

Mon 1/5 4.1.1 (4-7 → 4-4)

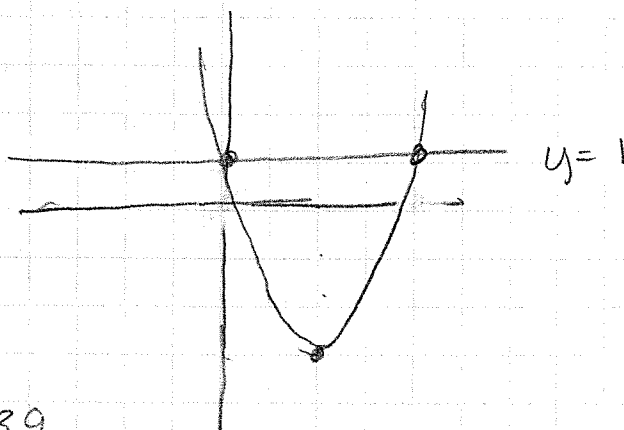
$$4-7) (x-2)^2 - 3 = 1$$

$$x^2 - 4x + 4 - 3 - 1 = 0$$

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

$$x(x-4) = 0$$

$$x=0 \quad x=4$$



$$4-8) a) 2(x-1)^2 + 7 = 39$$

$$\frac{2(x-1)^2}{2} = \frac{32}{2}$$

$$\sqrt{(x-1)^2} = \sqrt{16}$$

$$x-1 = \pm 4$$

$$\boxed{\begin{array}{l} x = 4 + 1 = 5 \\ x = -4 + 1 = -3 \end{array}}$$

$$b) 7 \frac{(\sqrt{m+1} - 3)}{7} = \frac{21}{7}$$

$$(\sqrt{m+1} - 3) = 3$$

$$\begin{array}{r} +3 \quad +3 \\ \sqrt{m+1} = 6 \end{array}$$

$$m+1 = 36$$

$$\boxed{\begin{array}{r} -1 \quad -1 \\ m = 35 \end{array}}$$

$$c) \frac{6}{1} \frac{x}{2} + \frac{x \cdot \frac{6}{3}}{1} = \frac{5x+2}{6} \cdot \frac{6}{6}$$

$$3x + 2x = 5x + 2$$

$$5x = 5x + 2$$

$$\begin{array}{r} -5x \quad -5x \\ 0 \neq 2 \end{array}$$

$$0 \neq 2$$

clear fractions

NO SOLUTION

$$d) -7 + \left(\frac{4x+2}{2} \right) = 8$$

$$+7$$

$$+7$$

$$2 \left(\frac{4x+2}{2} \right) = 15(2)$$

$$\begin{array}{r} 4x+2 = 30 \\ -2 \quad -2 \end{array}$$

$$\frac{4x}{4} = \frac{28}{4}$$

$$\boxed{x=7}$$

4-9) $\frac{12-2}{5-0} = \frac{0}{5} = 0 \quad m=0$

$y = 0x + b$
 $z = 0(0) + b$
 $z = b$
 $y = z$

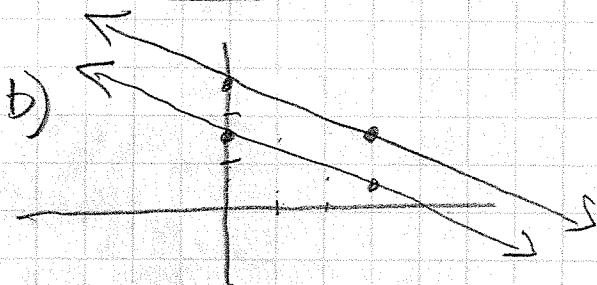
- a) x-axis $y=0$
 b) y-axis $x=0$

4-10)

$2x + 6y = 10$
 $x = 5 - 3y$

$2(5-3y) + 6y = 10$
 $10 - 6y + 6y = 10$

$10 \neq 10$ No Solution

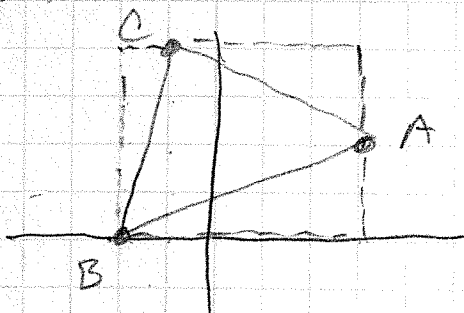


$3y = -x + 8$
 $y = -\frac{1}{3}x + \frac{8}{3}$

$6y = -2x + 10$
 $y = -\frac{1}{3}x + \frac{5}{3}$

c) The lines are parallel so there is no intersection and no solution

- 4-11) A(3,2)
 B(-2,0)
 C(-1,4)



$AC = \sqrt{2^2 + 4^2}$
 $= \sqrt{4 + 16} = \sqrt{20}$
 $= 2\sqrt{5}$

$CB = \sqrt{1^2 + 4^2}$
 $CB = \sqrt{17}$

$AB = \sqrt{2^2 + 5^2}$
 $AB = \sqrt{29}$

Scalene
 All sides
 have different lengths

- 4-12) a) $n=2$ (# cubes = $8-1=7$)
 $n=3$ (# cubes = $3^3-1=26$)
 $n=4$ (# cubes = $4^3-1=63$)

- b) 0 ($1^2-1=0$)
 c) # cubes = n^3-1

d) Neither;
 Both the
 ratios &
 differences
 between the
 terms vary

$$4-13) a) \frac{5x^2-11x+2}{x^2+8x+16} \cdot \frac{(x+6)(x+4)}{10x^2+13x-3}$$

$$AC = \begin{array}{c} 10 \\ -10 \quad -1 \end{array}$$

$$\frac{5x^2-10x-1x+2}{(x+4)(x+4)} \cdot \frac{(x+6)(x+4)}{10x^2-2x+15x-3}$$

$$AC = \begin{array}{c} -30 \\ 15 \quad -2 \end{array}$$

$$\frac{5x(x-2)-1(x-2)}{(x+4)(x+4)} \cdot \frac{(x+6)(x+4)}{2x(5x-1)+3(5x-1)}$$

$$\frac{\cancel{5x-1}(x-2)}{\cancel{(x+4)}(x+4)} \cdot \frac{\cancel{(x+6)}(x+4)}{\cancel{(2x+3)}(5x-1)} = \frac{(x-2)(x+6)}{(x+4)(2x+3)}$$

$$b) \frac{6x+3}{2x-3} \cdot \frac{2x^2-x-3}{3x^2-12x-15}$$

$$AC = \begin{array}{c} -6 \\ -3 \quad 2 \end{array}$$

$$\frac{3(2x+1)}{(2x-3)} \cdot \frac{2x^2+2x-3x-3}{3x^2+3x-15x-15}$$

$$AC = \begin{array}{c} -45 \\ -15 \quad 3 \end{array}$$

$$\frac{3(2x+1)}{(2x-3)} \cdot \frac{2x(x+1)-3(x+1)}{3x(x+1)-15(x+1)}$$

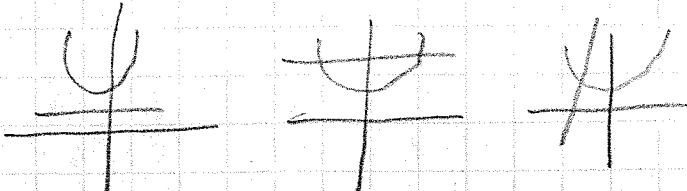
$$\frac{3(2x+1)}{\cancel{(2x-3)}} \cdot \frac{\cancel{(2x-3)}(x+1)}{\cancel{(3x-15)}(x+1)} = \frac{3(2x+1)}{(3x-5)} = \frac{3(2x+1)}{3(x-5)}$$

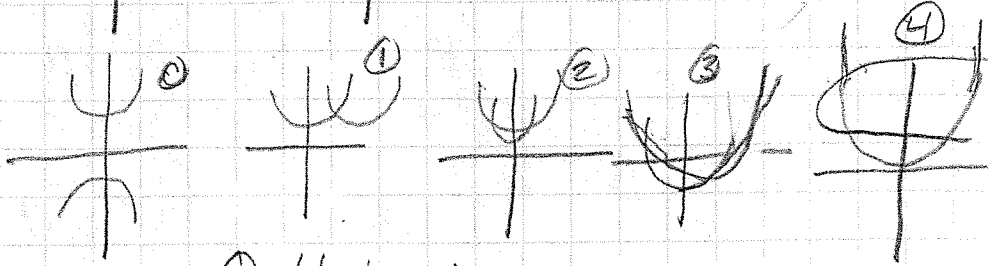
$$\boxed{\frac{2x+1}{x-5}}$$

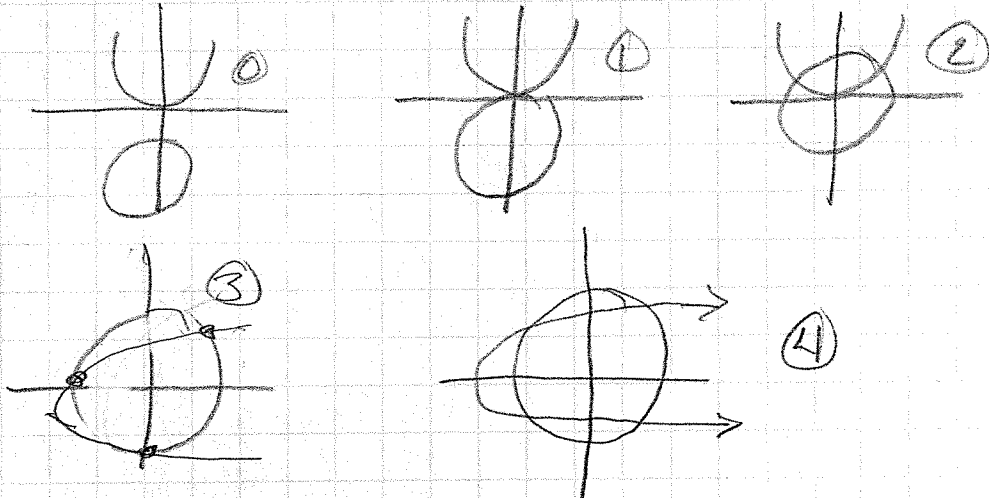
$$c) \frac{5m+10}{m+3} + \frac{4m+9}{m+3} = \frac{9m+21}{m+3} = \frac{9(m+3)}{\cancel{(m+3)}} = \boxed{9}$$

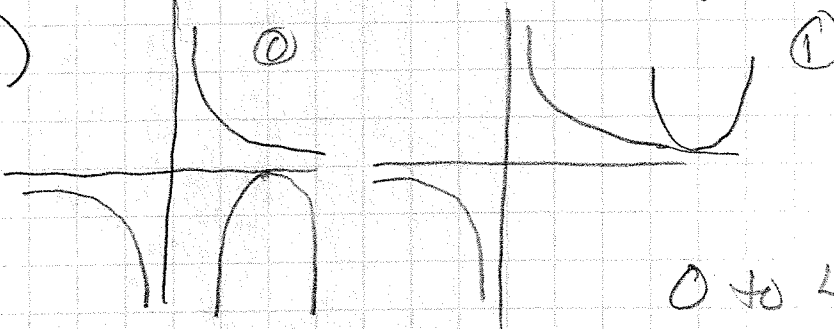
$$d) \frac{3a^2+a-1}{(a-1)(a-1)} - \frac{2a^2-a+2}{(a-1)(a-1)} = \frac{a^2+2a-3}{(a-1)(a-1)}$$

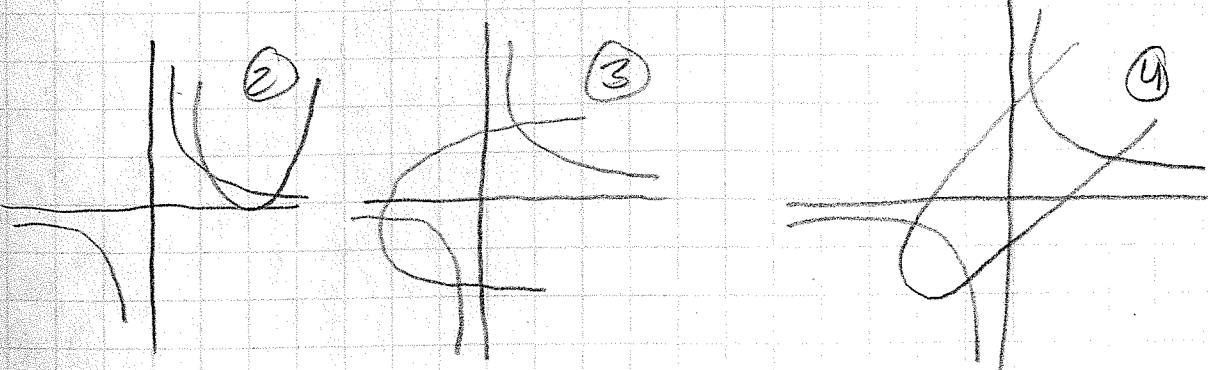
$$\frac{(a+3)\cancel{(a-1)}}{\cancel{(a-1)}(a-1)} = \boxed{\frac{a+3}{a-1}}$$

4-14 a) ψ  0-2 times

b) ψ^0 ψ^1 ψ^2 ψ^3 ψ^4  0-4 times

c) ψ^0 ψ^1 ψ^2 ψ^3 ψ^4  0 to 4 times

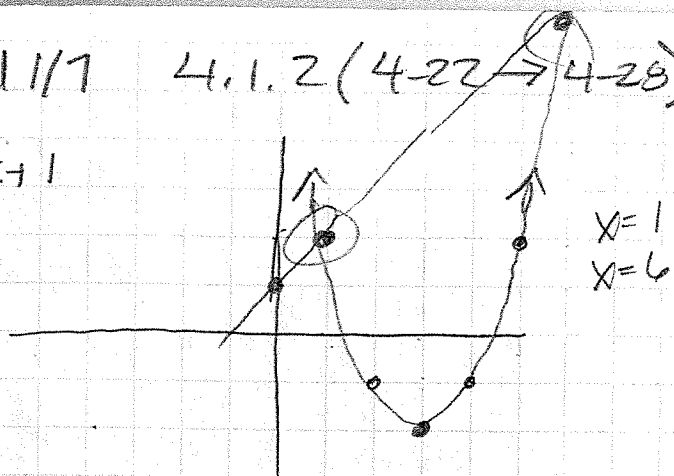
d) ψ^0 ψ^1  0 to 4 times

ψ^2 ψ^3 ψ^4 

Tue 1/6 and Wed 1/7 4.1.2 (4-22) → 4-28)

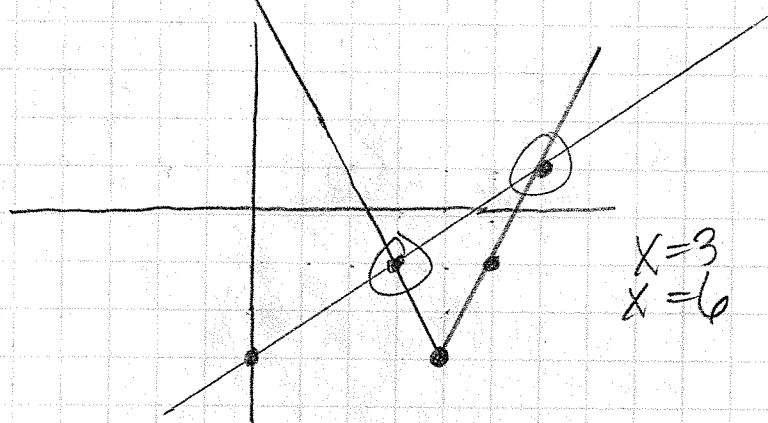
4-22) $(x-3)^2 - 2 = x+1$

x	y
4	-1
2	-1
5	2
1	2
6	7



could also graph $y = x^2 - 7x + 6$ and find the x-intercepts $x=1, x=6$

4-23) $2|x-4| - 3 = \frac{2}{3}x - 3$



$y = \frac{2}{3}x - 3$
 $2|x-4| - 3$
 ↑
 this is the slope

4-24) a) $-3\sqrt{2x-5} + 7 = -8$

$$\begin{aligned} -3\sqrt{2x-5} &= -15 \\ \frac{-3\sqrt{2x-5}}{-3} &= \frac{-15}{-3} \\ (\sqrt{2x-5})^2 &= (5) \end{aligned}$$

$$\begin{aligned} 2x-5 &= 25 \\ +5 &+5 \end{aligned}$$

$$\frac{2x}{2} = \frac{30}{2}$$

$$\boxed{x=15}$$

b) $2|3x+4| - 10 = 12$

$$\frac{2|3x+4|}{2} = \frac{22}{2}$$

$$\begin{aligned} 3x+4 &= 11 \\ -4 &-4 \end{aligned}$$

$$\frac{3x}{3} = \frac{7}{3}$$

$$\boxed{x = \frac{7}{3}}$$

or $\begin{aligned} 3x+4 &= -11 \\ -4 &-4 \end{aligned}$

$$\frac{3x}{3} = \frac{-15}{3}$$

$$\boxed{x = -5}$$

$$4-25) \quad y = 18x - 30$$

$$y = -22x + 50$$

use substitution

$$18x - 30 = -22x + 50$$

$$+22x \quad +22x$$

$$40x - 30 = 50$$

$$\frac{40x}{40} = \frac{80}{40}$$

$$\boxed{x=2}$$

$$y = 18(2) - 30$$

$$= 36 - 30$$

$$y = 6$$

$$\boxed{(2, 6)}$$

$$4-26) \quad \begin{array}{c|c|c|c} 1 & 2 & 3 & 4 \\ \hline 2 & a-b & a+b & 35 \end{array}$$

$$\frac{35-2}{4-1} = \frac{33}{3} = 11$$

$$a-b = 2+11$$

$$a-b = 13$$

$$a+b = 13+11$$

$$a+b = 24$$

$$\frac{2a}{2} = \frac{37}{2}$$

$$\boxed{a = 18.5}$$

$$b = 24 - 18.5$$

$$\boxed{b = 5.5}$$

$$4-27) \quad a) \quad \sqrt{2x-1} - x = -8$$

$$(\sqrt{2x-1})^2 = (x-8)^2$$

$$2x-1 = x^2 - 16x + 64$$

$$0 = x^2 - 18x + 65$$

$$\rightarrow (x-13)(x-5)$$

$$\boxed{x=13 \quad x=5}$$

$$\begin{array}{c} 65 \\ 5 \quad 13 \end{array}$$

$x=5$ is extraneous
does not make
original equation
true

$$b) \quad \sqrt{2x-1} - x = 0$$

$$(\sqrt{2x-1})^2 = (x)^2$$

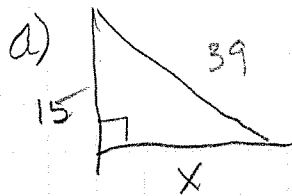
$$2x-1 = x^2$$

$$x^2 - 2x + 1 = 0$$

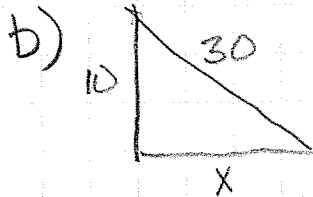
$$(x-1)(x-1) = 0$$

$$\boxed{x=1}$$

4-28)



$$x^2 + 15^2 = 39^2$$
$$x^2 + 225 = 1521$$
$$\sqrt{x^2} = \sqrt{1296}$$
$$x = 36$$



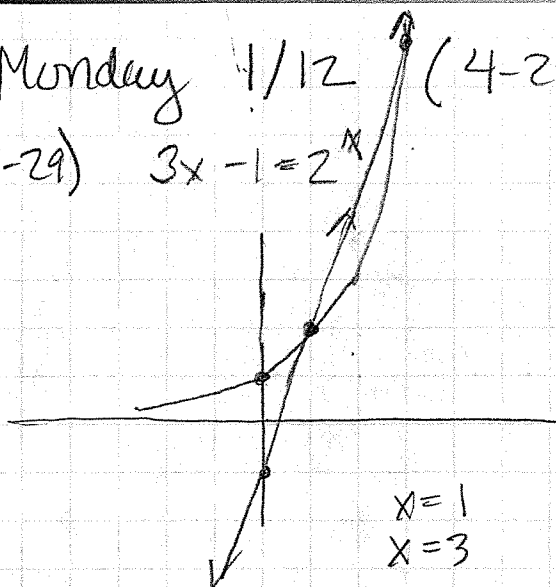
$$x^2 + 10^2 = 30^2$$
$$x^2 + 100 = 900$$
$$\begin{array}{r} -100 \\ -100 \end{array}$$
$$\sqrt{x^2} = \sqrt{800}$$
$$x = \sqrt{100 \cdot 2 \cdot 2 \cdot 2}$$
$$x = 10 \cdot 2\sqrt{2} = 20\sqrt{2}$$

Monday 1/12 (4-29 → 4-35)

4-29) $3x - 1 = 2^x$

$y = 2^x$

$y = 3x - 1$



x	y
0	1
1	2
2	4
3	8

x	y
0	-1
1	2
2	5
3	8

Cannot solve algebraically

4-30) $f(x) = \frac{1}{2}(x-2)^3 + 1$
 $g(x) = 2x^2 - 6x - 3$

a) $x=0$ $\frac{1}{2}(0-2)^3 + 1 = \frac{1}{2}(-8) + 1 = -4 + 1 = -3$
 $x=4$ $2(0)^2 - 6(0) - 3 = -3$ ✓

$\frac{1}{2}(4-2)^3 + 1 = 4 + 1 = 5$ ✓
 $2(4)^2 - 6(4) - 3 = 32 - 24 - 3 = 5$ ✓

b) $x=6$ is also a solution

$\frac{1}{2}(6-2)^3 + 1 = 32 + 1 = 33$ ✓
 $2(6)^2 - 6(6) - 3 = 72 - 36 - 3 = 33$ ✓

c) $\frac{1}{2}(x-2)^3 + 1 = 0$
 $(2) \frac{1}{2}(x-2)^3 = -1$
 $\sqrt[3]{(x-2)^3} = \sqrt[3]{-2}$
 $(x-2) = -1.26$
 $+2 \quad +2$
 $x = 0.74$

pt C is on the curve

vertex $-\frac{(-6)}{2(2)} = \frac{6}{4} = \frac{3}{2}$
 $y = 2\left(\frac{3}{2}\right)^2 - 6\left(\frac{3}{2}\right) - 3$
 $2\left(\frac{9}{4}\right) - \frac{18}{2} - 3$
 $-\frac{9}{2} + \frac{-6}{2} = -\frac{15}{2}$

d) $f(x)$
 D: all real #'s
 R: all real #'s

$g(x)$
 D: all real #'s
 R: $y \geq -7.5$ ✓

$$4-31) a) 2(x+3)^2 - 5 = -5$$

$$\frac{2(x+3)^2}{2} = \frac{0}{2}$$

$$(x+3)^2 = 0$$

$$\boxed{x = -3}$$

$$b) 3(x-2)^2 + 6 = 9$$

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

$$\sqrt{(x-2)^2} = \sqrt{1}$$

$$x-2 = \pm 1$$

$$x = 2 + 1 = 3$$

$$x = 2 - 1 = 1$$

$$c) |2x-5| - 6 = 15$$

$$|2x-5| = 21$$

$$2x-5 = 21$$

$$\frac{2x}{2} = \frac{26}{2}$$

$$\boxed{x = 13}$$

$$2x-5 = -21$$

$$\frac{2x}{2} = \frac{-16}{2}$$

$$\boxed{x = -8}$$

$$d) 3\sqrt{5x-2} + 1 = 7$$

$$\frac{3\sqrt{5x-2}}{3} = \frac{6}{3}$$

$$(\sqrt{5x-2})^2 = (2)^2$$

$$5x-2 = 4$$

$$\frac{5x}{5} = \frac{6}{5}$$

$$\boxed{x = \frac{6}{5} = 1.2}$$

$$4-32) a) 5x - 3y = 12$$

$$\begin{array}{r} -5x \\ -3y = -5x + 12 \\ -3 \quad -3 \end{array}$$

$$\boxed{y = \frac{5}{3}x - 4}$$

$$b) (r^2)F = \frac{Gm_1 m_2}{r^2} (r^2)$$

$$\frac{r^2 F}{Gm_1} = \frac{Gm_1 m_2}{Gm_1}$$

$$\boxed{m_2 = \frac{r^2 F}{Gm_1}}$$

$$c) E = \frac{1}{2}mv^2 (2)$$

$$\frac{2E}{v^2} = \frac{mv^2}{v^2}$$

$$\boxed{m = \frac{2E}{v^2}}$$

$$d) (x-4)^2 + (y-1)^2 = 10$$

$$\sqrt{(y-1)^2} = \sqrt{10 - (x-4)^2}$$

$$y-1 = \sqrt{10 - (x-4)^2}$$

$$\boxed{y = \sqrt{10 - (x-4)^2} + 1}$$

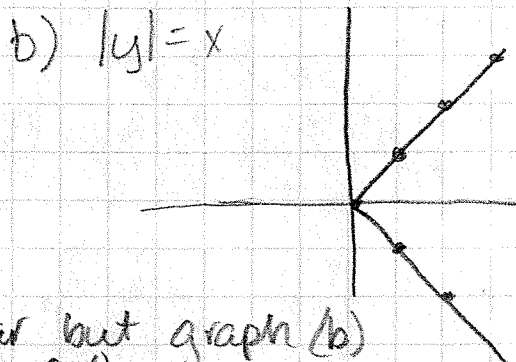
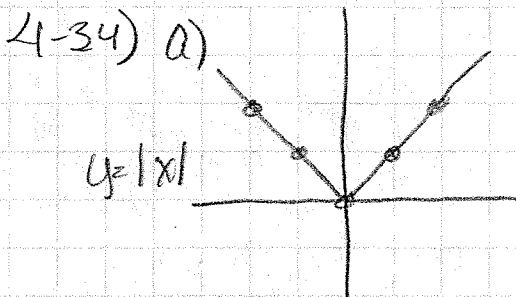
$$4-33) (a+b)^2 \stackrel{?}{=} (a^2+b^2) \quad \text{or}$$

$$a^2+2ab+b^2 \neq a^2+b^2$$

Sub numbers

$$(1+2)^2 \stackrel{?}{=} (1^2+2^2)$$

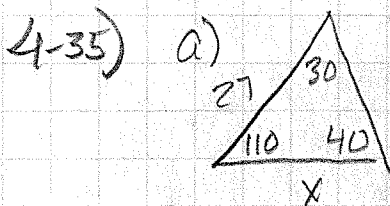
$$9 \neq 1+4$$



c) The graphs are similar but graph (b) is graph (a) rotated 90°

d) a) D: all real #s
R: $y \geq 0$

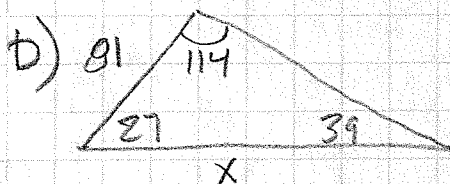
b) D: $x \geq 0$
R: all real #s



~~$$\frac{\sin 40}{27} = \frac{\sin 30}{x}$$~~

$$\frac{x \sin 40}{\sin 40} = \frac{27 \sin 30}{\sin 40}$$

$$x = 21$$



$$180 - 39 - 27 = 114$$

~~$$\frac{\sin 39}{27} = \frac{\sin 114}{x}$$~~

$$\frac{x \sin 39}{\sin 39} = \frac{27 \sin 114}{\sin 39}$$

$$x = \frac{27 \sin 114}{\sin 39}$$

$$x = 117.58$$