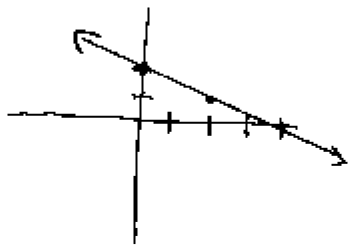
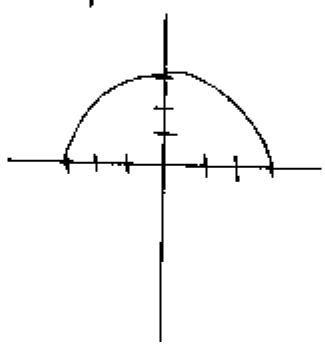
Part 1

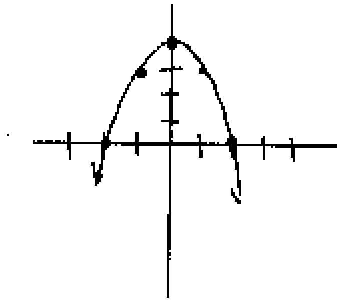
1 a. $y = -\frac{1}{2}x + 2$



b. $y = \sqrt{9 - x^2}$



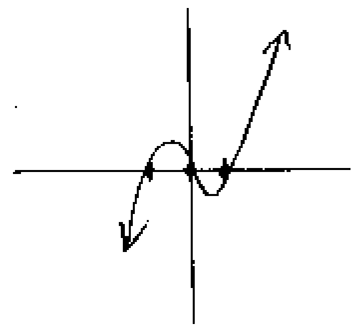
c. $y = 4 - x^2$



1d. $y = x^3 - x$

$= x(x^2 - 1)$

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



2a. $y = x^2 + x - 2$

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

x-int : $(-2, 0)$ and

y-int $(0, -2)$

2b. $y^2 = x^3 - 4x$

$x(x^2 - 4)$

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

x-int: $(0,0)$ (

y-int: $(0,0)$

Part 1 Continued

2c.

$$y = x\sqrt{9-x^2}$$

$\boxed{\begin{array}{l} x\text{-int}: x=0,\ x=3,\ x=-3 \\ y\text{-int}: y=0 \end{array}}$

2d.

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

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

$x(x+3)=0$

$\boxed{x=0,\ x=-3}$

y-int : $\boxed{y=0}$

3a.

$$y^2 = x^3-4x$$

y-axis sym replace x with $-x$

$y^2 = -x^3+4x$ not equivalent

x-axis replace y with $-y$

$(-y)^2 = x^3-4x$

$y^2 = x^3-4x$ equivalent

$\boxed{\therefore\ y \text{ axis symmetry}}$

3b.

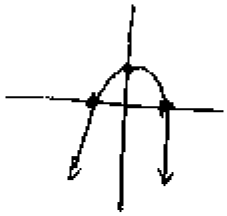
$$y = \frac{x}{x^2-1}$$

origin sym - replace x with $-x$
y with $-y$

$-y = \frac{-x}{(-x)^2-1}$ $\boxed{\text{origin symmetry}}$

$y = \frac{x}{x^2-1}$

4a. $y = 1 - x^2$

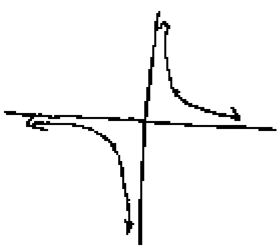


x-int $x = -1$
$x = 1$

y-int $y = 1$

y-axis symmetry

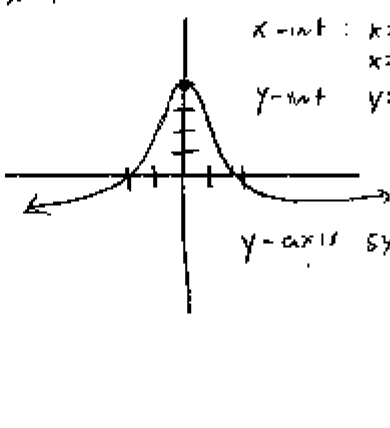
4b. $y = \frac{1}{x}$



no x or y intercepts

origin symmetry

5a. $y = \frac{5}{x^2+1} - 1$



x-int : $x = 2$
$x = -2$

y-int $y = 4$

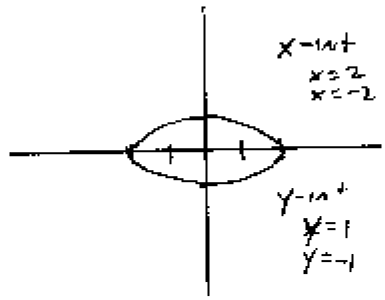
y-axis symmetry

5b. $x^2 + 4y^2 = 4$

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

$y^2 = 1 - \frac{x^2}{4}$

$y = \pm\sqrt{1 - \frac{x^2}{4}}$



x-int
$x = 2$
$x = -2$

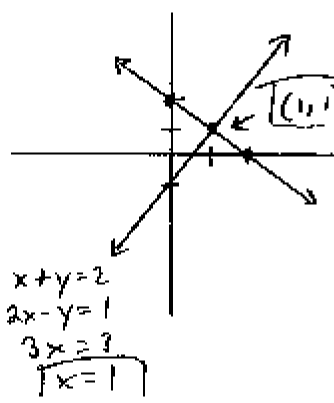
y-int
$\cancel{y} = 1$
$y = -1$

x-axis sym

y-axis sym

6a. $x + y = 2$
$2x - y = 1$

$y = -x + 2$
$y = 2x - 1$



$\boxed{(1,1)}$

$x + y = 2$
$2x - y = 1$
$3x = 3$
$\boxed{x = 1}$

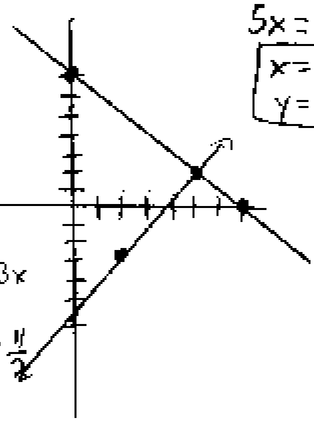
Part 1 (continued)

6b. $x + y = 7 \Rightarrow 2x + 2y = 14$

$3x - 2y = 11 \Rightarrow \underline{3x - 2y = 11}$

$5x = 25$

$\boxed{\begin{array}{l} x = 5 \\ y = 2 \end{array}}$



$-2y = 11 - 3x$

$y = \frac{3}{2}x - \frac{11}{2}$

7a. $y = x^3 - 2x^2 + x - 1$

$y = -x^2 + 3x - 1$

use the intersection function on the calculator

$(-1, -5)$ $(0, -1)$ $(2, 1)$

7b. $y = x^4 - 2x^2 + 1$

$y = 1 - x^2$

$(-1, 0)$ $(0, 1)$ $(1, 0)$

8. $C = 5.5\sqrt{x} + 10{,}000$

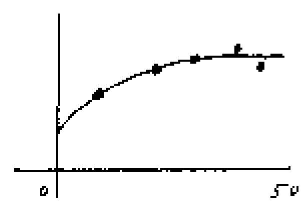
$R = 3.29x$

use calculator.

$x = 3133$ units

9a. $y = -0.1283t^2 + 11.0988t + 2$

b



c) $t = 54$

$y \approx 432.3$ acres per

Part 2 Summer Assignment

1a. $(2,1)$ $m=0$

3 more points
$(3,1)$, $(4,1)$ $(5,1)$

Eq. $y=1$

1b. $(1,7)$ $m=-3$

3 more points
$(2,4)$, $(3,1)$ $(4,-2)$

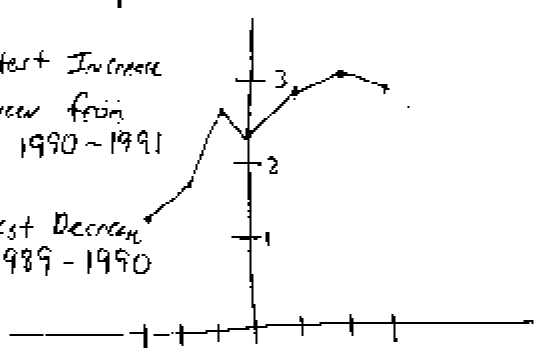
Eq: $y-7=-3(x-1)$

2.

t	y	m
-3	1.25	.38
-2	1.63	.9
-1	2.53	-.21
0	2.32	.55
1	2.87	.23
2	3.10	-.15
3	2.95	

Greatest Increase between from 1990 - 1991

Greatest Decrease 1989 - 1990



3a. $x+5y=20$

$5y=-x+20$

$y=-\frac{1}{5}x+4$

$m=-\frac{1}{5}$

y-int $(0,4)$

3b. $6x-5y=15$

$5y=6x-15$

$y=\frac{6}{5}x-3$

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

y-int $(0,-3)$

3c. $x=4$

Slope - undefined

y-int none

3d. $y=-1$

slope $=0$

y-int $(0,-1)$

4a. $(2,1)\ (0,-3)$

$m = \frac{rise}{run} = \frac{-4}{-2} = 2$

$\boxed{y+3 = 2(x-0) \text{ or } y-1 = 2(x-2)}$

4b. $(-3,-4)\ (1,4)$

$m = \frac{rise}{run} = \frac{8}{4} = 2$

$\boxed{y+4 = 2(x+3) \text{ or } y-4 = 2(x-1)}$

4c $(0,3)$ $m = \frac{3}{4}$

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

4d. $(-2,4)$ $m = -\frac{3}{5}$

$\boxed{y-4 = -\frac{3}{5}(x+2)}$

5. $\boxed{x=3}$

6a $\left(\frac{7}{8}, \frac{3}{4}\right)$ $5x+3y=0$

slope $= -\frac{A}{B} = -\frac{5}{3}$

$\parallel$ - line $y-\frac{3}{4} = -\frac{5}{3}\left(x-\frac{7}{8}\right)$

$\perp$ - line $y-\frac{3}{4} = \frac{3}{5}\left(x-\frac{7}{8}\right)$

6b. $(-6,4)$ $3x+4y=7$

slope $= -\frac{3}{4}$

$\parallel$ - line $y-4 = -\frac{3}{4}(x+6)$

$\perp$ - line $y-4 = \frac{4}{3}(x+6)$

7. \$150 per day plus \$0.30 per mile

C = cost to compa.

x = miles driven

$C = 150 + .30x$

8. Option 1 \$12.50/hr + \$.75/unit

Option 2 \$9.20/hr + \$1.30/unit

a) $W_1 = \$12.50 + .75x$

$W_2 = \$9.20 + 1.30x$

b) intersect at use calculat

$x = 6$

$w = 17$

(continued on next page)

8c) The hourly wages are equal if the emp. can produce 6 units per hour. If he can produce < 6 per hour pick option one. If he can produce > 6 per hour pick option 2.

7.

$ax + by = c_1$

$a \neq 0, b \neq 0$ $\quad m = -\frac{a}{b}$

$bx - ay = c_2$

$m = -\frac{b}{-a} = \frac{b}{a}$

Slopes are opposite reciprocal

$\therefore$ they are perpendicular

$\boxed{\text{True}}$

NO, it is not posible for two lines to have positive slopes and be perpendicular, they must be opposite recip. to be perpendicular.

Part 3

1. Given $f(x) = 2x-3$

$f(0) = \boxed{-3}$

$f(-3) = 2(-3)-3 = \boxed{-9}$

$f(b) = \boxed{2b-3}$

$f(x-1) = 2(x-1)-3$

$= 2x-2-3$

$= \boxed{2x-5}$

$$f(x) = \begin{cases} x^2+2, & x<0 \\ 2x^2+2 & x\geq 0 \end{cases}$$

$f(-2) = (-2)^2+2 = \boxed{6}$

$f(0) = 2(0)^2+2 = \boxed{2}$

$f(1) = 2(1)^2+2 = 4$

$f(s^2+2) = 2(s^2+2)^2+2$

$= 2(s^4+4s^2+4)+2$

$= \boxed{2s^4+8s^2+10}$

3. $f(x) = x^3$

$$\begin{array}{ccccccc} & & & 1 & & & \\ & & 1 & & 1 & & \\ & 1 & & 2 & & 1 & \\ 1 & & 3 & & 3 & & 1 \end{array}$$

$$\frac{f(x+h)-f(x)}{h} = \frac{(x+h)^3 - x^3}{h}$$

$$= \frac{\cancel{x^3} + 3x^2h + 3xh^2 + h^3 - \cancel{x^3}}{h}$$

$$= \boxed{3x^2 + 3xh + h^2}$$

4. $f(x) = x^3 - x$

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

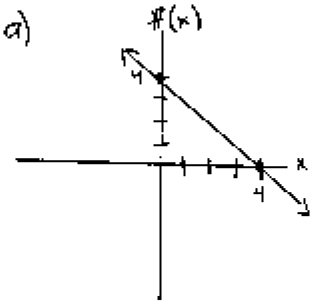
$$= \frac{x^3 - x}{x-1} = \frac{x(x^2-1)}{x-1}$$

$$= \frac{x(x-1)(x+1)}{(x-1)} = \boxed{x(x+1)}$$

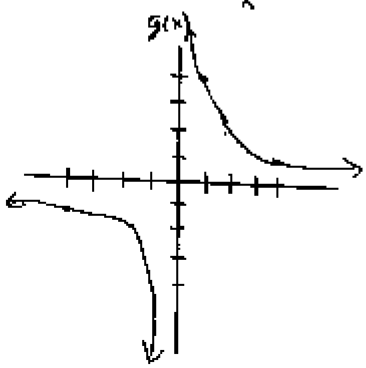
Part 3 (cont)

5. $f(x) = 4 - x$

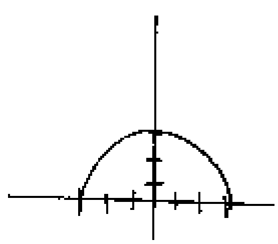
a)



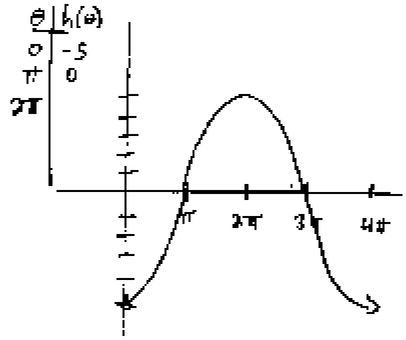
b) $g(x) = \frac{4}{x}$



c) $g(x) = \sqrt{9 - x^2}$



5d. $h(\theta) = -5\cos\left(\frac{\theta}{2}\right.$



6. $P_1(x) = x^3 - x + 1$

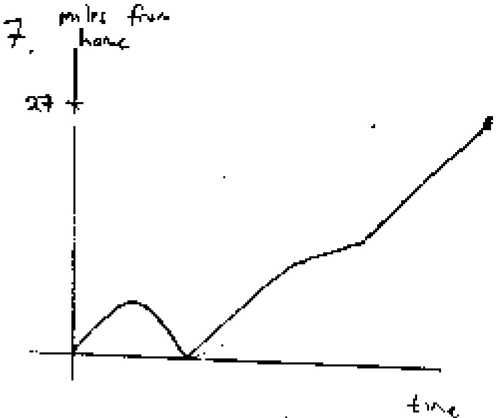
$P_2(x) = x^3 - x$

$P_1(x)$ has one zer

$P_2(x)$ has three zero

A cubic polynomial f
must have at least o
zero since its end b
is up forever on one
and down forever on
other side

Part 3 (cont)

7. 

Answers will vary

8. $f(x) = \frac{1}{x}$ $\quad g(x) = x^2 + 1$

$f(g(x)) = \frac{1}{x^2+1}$

Domain : all real numbers

Range : $y > 0$

$g(f(x)) = \frac{1}{x^2} + 1$

Domain : All Real numbers except $x \neq 0$

Range : $y > 1$

9. a) $f(x) = \frac{1}{x}$

If $f(-x) = f(x)$ even

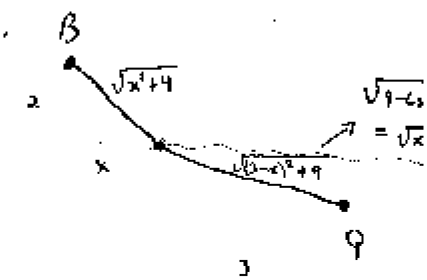
If $f(-x) = -f(x)$ odd

$\boxed{f(-x) = -\frac{1}{x} \quad \text{odd}}$

b) $f(x) = x\cos x$

$f(-x) = -x\cos(-x)$

$\boxed{f(-x) = x\cos x = f(x) \quad \text{even}}$

10. 

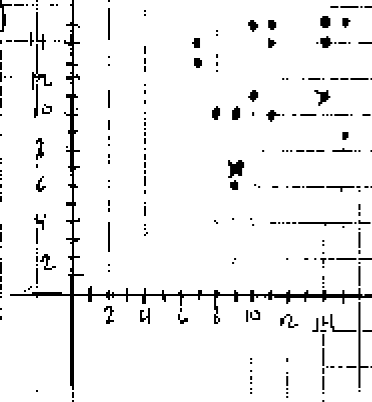
Distance = (rate)(time)

$\text{time} = \frac{D}{r}$

$\boxed{T(x) = \frac{\sqrt{x^2+4}}{2} + \frac{\sqrt{x^2+6x}}{4}}$

Part 4

1 a)



The relationship is not linear

1b. Quiz scores depend on many variables not just the score on the previous quiz.

2 a. 1) Enter data into L_1 and L_2 from the Stat menu
2) Turn plots on
3) Graph
4) Zoom Stat Plot
5) STAT/CALC/LinReg
$a = 2.619$
$b = 2.667$
$y = 2.619x + 2.667$

b. on calculator

c. The fit is not that accurate since the model splits the data. In general the model fits all the data points

Part 4 cont

3. a) Put 5-11 in L_1
Y_1 into L_2
Y_2 into L_3
Y_3 into L_4

Y_1, STAT/CALC/Quad Reg/ L_1, L_2

$\boxed{Y_1 = 0.161x^2 - 2.434x + 13.96}$

Store in Y_1 : Y=/VARS/STATISTICS/EQ/RegEQ

Y_2 STAT/CALC/LinReg/ L_1, L_3

$\boxed{Y_2 = 0.138x + 4.317}$

Store in Y_2

Y_3, STAT/CALC/LinReg/ L_1, L_4

$\boxed{Y_3 = 0.043x + 0.443}$

Store in Y_3.

b) Graph Y_1, Y_2, Y_3, $(Y_1 + Y_2 + Y_3) \Rightarrow Y_4$
Turn off Graphs for Y_1, Y_2, Y_3
Trace Y_4 to $x = 18$
$Y \approx 30.2$ cents per mile

Part 4 cont

7. Put x in L_1, y in L_2

STAT / CALC / cubic reg / L_1, L_2

a) $y = -1.806x^3 + 14.583x^2 + 16.389x + 10$

b) on calc, store RegEQ into Y_1, turn plots on

c) 2nd / Tblset / Ask Ind

Quit / 2nd Table / 4.5

$Y(4.5) = 214.53$