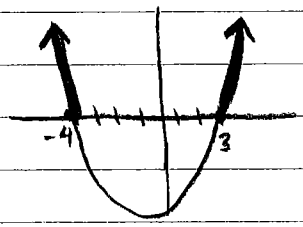
PC Math 11 5.1

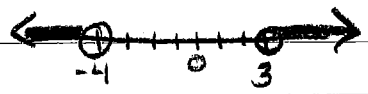
1. a.) $0 < x^2 - x - 12$

0 is less than the function

This occurs above the x-axis.

$x < -4$ and $x > 3$





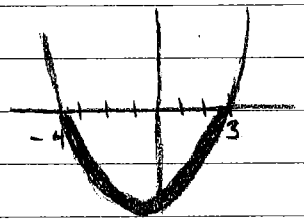
b.) $x^2 - x - 12 \leq 0$

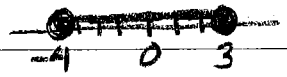
The function is less than 0

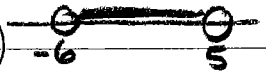
This occurs below the x-axis

Between -4 & 3

$-4 \leq x \leq 3$





2. a.) 

$x = -6 \quad x = 5$

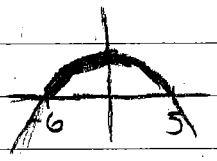
$x + 6 = 0 \quad x - 5 = 0$

$(x+6)(x-5)$

$x^2 + x - 30$

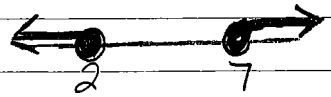
If $a > 0$, the function is btwn -6 & 5 below the x-axis

$\therefore a(x^2 + x - 30) < 0$



If $a < 0$, the function is btwn -6 & 5 above the x-axis

$\therefore 0 < -a(x^2 + x - 30)$

b.) 

$x = 2 \quad x = 7$

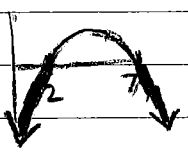
$x - 2 = 0 \quad x - 7 = 0$

$(x-2)(x-7)$

$x^2 - 9x + 14$

If $a > 0$, the function is less than 2 & greater than 7 above the x-axis

$\therefore 0 \leq a(x^2 - 9x + 14)$



If $a < 0$, the function is less than 2 & greater than 7 below the x-axis

$\therefore -a(x^2 - 9x + 14) \leq 0$

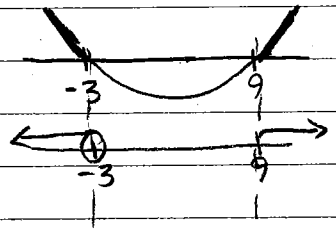
*It is a closed circle on the number line so it "equals" 2 & 7

PC II 5.1 con't... 2

3. a.) $0 < (x+3)(x-9)$

$x = -3 \quad x = 9$

Where is graph positive?

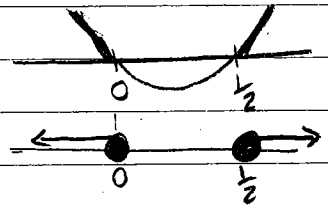


$x < -3 \qquad 9 < x$

b.) $0 \leq x(2x-1)$

$x = 0 \quad x = \frac{1}{2}$

Where is graph positive?



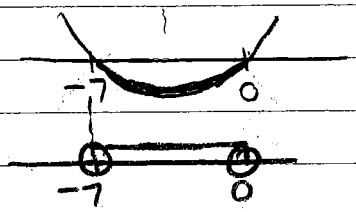
$x \leq 0 \qquad \frac{1}{2} \leq x$

c.) $x^2 + 7x < 0$

$x(x+7) = 0$

$x = 0 \quad x = -7$

Where is graph negative?



$-7 < x < 0$

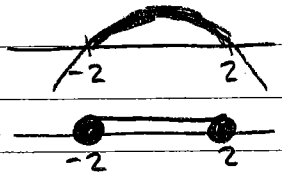
d.) $0 \leq -x^2 + 4$

$0 \leq -(x^2 - 4)$

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

$x = -2 \quad x = 2$

Where is graph positive?



$-2 \leq x \leq 2$

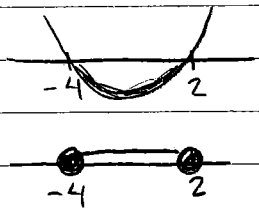
opens down since "$-x^2$"

e.) $x^2 + 6x + 8 \leq 0$

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

$x = -4 \quad x = 2$

Where is graph negative?



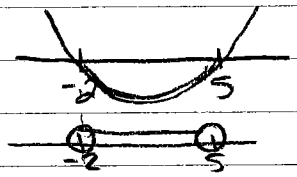
$-4 \leq x \leq 2$

PC11 5.1 con't... 3

3. f.) $x^2 - 3x - 10 < 0$

$(x-5)(x+2) = 0$

$x = 5 \quad x = -2$



Where is graph negative?

$-2 < x < 5$

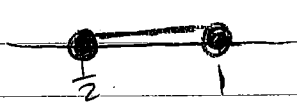
g.) $2x^2 - 3x + 1 \leq 0$

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

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

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

Where is graph negative?



$\frac{1}{2} \leq x \leq 1$

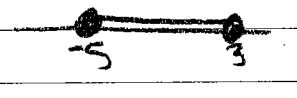
h.) $0 \leq -x^2 - 2x + 15$

$0 = -(x^2 + 2x - 15)$

$0 = -(x+5)(x-3)$

$x = -5 \quad x = 3$

Where is graph positive?



$-5 \leq x \leq 3$

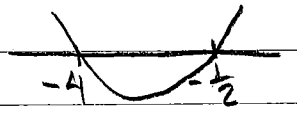
i.) $0 < 2x^2 + 9x + 4$

$0 = 2x^2 + 8x + 1x + 4$

$0 = 2x(x+4) + 1(x+4)$

$0 = (2x+1)(x+4)$

$x = -\frac{1}{2} \quad x = -4$



Where is graph positive?

$x < -4 \quad -\frac{1}{2} < x$

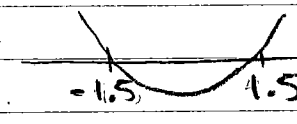
j.) $9 \leq 4x^2$

$0 \leq 4x^2 - 9$

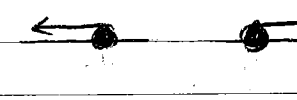
$0 = (2x+3)(2x-3)$

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

$x = -1.5 \quad x = 1.5$



Where is graph positive



$x \leq -1.5 \quad x \geq 1.5$

PC 11 5.1 con't... 4

3. k.) $4x^2 - 3 \leq -4x$

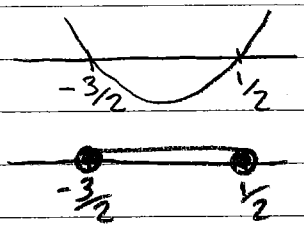
$4x^2 + 4x - 3 \leq 0$

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

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

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

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



where is graph negative?

$-\frac{3}{2} \leq x \leq \frac{1}{2}$

l.) $-2 + 2x \leq -3x^2 + 3x$

$0 \leq -3x^2 + 3x - 2x + 2$

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

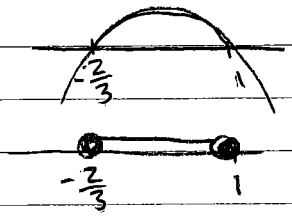
$0 = -(3x^2 - x - 2)$

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

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

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

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



where is graph positive

$-\frac{2}{3} \leq x \leq 1$

4. a.) $x^2 + 3x - 7 \leq 0$

$x^2 + 3x - 7 = 0$

$a=1 \quad b=3 \quad c=-7$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

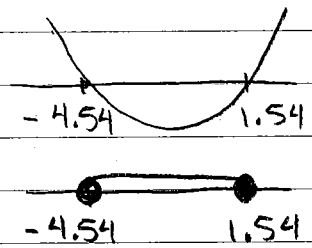
$x = \frac{-3 \pm \sqrt{3^2-4(1)(-7)}}{2(1)}$

$= \frac{-3 \pm \sqrt{9+28}}{2}$

$= \frac{-3 \pm \sqrt{37}}{2}$

$x = \frac{-3+\sqrt{37}}{2} \quad x = \frac{-3-\sqrt{37}}{2}$

$x = 1.54 \quad x = -4.54$



where is graph negative?

$-4.54 \leq x \leq 1.54$

PC11 5.1 con't... 5.

4. b.) $0 < 2x^2 - 5x + 1$

$0 = 2x^2 - 5x + 1$

$a = 2 \quad b = -5 \quad c = 1$

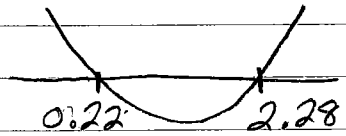
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(1)}}{2(2)}$$

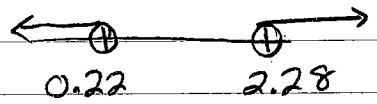
$$= \frac{5 \pm \sqrt{25 - 8}}{4}$$

$$x = \frac{5 + \sqrt{17}}{4} \qquad x = \frac{5 - \sqrt{17}}{4}$$

$x = 2.28 \qquad x = 0.219$



where is graph positive?



$x < 0.22 \qquad 2.28 < x$

c.) $-x^2 + x + 8 < 0$

$-x^2 + x + 8 = 0$

$a = -1 \quad b = 1 \quad c = 8$

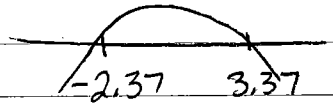
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-1 \pm \sqrt{1^2 - 4(-1)(8)}}{2(-1)}$$

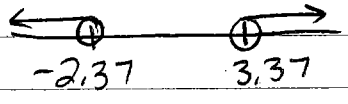
$$x = \frac{-1 \pm \sqrt{1 + 32}}{-2}$$

$$x = \frac{-1 + \sqrt{33}}{-2} \qquad x = \frac{-1 - \sqrt{33}}{-2}$$

$x = -2.37 \qquad x = 3.37$



where is graph negative?



$x < -2.37 \qquad 3.37 < x$

PC11 5.1 cont...6

5. Let $2x+1$ be an odd integer
then $2x+3$ is the next consecutive odd integer

$(2x+1)(2x+3) \leq 63$ (at most 63)

$4x^2+6x+2x+3-63 \leq 0$

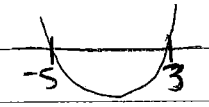
$4x^2+8x-60 \leq 0$

$\frac{4x^2+8x-60=0}{4} \quad \frac{}{4}$

$x^2+2x-15=0$

$(x+5)(x-3)=0$

$x=-5 \quad x=3$



$-5 \leq x \leq 3$

$-9 \leq \text{integer} \leq 9$

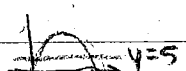
$\therefore$ One integer $= 2x+1$
$= 2(-5)+1$
$= -9$

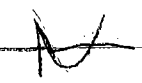
The other $= 2(x)+3$
$= 2(-5)+3$
$= -7$

or One integer $= 2x+1$
$= 2(3)+1$
$= 7$

The other $= 2(x)+3$
$= 2(3)+3$
$= 9$

6. $h = 15t-5t^2$

$5 \leq 15t-5t^2 \rightarrow$ 

$5t^2-15t+5 \leq 0 \rightarrow$ 

$\frac{5t^2-15t+5=0}{5} \quad \frac{}{5}$

$t^2-3t+1=0$

$a=1 \quad b=-3 \quad c=1$

$t = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$= \frac{-(-3) \pm \sqrt{(-3)^2-4(1)(1)}}{2(1)}$

$= \frac{3 \pm \sqrt{9-4}}{2}$

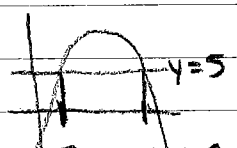
$t = \frac{3+\sqrt{5}}{2}$

$t = 2.618$

$t = \frac{3-\sqrt{5}}{2}$

$t = 0.382$

or



The grasshopper is 5m or higher from $t = 0.382$ sec to $t = 2.618$ sec or for $2.618-0.382 = 2.236$ sec

PC11 5.2

1. a.) $0 < x+y$ $A(-5,6)$ (x, y)
$0 < (-5)+(6)$
$0 < 1$ ← True.
yes.

b.) $2x-3y \leq 0$ $B(2,-1)$
$2(2)-3(-1) \leq 0$
$4+3 \leq 0$
$7 \leq 0$ False.
No.

c.) $0 \leq y+3$ $C(1,-1)$
$0 \leq -1+3$
$0 \leq 2$ True
yes.

d.) $3x+y < 7$ $D(2,-3)$
$3(2)+(-3) < 7$
$6-3 < 7$
$3 < 7$ True
yes.

e.) $2x \leq -y+1$ $E(5,-9)$
$2(5) \leq -(-9)+1$
$10 \leq 9+1$
$10 \leq 10$ True
yes.

f.) $-x+5y+1 \leq 2$ $F(-4,5)$
$-(-4)+5(5)+1 \leq 2$
$4+25+1 \leq 2$
$30 \leq 2$ False
No.

2. a.) $x+y=2$ TP(0,0)
$0+0 \; 2$
$0 \leq 2$
$\therefore x+y \leq 2$

b.) $x-y=2$ TP(0,0)
$0-0 \; 2$
$0 < 2$
$\therefore x-y > 2$ ← Since (0,0) is not in shaded region

c.) $x-y=-2$ TP(0,0)
$0-0 \; -2$
$0 > -2$
$\therefore x-y < -2$ ← Since (0,0) is not in shaded region

3. On Graph paper

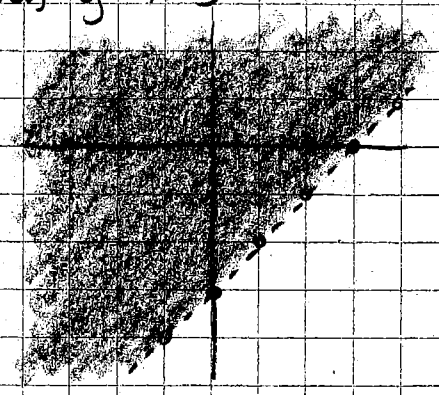
4. a) $m=-3$ $b=2$
Shaded below
$y < -3x+2$

b.) $m=\frac{2}{3}$ $b=-1$
Shaded above
$y \geq \frac{2}{3}x-1$

c.) $m=\frac{2}{5}$ $b=0$
Shaded below
$y < \frac{2}{5}x$

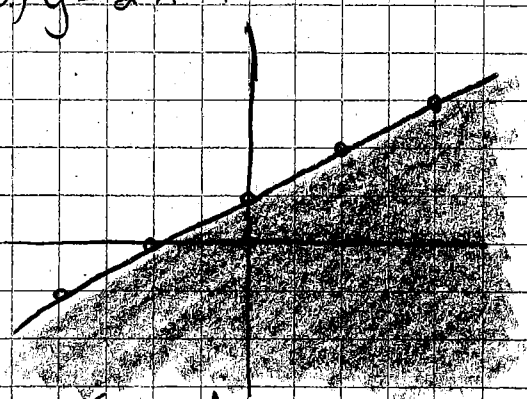
PC11 5.2 con't... 2

3a) $y > x - 3$



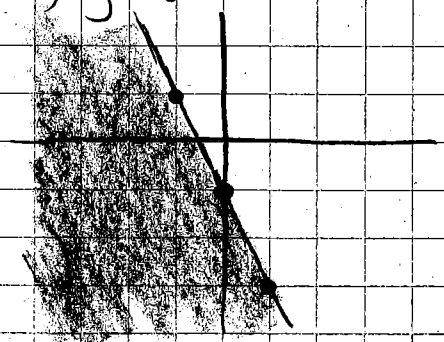
- Broken line
- Shade above

b) $y \leq \frac{1}{2}x + 1$



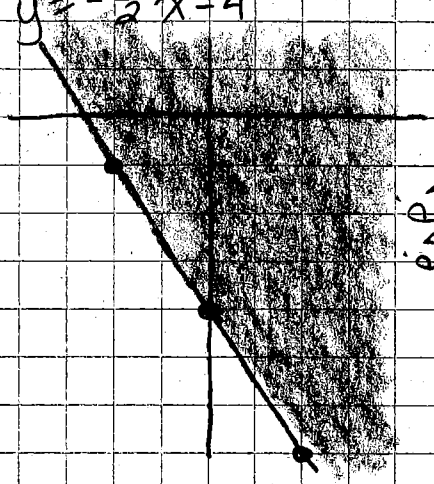
- Solid line
- Shade below

c) $y \leq -2x - 1$



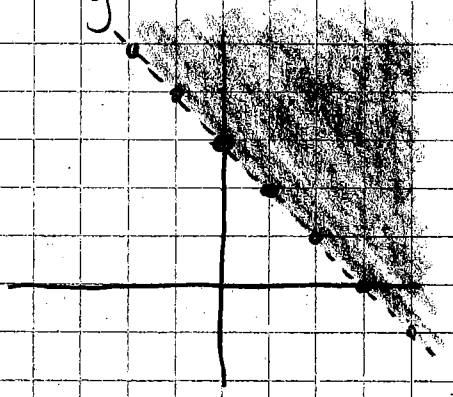
- Solid line
- Shade below

d) $y \geq -\frac{3}{2}x - 4$



- Solid line
- Shade above

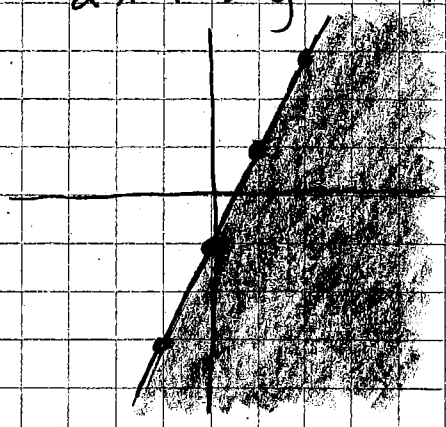
e) $x + y > 3$
$y > -x + 3$



test point (0,0)
$0 + 0 > 3$ False

- Shade above
- Broken line

f) $2x - y \geq 1$
$2x - 1 \geq y$



test point (0,0)
$2(0) - (0) \geq 1$ False

- Shade below
- Solid line

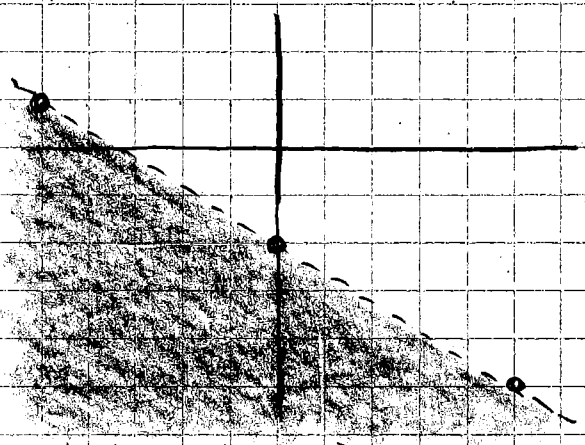
PC11 5.2 con't...3

3g) $-3x-5y>10$

$-5y>3x+10$

$\frac{-5y}{-5} < \frac{3x}{-5} + \frac{10}{-5}$

$y < -\frac{3}{5}x - 2$



test point (0,0)

$-3(0)-5(0)>10$

$0>10$ false

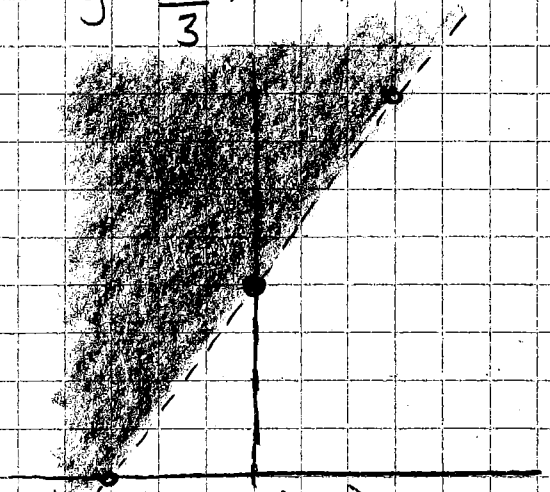
- Shade below
- Broken line

h) $4x-3y<-12$

$-3y<-4x-12$

$\frac{-3y}{-3} > \frac{-4x}{-3} - \frac{12}{-3}$

$y > \frac{4}{3}x + 4$



test point (0,0)

$4(0)-3(0)<-12$

$0<-12$ false.

- Shade above
- Broken line

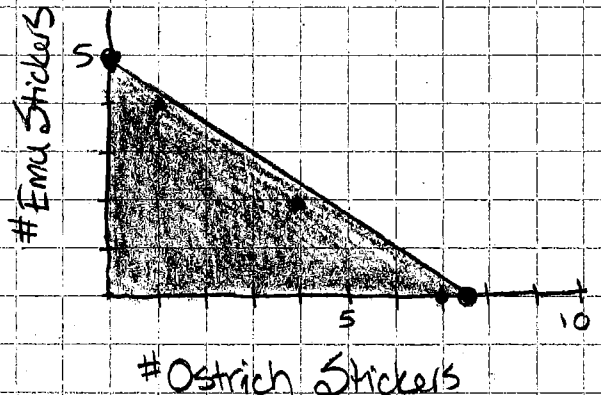
5. a) Let O = number of Ostrich stickers

E = number of Emu stickers.

$2O+3E \leq 15, \quad O \geq 0, \quad E \geq 0$

b)

O	E
0	5
7.5	0



c) Any combination in shaded region

d) $5(\$2)+3(\$3)=\$19$

No. Eli is $4 over budget

e) Any of the 3 points closest to the line in the shaded area

$1(\$2)+4(\$3)=\$14$

$4(\$2)+2(\$3)=\$14$

$7(\$2)+0(\$3)=\$14$

PC Math 11 5.3

1. a) $y < x^2 - 5$ A: $(-3, 2)$ (x, y)

$2 < (-3)^2 - 5$
$2 < 9 - 5$
$2 < 4$ True.

YES.

b.) $y \leq -3x^2 + 1$ B$(1, -2)$ (x, y)

$-2 \leq -3(1)^2 + 1$
$-2 \leq -3 + 1$
$-2 \leq -2$ True.

YES.

c) $y \geq \frac{2}{3}x^2 - 2$ C: $(3, -1)$ (x, y)

$-1 \geq \frac{2}{3}(3)^2 - 2$
$-1 \geq \frac{2}{3}(9) - 2$
$-1 \geq \frac{18}{3} - 2$
$-1 \geq 6 - 2$
$-1 \geq 4$ FALSE

NO.

d) $3y > x^2 + 3$ D: $(2, -3)$ (x, y)

$3(-3) > (2)^2 + 3$
$-9 > 4 + 3$
$-9 > 7$ FALSE

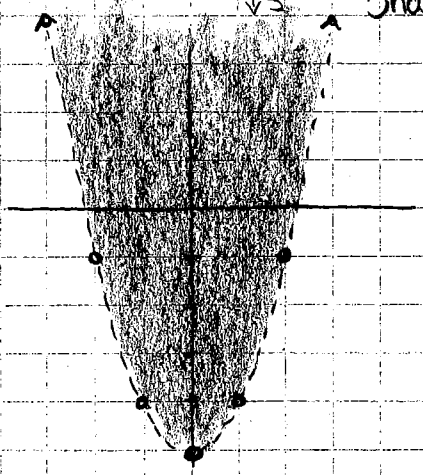
NO.

2. a) Shading is below curve (less than) & drawn with a solid line (so equal to) $\rightarrow$ $y \leq (x+3)^2 - 4$

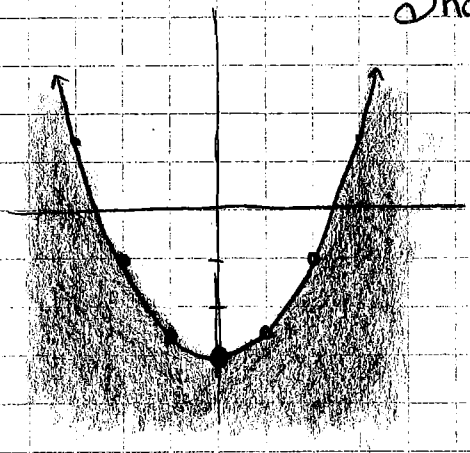
b) Shading is above curve (greater than) & drawn with a broken line (so not equal to) $\rightarrow$ $y > \frac{1}{2}(x+1)^2 + 1$

c) Shading is below curve (less than) & drawn with a broken line (so not equal to) $\rightarrow$ $y < -2x^2 + 5$

3. a) $y > x^2 - 5$ Broken line, Shade above

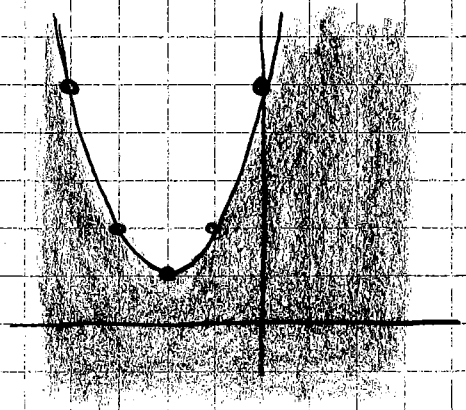


b.) $y \leq \frac{1}{2}x^2 - 3$ Solid line, Shade below

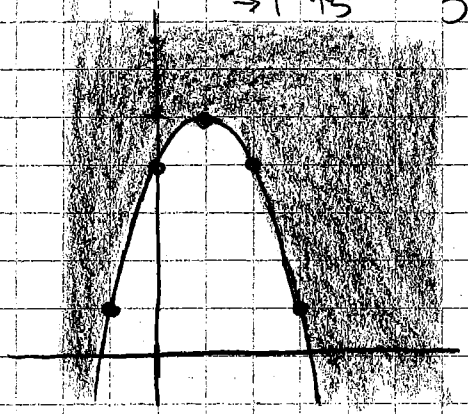


PC 11 5.3 con't...2

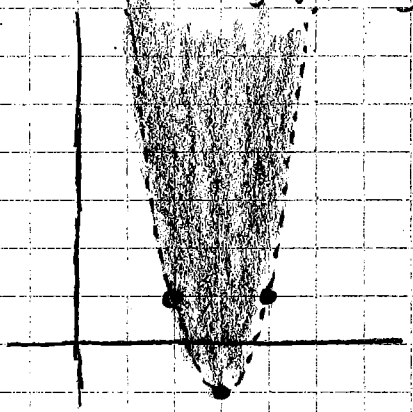
3. c) $y \leq (x+2)^2 + 1$ Solid line
$\leftarrow 2 \quad \uparrow 1$ Shade below



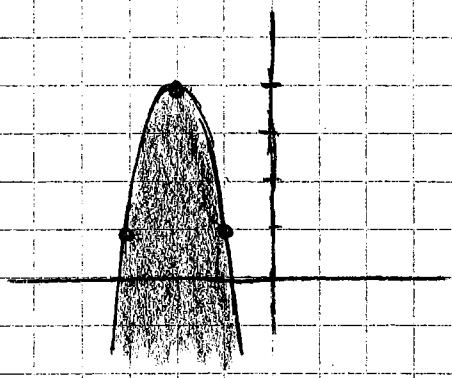
d) $y \geq -(x-1)^2 + 5$ Solid line
$\rightarrow 1 \quad \uparrow 5$ Shade above



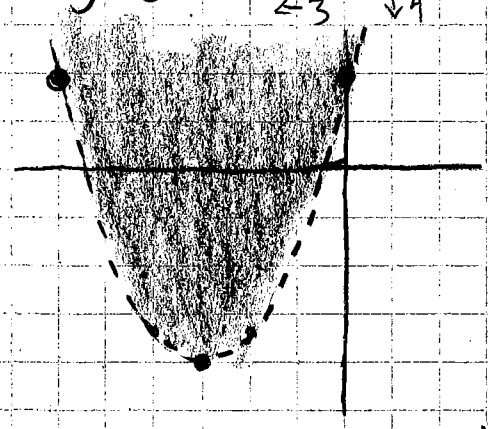
e) $y > 2(x-3)^2 - 1$ Broken line
$\rightarrow 3 \quad \downarrow 1$ Shade above



f) $y \leq -3(x+2)^2 + 4$ Solid line
$\leftarrow 2 \quad \uparrow 4$ Shade below



g) $y > \frac{2}{3}(x+3)^2 - 4$ Broken line
$\leftarrow 3 \quad \downarrow 4$ Shade above



note:

x	x^2	$\frac{2}{3}x^2$
0	0	0
1	1	$\frac{2}{3}$
2	4	$\frac{8}{3}$
3	9	6

↑ key point
"over 3, up 6"

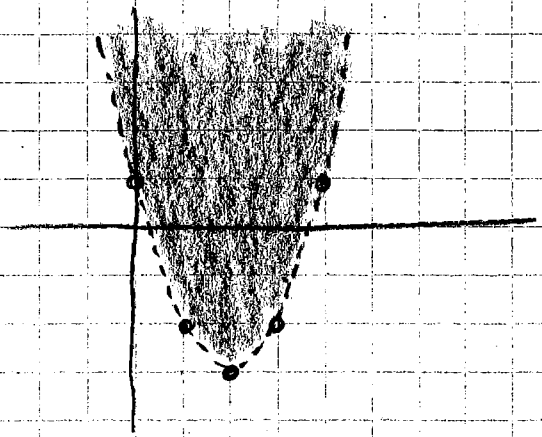
h) $y > x^2 - 4x + 1$

$\frac{1}{2}(4) = 2$
$\downarrow 2^2 = 4$

$y > (x^2 - 4x + 4 - 4) + 1$

$y > (x^2 - 4x + 4) - 4 + 1$

$y > (x-2)^2 - 3$ Broken line
$\rightarrow 2 \quad \downarrow 3$ Shade above



PC 11 5.3 con't... 3

3. i) $y \leq -2x^2 - 4x + 1$

$y \leq -2(x^2 + 2x) + 1$ $\quad \frac{1}{2}(2) = 1$

$y \leq -2(x^2 + 2x + 1 - 1) + 1$ $\quad \hookrightarrow 1^2 = 1$

$y \leq -2(x^2 + 2x + 1) + 2 + 1$

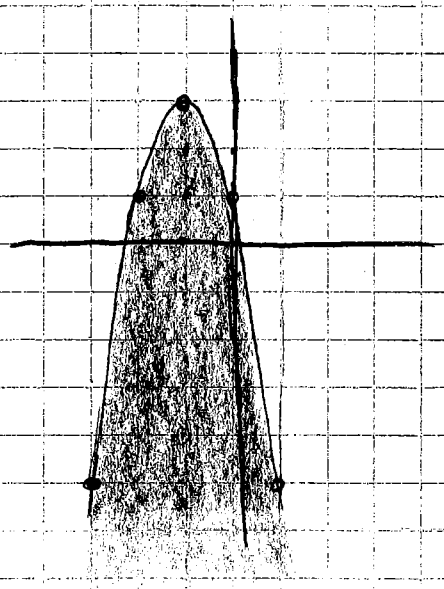
$y \leq -2(x+1)^2 + 3$

$\leftarrow 1 \quad \uparrow 3$

- Solid line
- Shade below

1, 3, 5

-2, -6, -10



4. a) Equation $y = (x-2)^2 + 1$

Shaded below → less than

Broken line → not equal to

$y < (x-2)^2 + 1$

b) Equation $y = \frac{1}{2}(x+3)^2 - 3$

Shaded above → greater than

Solid line → equal to.

$y \geq \frac{1}{2}(x+3)^2 - 3$

c) Equation $y = a(x+1)^2 + 5$

What is the value of a?

Take point $(2, -1)$ + substitute to solve for "a".

$-1 = a(2+1)^2 + 5$

$-1 = a(3)^2 + 5$

$-5 \qquad -5$

$-6 = a(9)$

$\frac{-6}{9} = -\frac{2}{3} = a$

Shaded below → less than

Broken line → not equal to

$y < +\frac{2}{3}(x+1)^2 + 5$

So,

$y = -\frac{2}{3}(x+1)^2 + 5$

5.) $y \leq -3x^2 + 8 \qquad A(\underset{x}{2}, \underset{y}{a})$

$a \leq -3(2)^2 + 8$

$a \leq -3(4) + 8$

$a \leq -12 + 8$

$a \leq -4$

6.) $y > 2x^2 - 7 \qquad B(\underset{x}{b}, \underset{y}{5})$

$5 > 2b^2 - 7$

$+7 \qquad +7$

$\frac{12}{2} > \frac{2b^2}{2}$

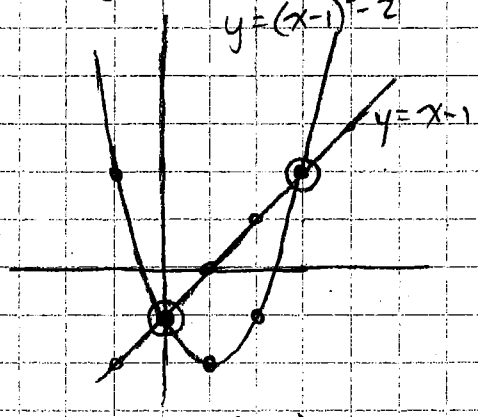
$6 > b^2$

$\pm\sqrt{6} > |b| \qquad -\sqrt{6} < b < \sqrt{6}$

7.) $5x^2 \leq y + 7$

PC Math II 5.5

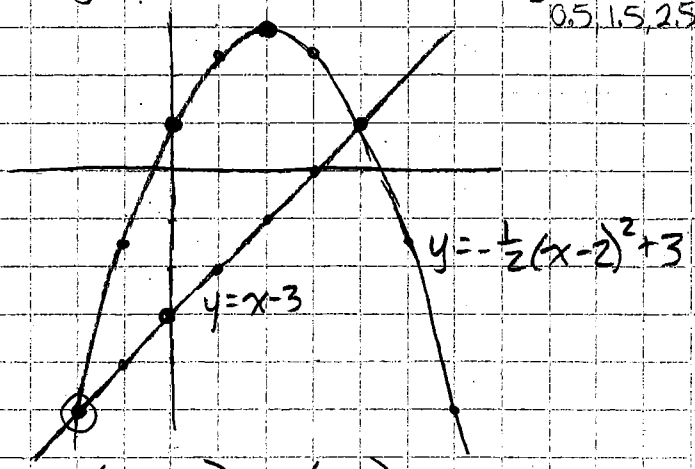
1.a) $y = (x-1)^2 - 2$
$y = x - 1$



$(0,-1)$ & $(3,2)$

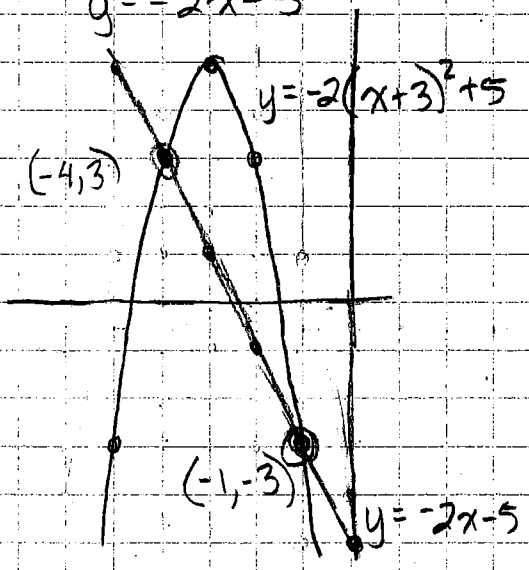
b.) $y = -\frac{1}{2}(x-2)^2 + 3$
$y = x - 3$

"Steps"
$x+\frac{1}{2}$: 1, 3, 5, 7
0.5, 1.5, 2.5, 3.5

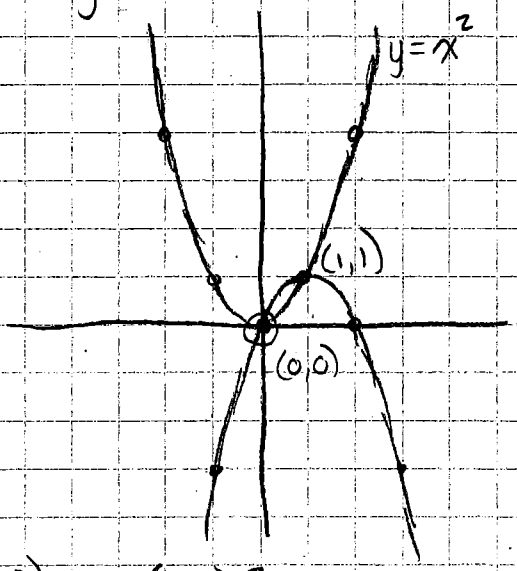


$(-2,-5)$ & $(4,1)$

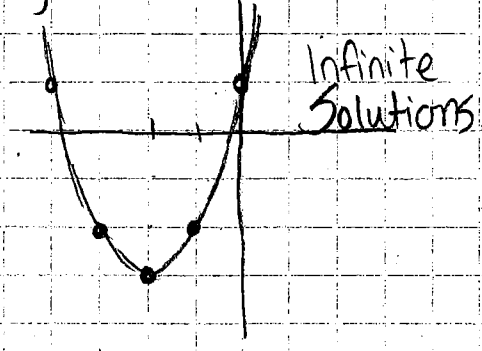
c.) $y = -2(x+3)^2 + 5$
$y = -2x - 5$



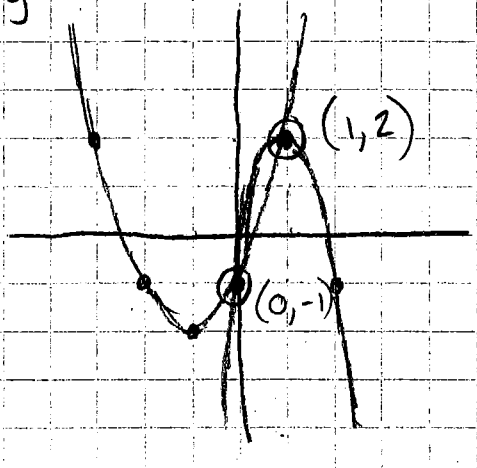
d.) $y = x^2$
$y = -(x-1)^2 + 1$



e.) $y = (x+2)^2 - 3$
$y = x^2 + 4x + 1$
$= (x^2 + 4x + 4 - 4) + 1$
$y = (x+2)^2 - 3$



f.) $y = (x+1)^2 - 2$
$y = -3(x-1)^2 + 2$



PC11 1.5.5 con't...2

2. a) (3,5)

$y = x^2 - 4$ | $y = 2x - 1$

$(5) = (3)^2 - 4$ | $5 = 2(3) - 1$

$5 = 9 - 4$ | $5 = 6 - 1$

$5 = 5$ ✓ | $5 = 5$ ✓

Yes. It is a solution

b) (-2,2)

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

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

$2 = (-1)^2 + 1$ | $-4 - 2 = -2$

$2 = 2$ ✓ | $-6 = -2$ ✗

No. It is not a solution

c) (3,-6)

$y = -2x^2 + 12$ | $y = (x-2)^2 - 7$

$-6 = -2(3)^2 + 12$ | $-6 = (3-2)^2 - 7$

$-6 = -2(9) + 12$ | $-6 = (1)^2 - 7$

$-6 = -18 + 12$ | $-6 = -6$ ✓

$-6 = -6$ ✓

Yes. It is a solution.

3 a) $y = x^2 + 2x - 1$ | $x = -2$ | $x = 1$

$y = x + 1$ | $y = x + 1$ | $y = x + 1$

$y = -2 + 1$ | $y = 1 + 1$

$y = -1$ | $y = 2$

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

$-x - 1 \quad -x - 1$

$0 = x^2 + x - 2$ | $(-2, -1)$ | $(1, 2)$

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

$x = -2 \quad x = 1$

b) $y = -x^2 - 2x + 2$ | $x = 0$ | $x = 1$

$y = -3x + 2$ | $y = -3x + 2$ | $y = -3x + 2$

$y = -3(0) + 2$ | $y = -3(1) + 2$

$y = 2$ | $= -3 + 2$

$y = -1$

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

$+3x - 2 \quad +3x - 2$

$0 = -x^2 + x$ | $(0, 2)$ | $(1, -1)$

$0 = -x(x - 1)$

$x = 0 \quad x = 1$

PC 11 5.5 con't... 3

3. c) $y = (x-2)^2 + 1$
$y = 2x - 4$

$(x-2)^2 + 1 = 2x - 4$
$(x-2)(x-2) + 1 = 2x - 4$
$x^2 - 2x - 2x + 4 + 1 - 2x + 4 = 0$
$x^2 - 6x + 9 = 0$
$(x-3)(x-3) = 0$
$x = 3$

$x = 3$
$y = 2x - 4$
$y = 2(3) - 4$
$= 6 - 4$
$y = 2$
$(3, 2)$

d) $y = x^2 - 2x$
$y = -2x^2 + 4x$

$x^2 - 2x = -2x^2 + 4x$
$x^2 - 2x + 2x^2 - 4x = 0$
$3x^2 - 6x = 0$
$3x(x-2) = 0$
$x = 0 \quad x = 2$

$x = 0$
$y = x^2 - 2x$
$y = (0)^2 - 2(0)$
$y = 0$
$(0, 0)$

$x = 2$
$y = x^2 - 2x$
$y = (2)^2 - 2(2)$
$= 4 - 4$
$y = 0$
$(2, 0)$

e) $y = x^2 + 4x + 5$
$y = -(x+2)^2 + 1$

$x^2 + 4x + 5 = -(x+2)^2 + 1$
$x^2 + 4x + 5 = -(x+2)(x+2) + 1$
$x^2 + 4x + 5 = -(x^2 + 4x + 4) + 1$
$x^2 + 4x + 5 = -x^2 - 4x - 4 + 1$
$x^2 + 4x + 5 + x^2 + 4x + 4 - 1 = 0$
$\frac{2x^2 + 8x + 8}{2} = \frac{0}{2}$
$x^2 + 4x + 4 = 0$
$(x+2)(x+2) = 0$
$x = -2$

$x = -2$
$y = -(x+2)^2 + 1$
$y = -(-2+2)^2 + 1$
$y = -(0)^2 + 1$
$y = 1$
$(-2, 1)$

PC11 5.5 con't... 4

3 f) $y = x^2 + 6x + 6$
$y = -\frac{1}{2}x^2 + 6$

$x^2 + 6x + 6 = -\frac{1}{2}x^2 + 6$
$2(x^2 + 6x + 6) = 2(-\frac{1}{2}x^2 + 6)$
$2x^2 + 12x + 12 = -1x^2 + 12$
$+x^2 \quad -12 \quad +x^2 \quad -12$
$3x^2 + 12x = 0$
$3x(x + 4) = 0$
$x = 0 \quad x = -4$

$x = 0$
$y = -\frac{1}{2}x^2 + 6$
$= -\frac{1}{2}(0)^2 + 6$
$y = 6$
$(0, 6)$

$x = -4$
$y = -\frac{1}{2}(-4)^2 + 6$
$= -\frac{1}{2}(16) + 6$
$= -8 + 6$
$= -2$
$(-4, -2)$

g) $y - 9 = x^2 - 6x$
$y = (x-3)^2$

$(x-3)^2 - 9 = x^2 - 6x$
$(x-3)(x-3) - 9 = x^2 - 6x$
$x^2 - 6x + 9 - 9 - x^2 + 6x = 0$
$0 = 0$ Hmmm... always!

} Infinitely many solutions.

h) $y = x^2 - 2x - 1$
$y = -(x-2)^2 + 11$

$x^2 - 2x - 1 = -(x-2)^2 + 11$
$x^2 - 2x - 1 = -(x-2)(x-2) + 11$
$x^2 - 2x - 1 = -(x^2 - 2x - 2x + 4) + 11$
$x^2 - 2x - 1 + x^2 - 2x - 2x + 4 - 11 = 0$
$\frac{2x^2 - 6x - 8}{2} = \frac{0}{2}$

$x^2 - 3x - 4 = 0$
$(x-4)(x+1) = 0$
$x = 4 \quad x = -1$

$y = x^2 - 2x - 1$
$y = (4)^2 - 2(4) - 1$
$= 16 - 8 - 1$
$= 7$
$(4, 7)$

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

i) $y = 4x^2 - 8x + 3$
$y = -4(x-2)^2 + 3$

$4x^2 - 8x + 3 = -4(x-2)^2 + 3$
$4x^2 - 8x + 3 + 4(x-2)(x-2) - 3 = 0$
$4x^2 - 8x + 3 + 4(x^2 - 4x + 4) - 3 = 0$
$4x^2 - 8x + 3 + 4x^2 - 16x + 16 - 3 = 0$
$\frac{8x^2 - 24x + 16}{8} = \frac{0}{8}$

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

$y = 4x^2 - 8x + 3$
$= 4(2)^2 - 8(2) + 3$
$= 4(4) - 16 + 3$
$= 16 - 16 + 3 = 3$
$(2, 3)$

$y = 4(x)^2 - 8x + 3$
$= 4(1)^2 - 8(1) + 3$
$= 4 - 8 + 3$
$= -1$
$(1, -1)$