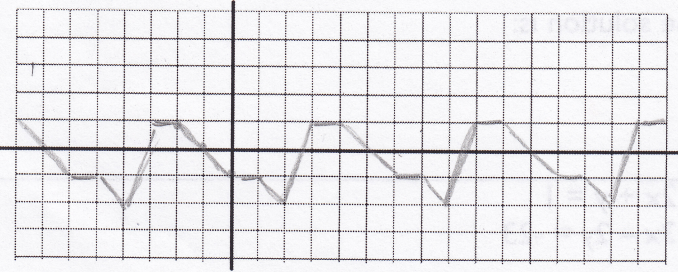
$f(-4) = -2$



13. $y = -f(x)$

opp. y

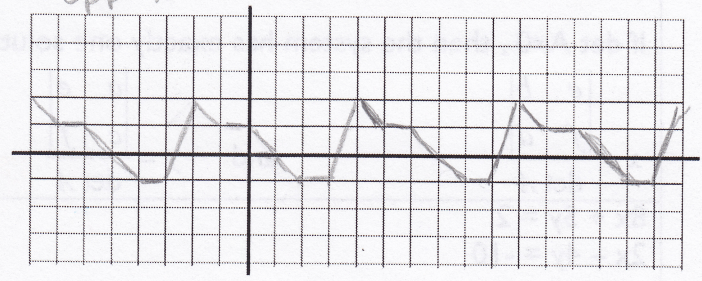
-2	-1	0	1	2	3	4
1	0	-1	-1	-2	1	1



14) $y = f(-x)$

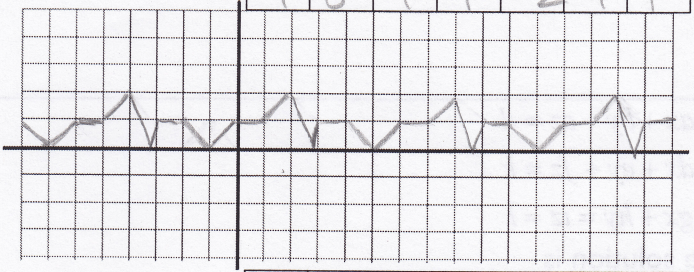
opp. x

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



15. $y = |f(x)|$

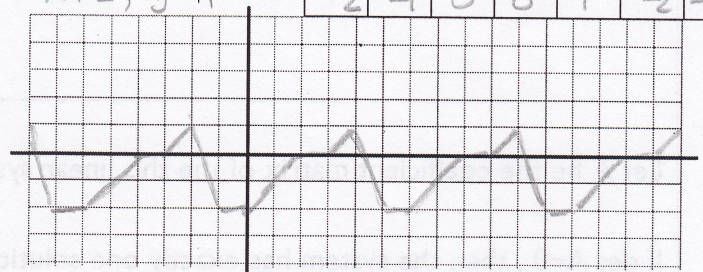
-2	-1	0	1	2	3	4
1	0	1	1	2	1	1



16) $y+1 = f(x-2)$

$x+2; y-1$

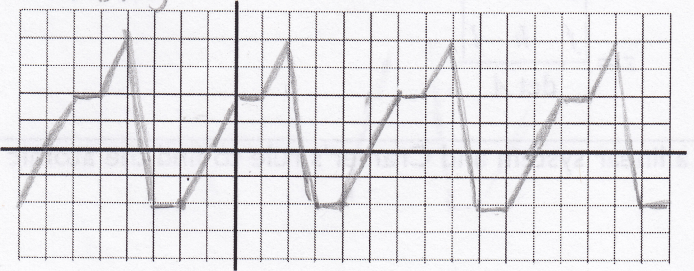
0	1	2	3	4	5	6
-2	-1	0	0	1	-2	-2



17) $y = 2f(x)$

dbl y

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



18) $y = f(2x)$

half x

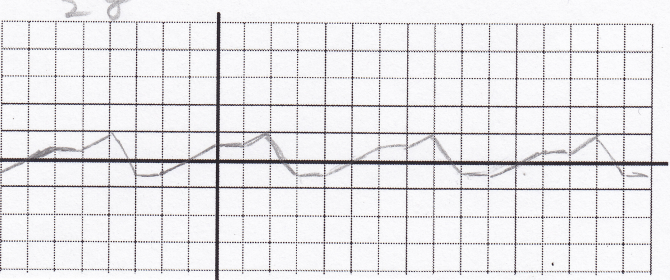
-1	-1/2	0	1/2	1	3/2	2
-1	0	1	1	2	-1	-1



19) $y = \frac{1}{2}f(x)$

1/2 y

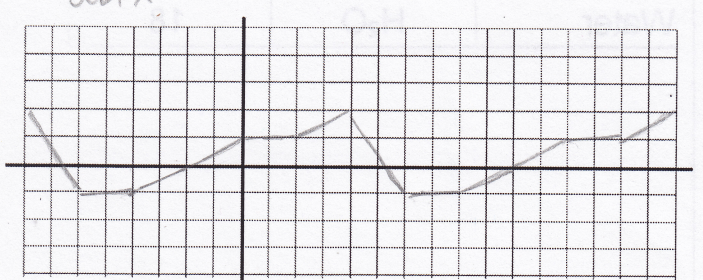
-2	-1	0	1	2	3	4
-1/2	0	1/2	1/2	1	-1/2	-1/2



20) $y = f\left(\frac{1}{2}x\right)$

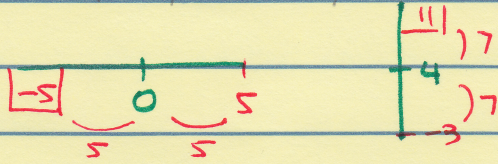
dbl x

-4	-2	0	2	4	6	8
-1	0	1	1	2	-1	-1



① Point of symmetry (0,4)

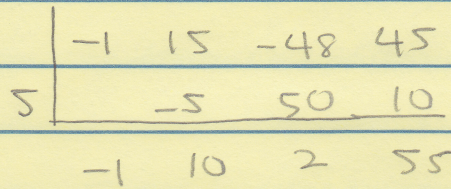
(5,-3)



(5,-3) → (-5,11)

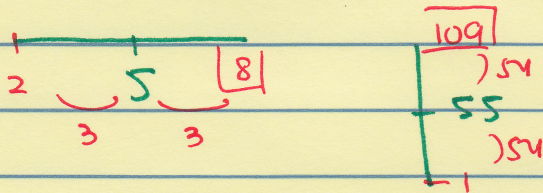
② $f(x) = -x^3 + 15x^2 - 48x + 45$

POS: $x = \frac{-b}{3a} = \frac{-15}{3(-1)} = \frac{-15}{-3} = 5$



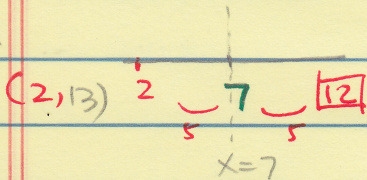
→ P.O.S. = (5, 55)

(2,1)



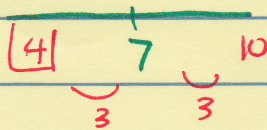
(2,1) → (8,109)

3



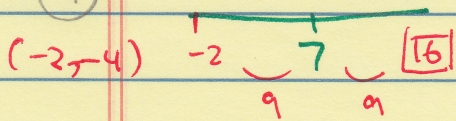
→ (2,13) → (12,13) y value doesn't change

(10,-6)

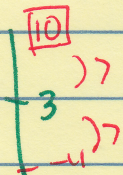


(10,-6) → (4,-6)

④

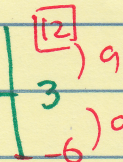
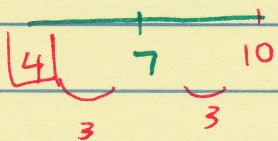


(-2,-4)



(-2,-4) → (16,10)

(10,-6)



(10,-6) → (4,12)

5. $x^2 + 2xy + 4 = 0$

a x-axis \rightarrow switch y to $-y$

$x^2 + 2x(-y) + 4 = 0 \rightarrow x^2 - 2xy + 4 = 0 \rightarrow$ not the same

b y-axis \rightarrow switch x to $-x$

$(-x)^2 + 2(-x)y + 4 = 0 \rightarrow x^2 - 2xy + 4 = 0 \rightarrow$ not the same

c origin: $x \rightarrow -x; y \rightarrow -y$

$(-x)^2 + 2(-x)(-y) + 4 = 0 \rightarrow x^2 + 2xy + 4 = 0 \rightarrow$ same YES

d $y = x \rightarrow$ switch x to y & y to x

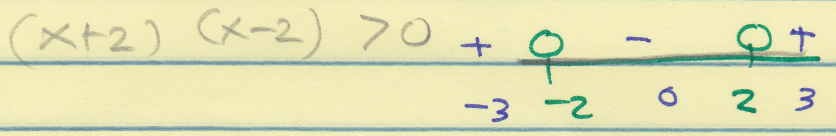
$y^2 + 2yx + 4 = 0 \rightarrow y^2 + 2xy + 4 = 0 \rightarrow$ not the same

6. $f(x) = \frac{x}{x^2 - 4}$ denominator $\neq 0$

$x^2 - 4 \neq 0 \rightarrow x^2 \neq 4 \rightarrow x \neq \pm 2$

b $f(x) = \frac{x}{\sqrt{x^2 - 4}}$ denominator $\neq 0$

$x^2 - 4 > 0$



3: $++ \rightarrow (+)$

0: $+ - \rightarrow (-)$

-3: $-- \rightarrow (+)$

$x > 2$ or $x < -2$

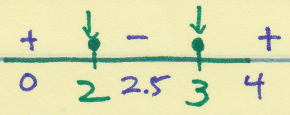
c $\sqrt{x^2 - 5x + 6}$

$x^2 - 5x + 6 = (x-3)(x-2) > 0$

4: $++ \rightarrow (+)$

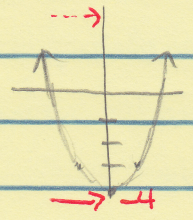
2.5: $-+ \rightarrow (-)$

0: $-- \rightarrow (+)$



$x > 3$ or $x < 2$

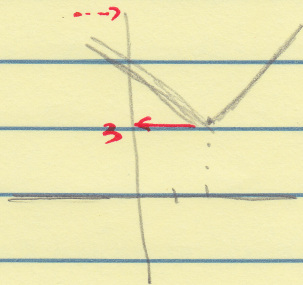
7) $f(x) = x^2 - 4$ AOS: $x = \frac{0}{2(1)} = 0$ vertex $(0, -4)$



x	y
1	-3

R: $y > -4$

7b $|x-2|+3 = f(x)$ vertex (2,3)



$R: y \geq 3$

8. $f(x) = \frac{1}{x} \rightarrow D: x \neq 0$ (can't divide by 0)

$g(x) = \sqrt{x-1} : D: x-1 \geq 0$ or $x \geq 1$

b $\left(\frac{g}{f}\right)(x) = \frac{g(x)}{f(x)} = \frac{\sqrt{x-1}}{\frac{1}{x}} = \sqrt{x-1} \cdot x = x\sqrt{x-1}$

$D: x-1 \geq 0$ or $x \geq 1$

c. $f(g(x)) = f(\sqrt{x-1}) = \frac{1}{\sqrt{x-1}}$ $x-1 \geq 0 \rightarrow x \geq 1$

d. $g^{-1}(x) : \begin{matrix} y = \sqrt{x-1} \\ x = \sqrt{y-1} \end{matrix}$ original:

$D: x \geq 1$

square both sides: $x^2 = y-1$

$R: y \geq 1$

$y = x^2 + 1$

new:

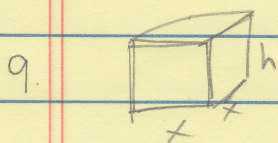
$g^{-1}(x) = x^2 + 1$

$D: x \geq 0$

$R: y \geq 1$

e $f^{-1}(f(x)) = x \rightarrow$ definition of inverse

f $g(g^{-1}(15)) = 15 \rightarrow$ definition

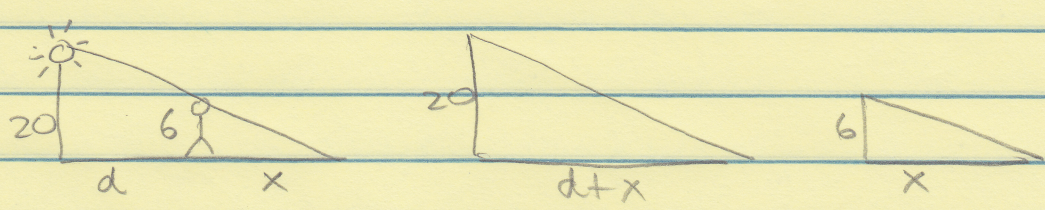


(open top)
 $SA = 2 = x^2 + 4xh \rightarrow h = \frac{2-x^2}{4x}$

$Vol = x^2 \cdot h = x^2 \left(\frac{2-x^2}{4x}\right)$

$V(x) = \frac{x(2-x^2)}{4}$

10



$$\frac{20}{d+x} = \frac{6}{x} \rightarrow 20x = 6(d+x)$$

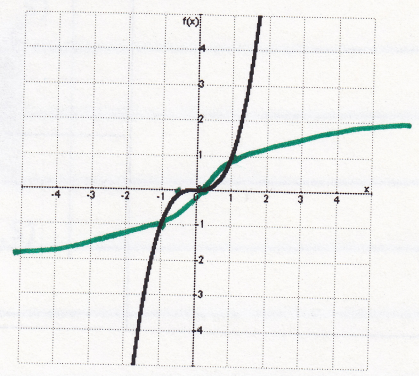
$$20x = 6d + 6x$$

$$14x = 6d$$

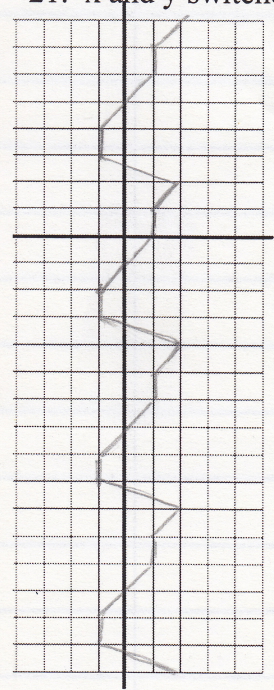
$$x(d) = \frac{6d}{14} = \frac{3d}{7}$$

11. Graph $f^{-1}(x)$ on the same set of axes.

original	new
$x \mid y$	$x \mid y$
0 0	0 0
1 1	1 1
-1 -1	-1 -1
2 8	8 2
-2 -8	-8 -2



21. x and y switched



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