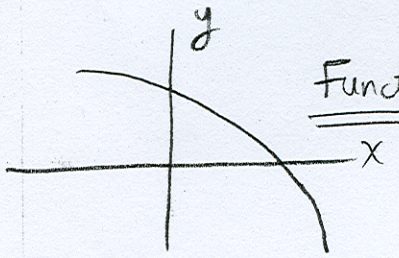
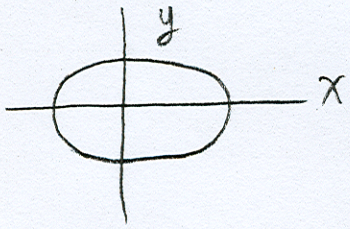
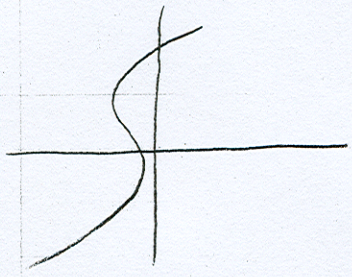
#2)

a) 

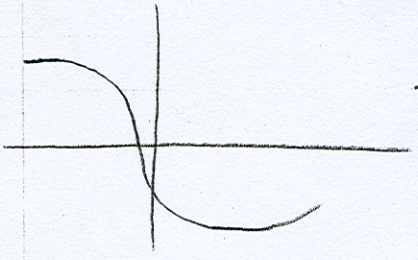
Function; every x has only one y value

b) 

Not a function; B/C one x can have two y values (This graph fails Vertical Line test)

c) 

Not a function; B/C one x can have two y values (This graph fails V. Line test)

d) 

function; B/C every x has only one y value

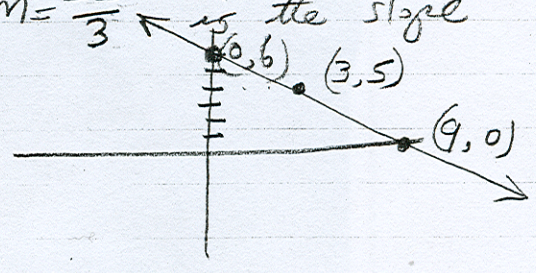
#3) $2x+3y=18 \Rightarrow 3y=-2x+18 \Rightarrow y=\frac{-2}{3}x+6$

a) find x intercept; let $y=0$ $\quad 2x=18 \Rightarrow x=9$ $\quad (9,0)$ = x int

b) find y intercept; let $x=0$ $\quad 3y=18 \Rightarrow y=6$ $\quad (0,6)$ = y int

c) find the slope; $m=\frac{-2}{3}$ is the slope

d) sketch the graph



e) $y=mx+b$

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

$-2=2+b$

$-4=b$

$\Rightarrow \boxed{y=\frac{-2}{3}x-4}$

#4) $f(x) = 4x^2 - 3x - 6$

$f(x) = 4\left(x^2 - \frac{3}{4}x + \frac{9}{64}\right) - 6 - \frac{9}{16}$ $\qquad \left(\frac{\frac{3}{4}}{2}\right)^2 = \frac{9}{64}$

$f(x) = 4\left(x - \frac{3}{8}\right)^2 - \frac{105}{16}$

a) $f(x) = a(x-h)^2 + k$ $\Rightarrow$ Vertex $= \left(\frac{3}{8}, \frac{-105}{16}\right)$

b) $x = \frac{-b}{2a} = \frac{-(-3)}{2(4)} = \frac{3}{8} \Rightarrow f\left(\frac{3}{8}\right) = \frac{-105}{16} \Rightarrow$ Vertex $= \left(\frac{3}{8}, \frac{-105}{16}\right)$

Vertex $\left(\frac{3}{8}, \frac{-105}{16}\right)$ By Graphing the $Y_1 = 4X^2 - 3X - 6$

c) $(-0.906, 0)$ & $(1.656, 0)$

d) To find y-intercept let $x = 0 \Rightarrow (0, -6)$ = y-intercept

#5) a) $\sqrt{48} = \sqrt{16}\sqrt{3} = 4\sqrt{3}$

b) $\frac{5}{\sqrt{15}} = \frac{5}{\sqrt{15}} \cdot \frac{\sqrt{15}}{\sqrt{15}} = \frac{5\sqrt{15}}{15} = \frac{\sqrt{15}}{3}$

c) $3\sqrt{20} - 7\sqrt{45} + \sqrt{5} = 3\sqrt{4}\sqrt{5} - 7\sqrt{9}\sqrt{5} + \sqrt{5} = 6\sqrt{5} - 21\sqrt{5} + \sqrt{5} = -14\sqrt{5}$

#6) $f(x) = 3 - 4x$

a) $f(-2) = 3 - 4(-2) = 3 + 8 = 11$

b) $f(x) = -2 \Rightarrow 3 - 4x = -2 \Rightarrow -4x = -5$

$x = \frac{-5}{-4} = \frac{5}{4}$

#7) $f(x) = 3x^2 - 6x + 1$

To find x intercept let $y = 0 \Rightarrow 3x^2 - 6x + 1 = 0$

$$x = \frac{6 \pm \sqrt{36 - 12}}{6} = \frac{6 \pm \sqrt{24}}{6}$$

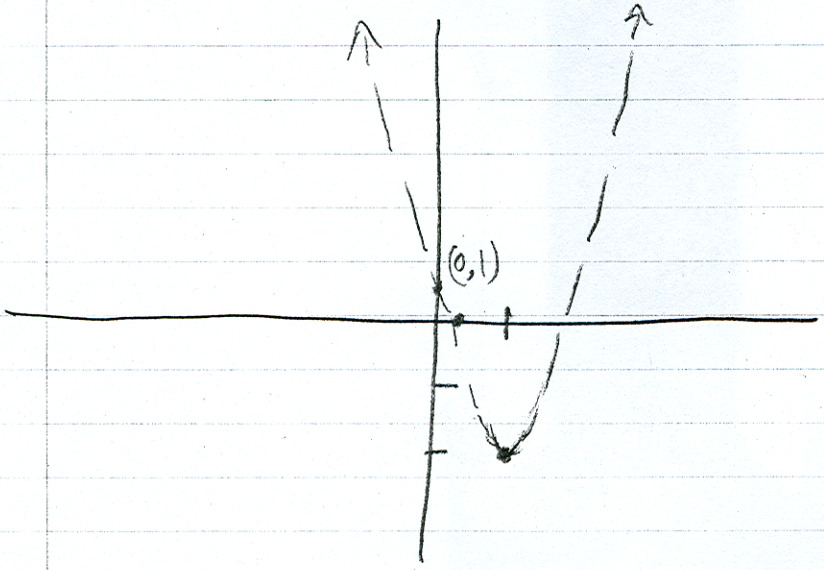
$$= \frac{6 \pm 2\sqrt{6}}{6} = \begin{cases} \rightarrow (1.816, 0) \\ \rightarrow (0.184, 0) \end{cases}$$

To find y intercept let $x = 0 \Rightarrow$ y intercept $(0, 1)$

b) $f(2) = 3(2)^2 - 6(2) + 1 = 1$

$f(-2) = 3(-2)^2 - 6(-2) + 1 = 25$

c)



Vertex $= (1, -2)$

d) $x_{\text{vertex}} = \frac{-b}{2a} = \frac{-(-6)}{2(3)} = \frac{6}{6} = 1$

#7 Continued $g(x) = -9x - 2x^2 = -2x^2 - 9x$

(a) Find all Intercepts

To find y intercept let $x = 0 \Rightarrow y = 0 \Rightarrow$ y intercept $(0, 0)$

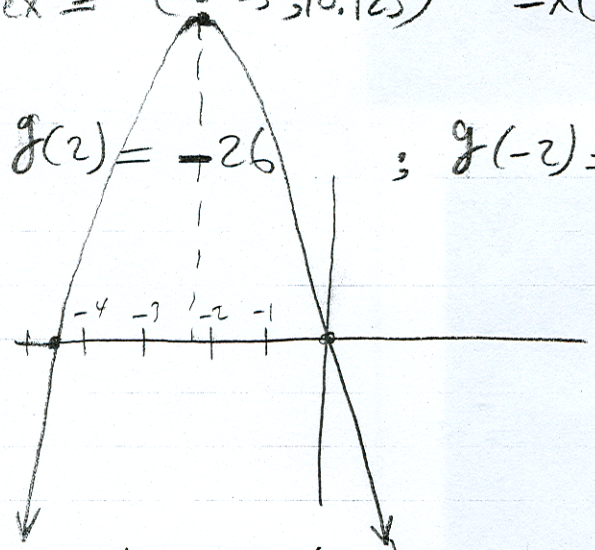
To find x intercept let $y = 0 \Rightarrow -9x - 2x^2 = 0$

$-x(9 + 2x) = 0 \Rightarrow (x = 0, y = 0)$ OR $(x = \frac{-9}{2}, y = 0)$

Vertex = $(-2.25, 10.125)$

b) $g(2) = -26$; $g(-2) = 10$

c)



d) $x = \frac{-b}{2a} = \frac{-(-9)}{2(-2)} = \frac{9}{-4} = -2.25$ $\quad y = 10.125$

(*) $h(x) = x^3 - 2x - 6$

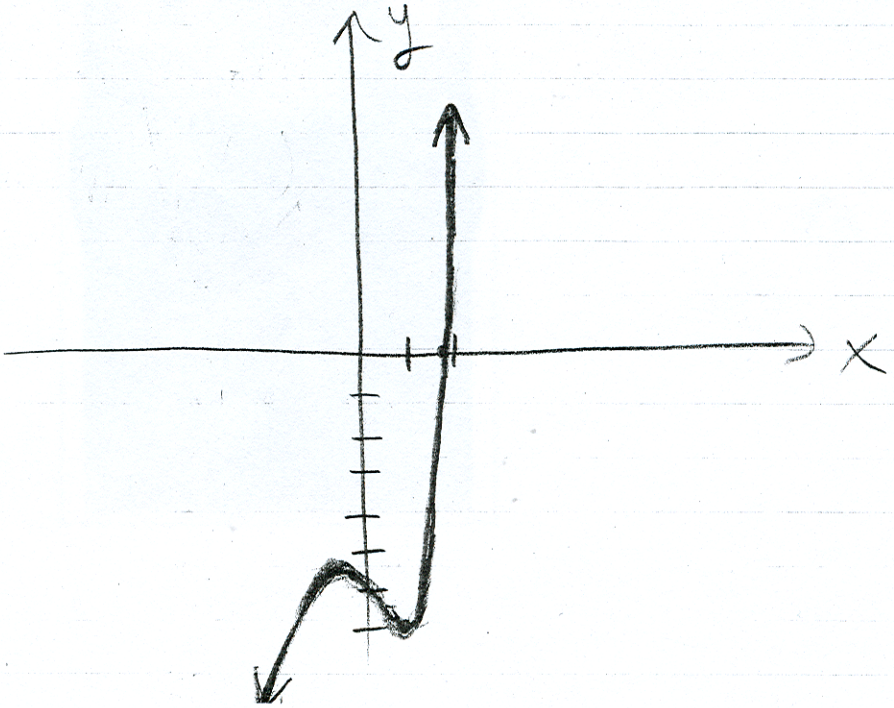
y intercept $(0, -6)$

y intercept let $x = 0$ $\quad y = -6 \Rightarrow$

x intercept $(2.18, 0)$

$h(2) = 0$

$h(-2) = -14$



#8) a) $8x^{\frac{1}{3}} = 8\sqrt[3]{x}$

b) $(-8x)^{1/3} = (-8)^{1/3}(x)^{1/3} = -2\sqrt[3]{x}$

c) $(8x)^{-\frac{1}{3}} = \frac{1}{(8x)^{1/3}} = \frac{1}{8^{\frac{1}{3}}x^{1/3}} = \frac{1}{2\sqrt[3]{x}}$

d) $(3x^{\frac{3}{4}})(16x)^{1/4} = 3x^{\frac{3}{4}} \cdot 16^{\frac{1}{4}} x^{\frac{1}{4}}$

$= 3x^{\frac{3}{4}} \cdot 2\, x^{\frac{1}{4}} = 6x^{\frac{4}{4}} = 6x$

e) $\frac{x^{\frac{1}{2}}}{x^{\frac{5}{2}}} = x^{\frac{1}{2}-\frac{5}{2}} = x^{-\frac{4}{2}} = x^{-2} = \frac{1}{x^2}$

#9) $\frac{8-\sqrt{-36}}{4} = \frac{8-6i}{4} = \frac{8}{4} - \frac{6}{4}i$

$= 2 - \frac{3}{2}i$

#10/ a) $\sqrt{x} \cdot \sqrt[3]{x} = x^{\frac{1}{2}} \cdot x^{\frac{1}{3}} = x^{\frac{3+2}{6}}$

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

b) $5\sqrt{3} - \sqrt{3} = 4\sqrt{3}$

#9) Simplify $\frac{8-\sqrt{-36}}{4} = \frac{8-6i}{4} = \frac{8}{4} - \frac{6i}{4} = 2 - \frac{3}{2}i$

#11) a) $(x+3)^2 - 81 = 0$

$(x+3)^2 = 81$

$(x+3) = \pm 9$

$x+3 = 9$ $\quad$ $x+3 = -9$

$x = 9-3 = 6$ $\quad$ $x = -12$

b) $3x^2 + 5x = 2$

$3x^2 + 5x - 2 = 0$

$(3x-1)(x+2) = 0$

$3x - 1 = 0$ $\quad$ $x + 2 = 0$

$x = \frac{1}{3}$ $\quad$ $x = -2$

c) $(x+1)(x-2) = 18$

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

$x^2 - x - 20 = 0$

$(x-5)(x+4) = 0$

$x = 5$ $\quad$ $x = -4$

d) $2x^2 - 4x + 5 = 0$

Will Not factor; So, use Quad formula

$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(2)(5)}}{2(2)}$

$x = \frac{4 \pm \sqrt{-24}}{4} = \frac{4 \pm 2\sqrt{6}\,i}{4}$

$x = 1 \pm \frac{1}{2}\sqrt{6}\,i$

Extra) $x(x^2 + 3x - 1) = 3$

$x^3 + 3x^2 - x = 3$

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

$x^2(x+3) - 1(x+3) = 0$

$(x+3)(x^2 - 1) = 0$

$(x+3)(x+1)(x-1) = 0$

$x + 3 = 0$ $\quad$ $x + 1 = 0$ $\quad$ $x - 1 = 0$

$x = -3$ $\quad$ $x = -1$ $\quad$ $x = 1$

#13) $x = 1.1578074156$ (tenths, hundredths, thousandths)

$y = 2E-13$

this means $y = 2 \times 10^{-13}$ which is almost zero

So, the coordinates of x intercept is:

$(1.158, 0)$

#12) $f(t) = -0.19t^2 + 2.56t - 2.37$

where $f(t)$ represents the amount of profit in millions of $

t is the number of years since 1995

a) Year 2003 $\quad t = 2003 - 1995 = 8$

$f(8) = -0.19(8)^2 + 2.56(8) - 2.37 = 5.95$

So the profit in 2003 was $5.95 million.

b) $f(t) = 4.23 = -0.19t^2 + 2.56t - 2.37$

Now; Solve by Graphing or Quad formula $\Rightarrow t = 3.47$ & $t = 10$

So, In the years $1995 + 3 = 1998$ and $1995 + 10 = 2005$

the profit was $ 4.23 million

c) When t is negative the Company didnot exist.

Also the model predicts losses after 2008.

d) $f(t) = 0$; $t = 1$ & $t = 12.47 \approx 12.5 \approx 13$

In the years 1996 & 2008, the profit is 0.

e) Vertex $t = \frac{-b}{2a} = \frac{-2.56}{2(-0.19)} = 6.73$ the Company will have Max profit in the year 2002

#14| Solve for x $\quad \frac{x}{x+1} + \frac{2x-2}{x} = \frac{-1}{x+1}$

step I) find LCD and Multiply every term by that LCD

$$\cancel{x(x+1)}\,\frac{x}{\cancel{x+1}} + \frac{(2x-2)\cancel{x}(x+1)}{\cancel{x}} = \frac{-1 \times \cancel{(x+1)}}{\cancel{x+1}}$$

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

step II) simplify & Solve for x.

$$x^2 + 2x^2 + \cancel{2x} - \cancel{2x} - 2 = -x$$

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

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

Now Solve By factoring or Quad formula.

$$(3x-2)(x+1) = 0$$

$3x - 2 = 0$ $\qquad$ $x + 1 = 0$

$x = \frac{2}{3}$ $\qquad$ $x = -1$

But $x = -1$ is called extraneous solution (ie No Good Soln.)

So, the final Answer is $x = \frac{2}{3}$

#14 Continued $2x+1=\sqrt{7-x}$

We will Square Both sides to Solve for x

$$(2x+1)^2 = \left(\sqrt{7-x}\right)^2$$

$$(2x+1)(2x+1) = 7-x$$

$$4x^2+4x+1 = 7-x$$

$$+x \quad -7 \qquad -7+x$$

$$4x^2+5x-6 = 0$$

Now Solve by factoring if possible; $(4)(-6) = -24$

$8 \quad -3$

$$4x^2+8x-3x-6=0$$

$$4x(x+2)-3(x+2)=0$$

$$(x+2)(4x-3)=0$$

$$x=-2 \quad \text{or} \quad x=\frac{3}{4}$$

But $x=-2$ is called extraneous sln Because.

$$2(-2)+1 \neq \sqrt{7-(-2)}$$

So, the only Answer is $\boxed{x=\frac{3}{4}}$