Assign 14

New

1. Wallbanger: 8 hrs lathe, 2 hrs finish, profit $17.
Dingbat: 5 hrs lathe, 5 hrs finish, profit $29
total lathe: 80 hrs. total finish: 50 hrs
How many of each bat should be produced to have max profit? What is max profit?

x = wall banger — $x \geq 0$

y = Dingbat $y \geq 0$

Lathe: $8x + 5y \leq 80 \rightarrow y \leq \frac{(80-8x)}{5}$

finish: $2x + 5y \leq 50 \rightarrow y \leq \frac{(50-2x)}{5}$

$f(x,y) = 17x + 29y$

$8x + 5y \leq 80$ { $2x + 5y \leq 50$

x-int: $(10, 0)$ { x-int: $(25, 0)$ — x-max: 30, x-min: 0, xscl: 5

$8x = 80$

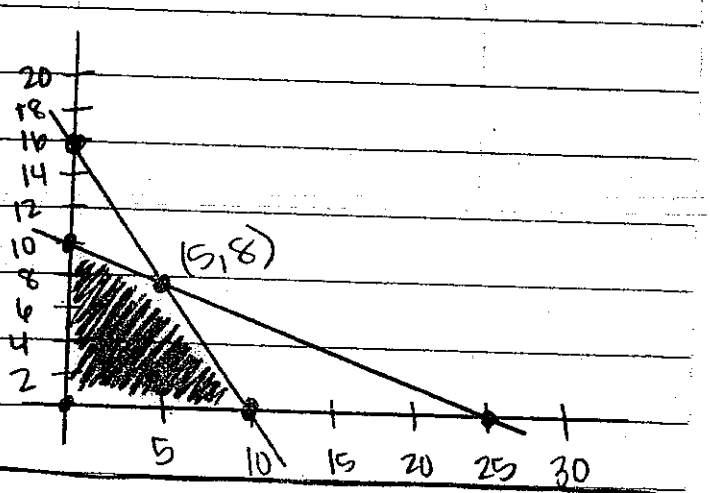
$2x = 50$, $x = 25$

y-int: $(0, 16)$ { y-int: $(0, 10)$ — y-max: 20, y-min: 0, yscl: 2

$5y = 80$, $y = 16$

$5y = 50$, $y = 10$

(x,y)	$17x + 29y$	$f(x,y) =$
$(0,0)$	$17(0)+29(0) = 0$	$f(0,0) = 0$
$(0,10)$	$17(0)+29(10) = 290$	$f(0,10) = 290$
$(5,8)$	$17(5)+29(8) = 317$	$f(5,8) = 317$
$(10,0)$	$17(10)+29(0) = 170$	$f(10,0) = 170$



The max profit is $317.

They should make 5 wallbangers and 8 Dingbats to get max profit.

Assign 14 cont

2. Gentle Rose: 2 oz, cost $3, profit $4.
Rich Gardenia: 1.5 oz, cost $6, profit $5
- equipment can make up to 3000 oz
- can't afford to spend more than $9000

How many bottles should be made for max profit & what is max profit?

X = Gentle Rose bottles
y = Rich Gardenia bottles

$f(x,y) = 4x+5y$
$x \geq 0$
$y \geq 0$

$2x + 1.5y \leq 3000$

x-int: (1500, 0)
$2x = 3000$
$x = 1500$

y-int: (0, 2000)
$1.5y = 3000$
$y = 2000$

$y \leq \frac{(3000 - 2x)}{1.5}$

$3x + 6y \leq 9000$

x-int: (3000, 0)
$3x = 9000$
$x = 3000$

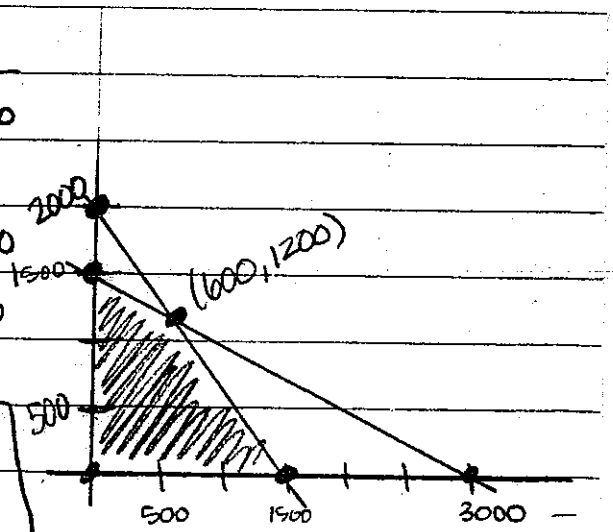
y-int: (0, 1500)
$6y = 9000$
$y = 1500$

$y \leq \frac{(9000 - 3x)}{6}$

x min: 0
x max: 3000
x scl: 500

y min: 0
y max: 2000
y scl: 500

(x,y)	4x + 5y	f(x,y) =
(0,1500)	4(0) + 5(1500) = 7500	f(0,1500) = 7500
(0,0)	4(0) + 5(0) = 0	f(0,0) = 0
(1500,0)	4(1500) + 5(0) = 6000	f(1500,0) = 6000
(600,1200)	4(600) + 5(1200) = 8400	f(600,1200) = 8400



The herb shop should make 600 bottles of Gentle Rose and 1200 bottles of Rich Gardenia to make a max profit of $8400.

Assign 14
cont

3. Machine 1: costs $2 per hour, 240 bolts, 100 nuts
Machine 2: costs $2.40, 160 bolts, 160 nuts
run no more than 30 hrs.
produce at least 2080 bolts; produce at least 1520 nuts
* min operation cost?

$f(x,y) = 2x + 2.40y$

$240x + 160y \geq 2080$

$100x + 160y \geq 1520$

$x + y \leq 30$

x = hrs Machine 1

y = hrs Machine 2

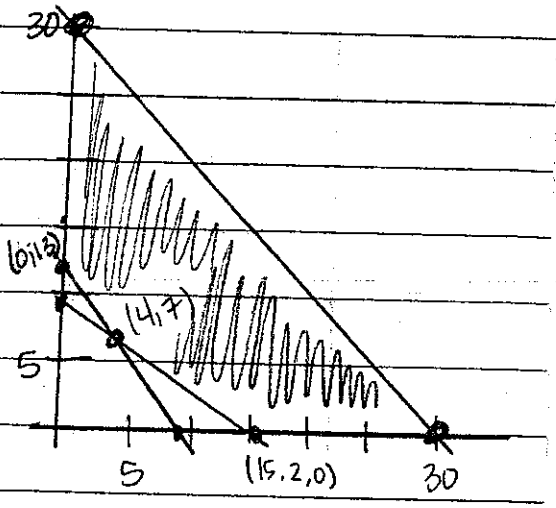
$x \geq 0 \quad y \geq 0$

$240x + 160y \geq 2080$
x-int: $(8\frac{2}{3}, 0)$
y-int: $(0, 13)$
$y \geq \frac{(2080 - 240x)}{160}$

$100x + 160y \geq 1520$
x-int: $(15.2, 0)$
y-int: $(0, 9.5)$
$y \geq \frac{(1520 - 100x)}{160}$

$x + y \leq 30$
x-int: $(30, 0)$
y-int: $(0, 30)$
$y \leq 30 - x$

(x,y)	$2x + 2.40y$	$f(x,y) =$
$(0,13)$	$2(0) + 2.4(13) = 31.2$	$f(0,13) = 31.2$
$(4,7)$	$2(4) + 2.4(7) = 24.8$	$f(4,7) = 24.8$
$(15.2,0)$	$2(15.2) + 2.4(0) = 30.4$	$f(15.2,0) = 30.4$
$(30,0)$	$2(30) + 2.4(0) = 60$	$f(30,0) = 60$
$(0,30)$	$2(0) + 2.4(30) = 72$	$f(0,30) = 72$



The minimum cost is $24.80.
Machine 1 should be run for 4 hrs
and Machine 2 should be run for 7 hrs.

Assign 14 Cont

4. at least 40 lbs of food = no more than 100 lbs
at least 20 units Nutrient A
at least 30 units Nutrient B

Least cost & how much of each type of food?

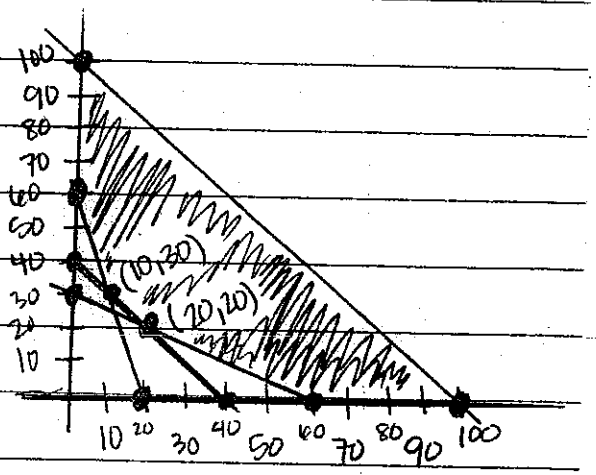
x = Food type x (lbs) $x \geq 0$
y = Food type y (lbs) $y \geq 0$

$f(x,y) = .8x + .4y$

$x + y \leq 100 \rightarrow y \leq 100 - x$ x-int: (100,0) y-int: (0,100)
$x + y \geq 40 \rightarrow y \geq 40 - x$ x-int: (40,0) y-int: (0,40)
$1x + \frac{1}{3}y \geq 20 \rightarrow y \geq \frac{20 - x}{(\frac{1}{3})}$ x-int: (20,0) y-int: (0,60)
$\frac{1}{2}x + 1y \geq 30 \rightarrow y \geq 30 - \frac{1}{2}x$ x-int: (60,0) y-int: (0,30)

x-min: 0 ymin: 0
x-max: 100 ymax: 100
xscl: 10 yscl: 10

(x,y)	.8x + .4y	f(x,y) =
(0,100)	.8(0) + .4(100) = 40	f(0,100) = 40
(0,60)	.8(0) + .4(60) = 24	f(0,60) = 24
(10,30)	.8(10) + .4(30) = 20	f(10,30) = 20
(20,20)	.8(20) + .4(20) = 24	f(20,20) = 24
(60,0)	.8(60) + .4(0) = 48	f(60,0) = 48
(100,0)	.8(100) + .4(0) = 80	f(100,0) = 80



The least cost is $ 20
using 10 lbs of food x and
30 lbs of food type y.

Review packet

Assign 14 cont

5. $2-3x \geq 7(8-2x)+12$

$2-3x \geq 56-14x+12$

$2-3x \geq -14x+68$

$+14x \quad +14x \quad -2$

$\frac{11x}{11} \geq \frac{66}{11}$

$\boxed{x \geq 6}$

6. $|6-5y| \leq 1$

$6-5y \leq 1$ and $6-5y \geq -1$

$-6 \quad -6 \qquad -6 \quad -6$

$-5y \leq -5 \qquad -5y \geq -7$

$\frac{-5y}{-5} \leq \frac{-5}{-5} \qquad \frac{-5y}{-5} \leq \frac{-7}{-5}$

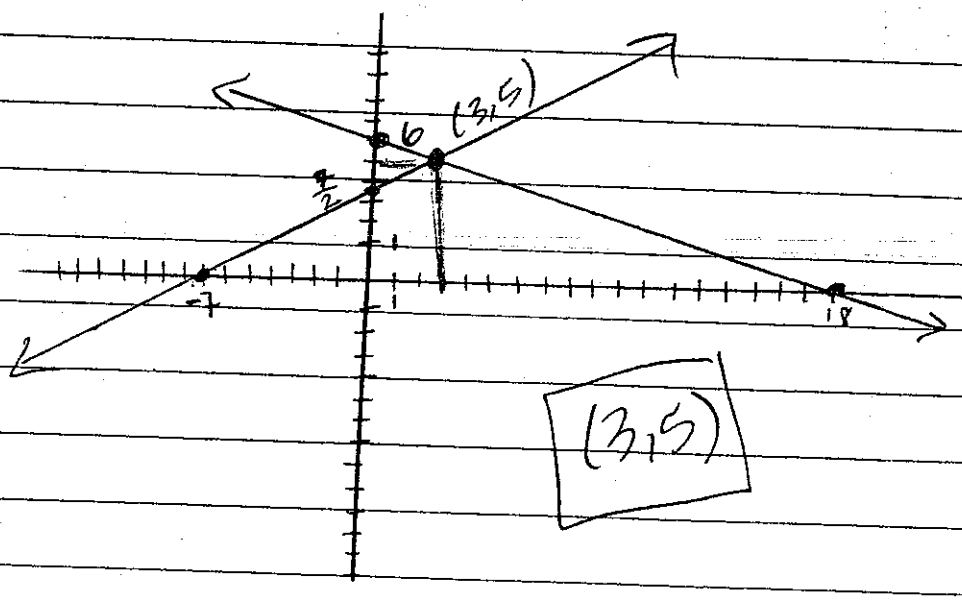
$y \geq 1 \qquad y \leq \frac{7}{5}$

$\boxed{1 \leq y \leq \frac{7}{5}}$

7. Solve by graphing

$x+3y=18$ x-int: $(18,0)$ y-int: $(0,6)$

$-x+2y=7$ x-int: $(-7,0)$ y-int: $(0,\frac{7}{2})$



$\boxed{(3,5)}$

Assign 14 cont

Solve by graphing on Calc

8. $.3x + 1.6y = 0.44 \rightarrow y = \frac{.44 - .3x}{1.6}$

$.4x + 2.5y = 0.66 \rightarrow y = \frac{.66 - .4x}{2.5}$

$(.4, .2)$

9. $\frac{2}{3}x - \frac{5}{3}y = -\frac{1}{3} \rightarrow y = \frac{-\frac{1}{3} - \frac{2}{3}x}{-5/3}$

$\frac{5}{8}x + \frac{7}{6}y = 1 \rightarrow y = \frac{1 - \frac{5}{8}x}{7/6}$

$(.75, .5)$

10. Your uncle comes in & tells you he has 26 coins in his pocket. All are dollars and quarters. If he has $17 in his pocket, how many of each coin does he have?

x = # of dollars

y = # of quarters

$x + y = 26 \rightarrow x = 26 - y$

$1x + .25y = 17$

$(26 - y) + .25y = 17$

$26 - .75y = 17$

$-26 \quad -26$

$\frac{-.75y}{-.75} = \frac{-9}{-.75}$

$y = 12$

$x = 26 - 12$

$x = 14$

Your uncle has 14 dollar coins and 12 quarters.

BOOK

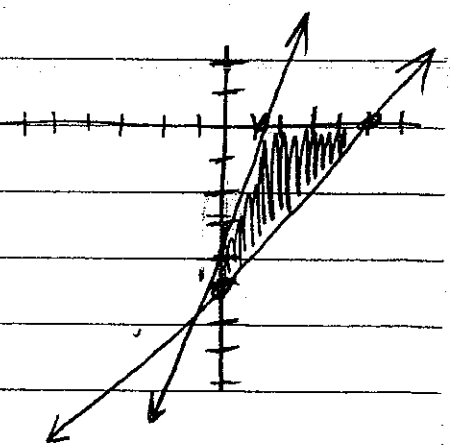
Pg 113: 28, 40 (no calc)

28. Graph all points in the 4th quadrant bounded by two axes and lines

$3x - y = 4$ and $x - y = 5$

x-int: $(\frac{4}{3}, 0)$ x-int: $(5, 0)$

y-int: $(0, -4)$ y-int: $(0, -5)$



Assign 14 cont

pg 113

40. Write an equation in slope-intercept form for the line w/ slope $\frac{2}{3}$ that passes through $(6, -5)$.

$y = \frac{2}{3}x + b$

$-5 = \frac{2}{3}(6) + b$

$-5 = 4 + b$

$-4 \quad -4$

$-9 = b$

$\boxed{y = \frac{2}{3}x - 9}$

Pg 137: 18, 24, 30, 38, 44 (calc ok on 44 only)

18. Solve w/ sub.

$n = 3m + 7$ $\qquad 4m + 9(3m+7) = 1$

$4m + 9n = 1$ $\qquad 4m + 27m + 63 = 1$

$-63 \quad -63$

$\frac{31m}{31} = \frac{-62}{31}$

$m = -2$

$n = 3(-2) + 7$

$n = -6 + 7$

$n = 1$

$\boxed{(-2, 1)}$

Solve w/ elimination

24. $5c - 6d = -27$

$(7c + 3d = -15)2 \rightarrow 14c + 6d = -30$

$\frac{19c}{19} = \frac{-57}{19}$

$c = -3$

$5(-3) - 6d = -27$

$-15 - 6d = -27$

$+15 \quad +15$

$-6d = -12$

$d = 2$

$\boxed{(-3, 2)}$

30. $(3u + 5v = -12)3 \rightarrow 9u + 15v = -36$

$(2u - 3v = -8)5 \rightarrow 10u - 15v = -40$

$\frac{19u}{19} = \frac{-76}{19}$

$u = -4$

$3(-4) + 5v = -12$

$-12 + 5v = -12$

$+12 \quad +12$

$5v = 0$

$v = 0$

$\boxed{(-4, 0)}$

Assign 14 cont

Pg 137

38. $4m+9n=3$
$(8m-3n=-8)3 \rightarrow$

$4m+9n=3$
$24m-9n=-24$

$\frac{28m}{28} = \frac{-21}{28}$

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

$4\left(-\frac{3}{4}\right)+9n=3$
$-3+9n=3$
$+3 \quad +3$

$\frac{9n}{9}=\frac{6}{9}$

$n=\frac{2}{3}$

$\left(-\frac{3}{4}, \frac{2}{3}\right)$

44. X = Tweedledum → $y+2x=361$
Y = Tweedledee → $x+2y=362$

$x+2(361-2x)=362$
$x+722-4x=362$
$-3x+722=362$
$\frac{-3x}{-3}=\frac{-360}{-3}$
$x=120$

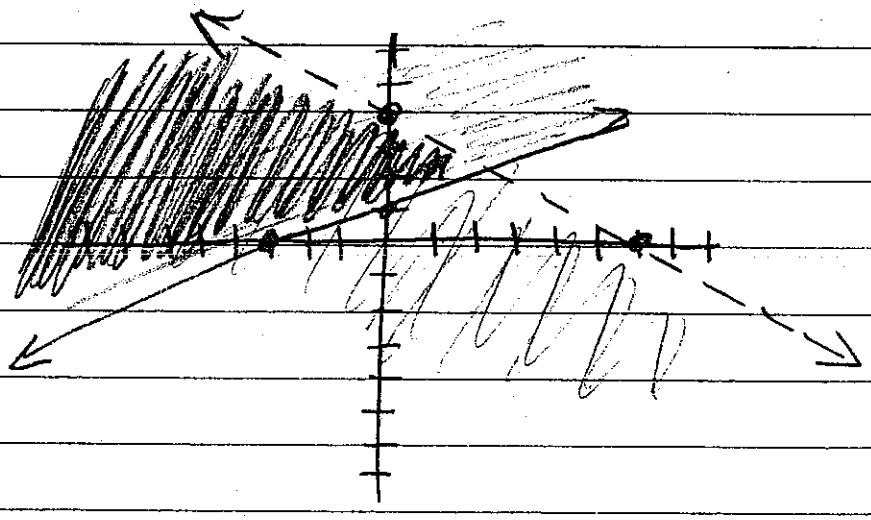
$y=361-2x$
$y=361-2(120)$
$y=361-240$
$y=121$

(120, 121)

Tweedledum is 120 lbs and Tweedledee is 121 lbs.

Pg 150: 10, 27 (no calc) - Solve by graphing

10. $x-3y \leq -3$ → x-int: $(-3,0)$ y-int: $(0,1)$ Test (0,0): $0 \leq -3$ X
$2x+3y<12$ → x-int: $(6,0)$ y-int: $(0,4)$ Test (0,0): $0<12$ ✓



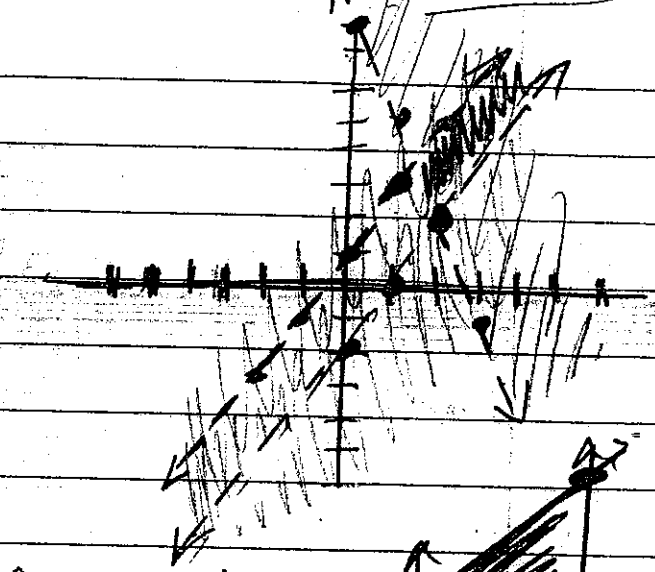
Assign 14 cont

Pg 150

27. $y < 2x + 1$ Test (0,0) $0 < 1$ ✓

$y > 2x - 2$ Test (0,0) $0 > -2$ ✓

$y > 8 - 3x$ Test (0,0) $0 > 8$ ×

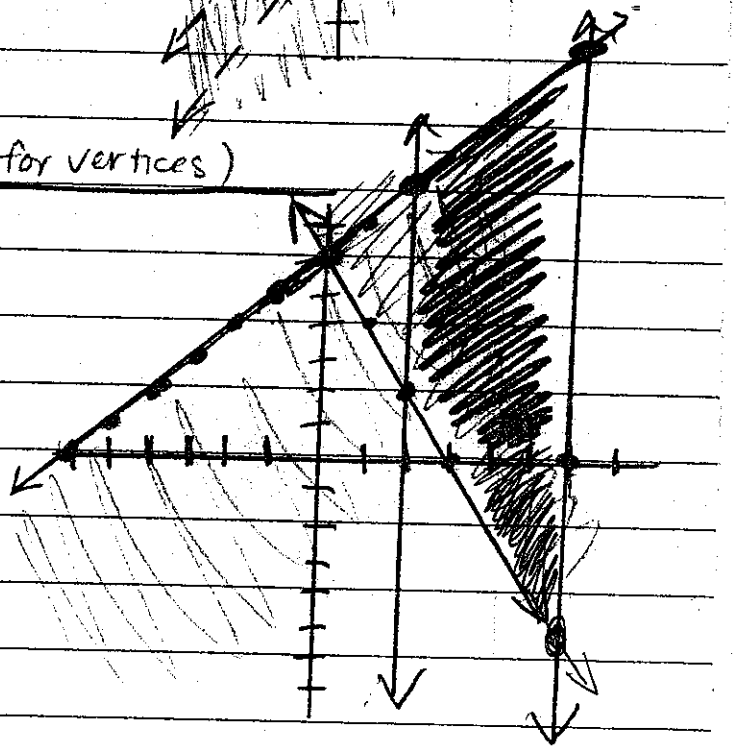


Pg 157: 18, 20 (Calc for vertices)

18. $y \leq x + 6$ Test (0,0) $0 < 6$ ✓

$y \geq -2x + 6$ Test (0,0) $0 \geq 6$ ×

$2 \leq x \leq 6$



$f(x,y) = -x + 3y$

(x,y)	$-x+3y$	$f(x,y) =$
~~$(3,0)$~~	~~$(3)+3(0)=3$~~	~~$f(3,0)=3$~~
$(6,0)$	$-(6)+3(0)=-6$	$f(6,0)=-6$
$(6,12)$	$-(6)+3(12)=30$	$f(6,12)=30$
$(2,8)$	$-(2)+3(8)=22$	$f(2,8)=22$
$(2,2)$	$-(2)+3(2)=4$	$f(2,2)=4$
$(6,-6)$	$-(6)+3(-6)=$	$f(6,-6)=-24$

The max is 30 at (6,12).

The min is ~~-6 at (6,0)~~.

-24 at (6,-6)

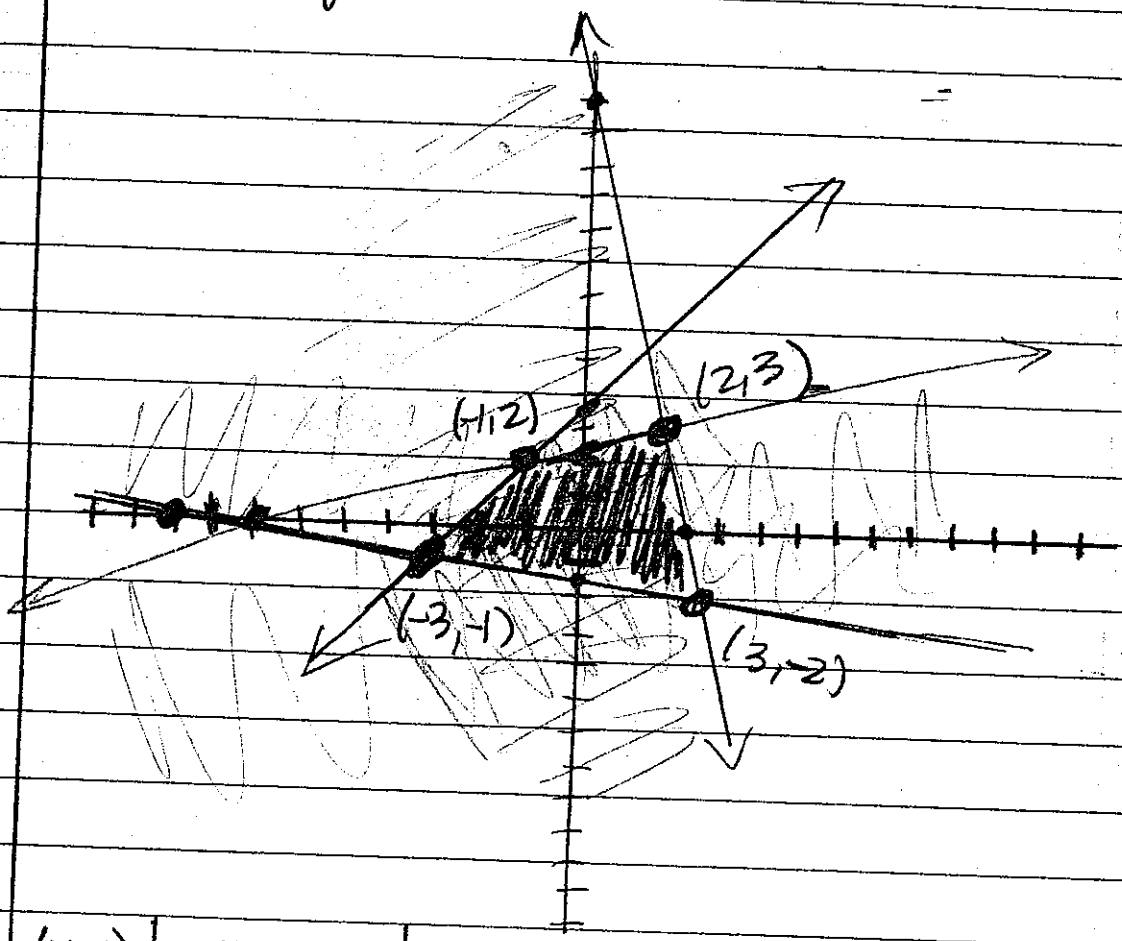
Assign 14 cont

Pg 157

20.

$x-3y \leq -7$	x-int: $(-7,0)$	y-int: $(0, \frac{7}{3})$	$y \leq \frac{1}{3}x + \frac{7}{3}$
$5x+y \leq 13$	x-int: $(\frac{13}{5},0)$	y-int: $(0,13)$	$y \leq -5x+13$
$x+6y \geq -9$	x-int: $(-9,0)$	y-int: $(0,-\frac{3}{2})$	$y \geq \frac{-1}{6}x - \frac{3}{2}$
$3x-2y \geq -7$	y-int: $(-\frac{7}{3},0)$	y-int: $(0,\frac{7}{2})$	$y \leq \frac{3}{2}x + \frac{7}{2}$

$f(x,y) = x-y$



(x,y)	$x-y=$	$f(x,y)=$
$(-1,2)$	$-1-2=-3$	$f(-1,2)=-3$
$(2,3)$	$2-3=-1$	$f(2,3)=-1$
$(3,-2)$	$3--2=5$	$f(3,-2)=5$
$(-3,-1)$	$-3--1=-2$	$f(-3,-1)=-2$

The max is 5 at $(3,-2)$.
The min is -3 at $(-1,2)$.