

New

Assign #13

Book pg 157: #5, 11, 15-23 odd

5. The feasible region has vertices at $(-3, 2)$, $(4, 1)$, $(2, 6)$ and $(1, -2)$. Find the max + min

$$f(x, y) = 4x - y$$

(x, y)	$4x - y$	$f(x, y) =$
$(-3, 2)$	$4(-3) - 2 = -12 - 2$	$f(-3, 2) = -14$ min
$(4, 1)$	$4(4) - 1 = 16 - 1 = 15$	$f(4, 1) = 15$ Max
$(2, 6)$	$4(2) - 6 = 8 - 6 = 2$	$f(2, 6) = 2$
$(1, -2)$	$4(1) - (-2) = 4 + 2 = 6$	$f(1, -2) = 6$

The min is -14 at $(-3, 2)$ $f(-3, 2) = -14$

The max is 15 at $(4, 1)$ $f(4, 1) = 15$

11. The feasible region has vertices at $(-1, 3)$, $(3, 5)$, $(4, -1)$ and $(-1, -2)$. Find max + min

$$f(x, y) = 3x + 2y$$

(x, y)	$3x + 2y$	$f(x, y) =$
$(-1, 3)$	$3(-1) + 2(3) = -3 + 6 = 3$	$f(-1, 3) = 3$
$(3, 5)$	$3(3) + 2(5) = 9 + 10 = 19$	$f(3, 5) = 19$ Max
$(4, -1)$	$3(4) + 2(-1) = 12 - 2 = 10$	$f(4, -1) = 10$
$(-1, -2)$	$3(-1) + 2(-2) = -3 - 4 = -7$	$f(-1, -2) = -7$ min

The min is -7 at $(-1, -2)$ $f(-1, -2) = -7$

the max is 19 at $(3, 5)$ $f(3, 5) = 19$

15-23 odd

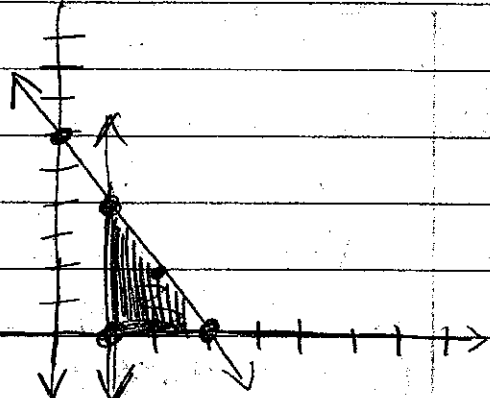
Graph & find max & min

15. $x \geq 1$

$y \geq 0$

$2x + y \leq 6 \rightarrow y \leq -2x + 6$

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



(x,y)	$3x + y$	$f(x,y) =$
$(1,0)$	$3(1) + 0 = 3$	$f(1,0) = 3$ min
$(3,0)$	$3(3) + 0 = 9$	$f(3,0) = 9$ max
$(1,4)$	$3(1) + 4 = 7$	$f(1,4) = 7$

The max is 9 at $(3,0)$

$f(3,0) = 9$

The min is 3 at $(1,0)$

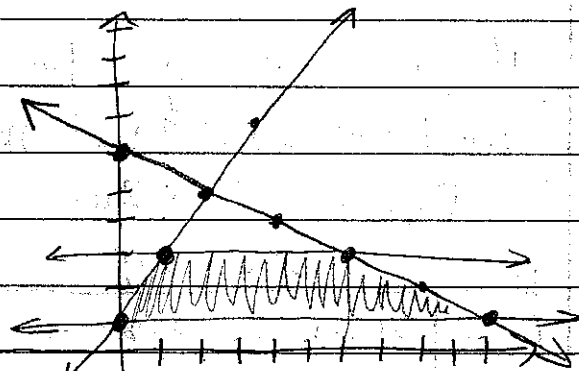
$f(1,0) = 3$

17. $y \leq 2x + 1$

$1 \leq y \leq 3$

$y \leq -\frac{1}{2}x + 6$

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



(x,y)	$3x + y$	$f(x,y) =$
$(0,1)$	$3(0) + 1 = 1$	$f(0,1) = 1$ min
$(1,3)$	$3(1) + 3 = 3 + 3 = 6$	$f(1,3) = 6$
$(7,3)$	$3(7) + 3 = 21 + 3 = 24$	$f(7,3) = 24$
$(10,1)$	$3(10) + 1 = 30 + 1 = 31$	$f(10,1) = 31$ max

The max is 31 at $(10,1)$

$f(10,1) = 31$

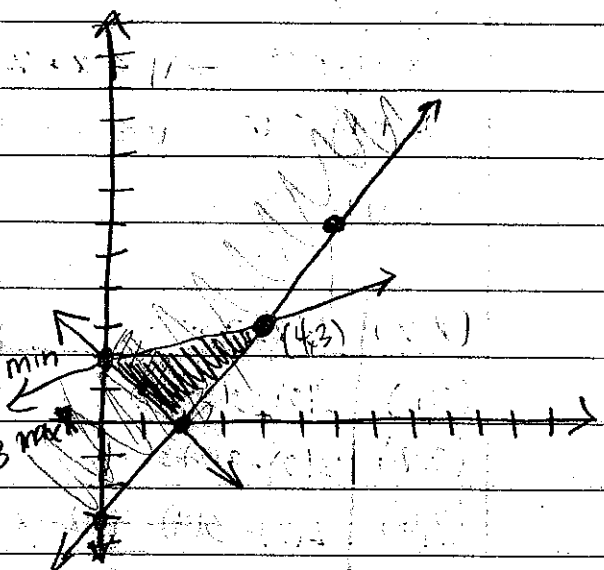
The min is 1 at $(0,1)$

$f(0,1) = 1$

19. $x + y \geq 2 \rightarrow y \geq -x + 2$
 $2y \geq 3x - 6 \rightarrow y \geq \frac{3}{2}x - 3$
 $4y \leq x + 8 \rightarrow y \leq \frac{1}{4}x + 2$

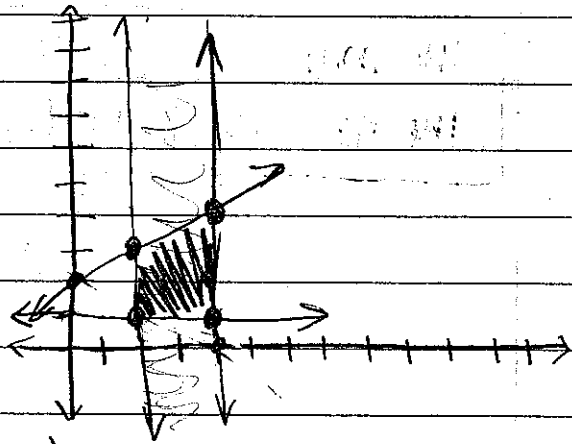
$f(x,y) = 3y + x$

(x,y)	$3y + x$	$f(x,y) =$
$(0,2)$	$3(2) + 0 = 6 + 0 = 6$	$f(0,2) = 6$
$(2,0)$	$3(0) + 2 = 0 + 2 = 2$	$f(2,0) = 2$ min
$(4,3)$	$3(3) + 4 = 9 + 4 = 13$	$f(4,3) = 13$ max



The max is 13 at $(4,3)$ $f(4,3) = 13$
The min is 2 at $(2,0)$ $f(2,0) = 2$

21. $x \geq 2$
 $x \leq 4$
 $y \geq 1$
 $x - 2y \geq -4 \rightarrow -2y \geq -x - 4$
 $y \leq \frac{1}{2}x + 2$
 $f(x,y) = x - 3y$



(x,y)	$x - 3y$	$f(x,y) =$
$(2,1)$	$2 - 3(1) = 2 - 3 = -1$	$f(2,1) = -1$
$(2,3)$	$2 - 3(3) = 2 - 9 = -7$	$f(2,3) = -7$
$(4,1)$	$4 - 3(1) = 4 - 3 = 1$	$f(4,1) = 1$ max
$(4,4)$	$4 - 3(4) = 4 - 12 = -8$	$f(4,4) = -8$ min

The max is 1 at $(4,1)$ $f(4,1) = 1$
The min is -8 at $(4,4)$ $f(4,4) = -8$

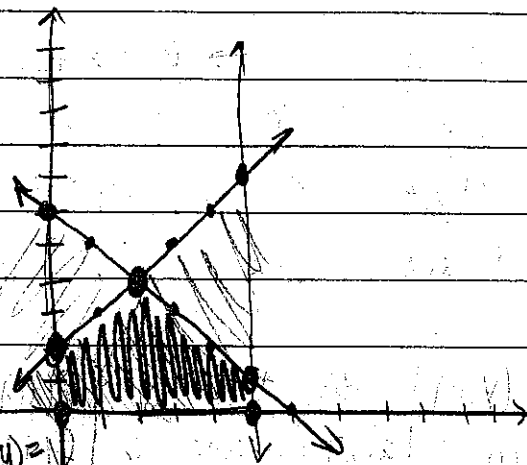
23. $0 \leq x \leq 5$

$y \geq 0$

$-x + y \leq 2 \rightarrow y \leq x + 2$

$x + y \leq 6 \rightarrow y \leq -x + 6$

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



(x, y)	$2x - 3y$	$f(x, y) =$
$(0, 0)$	$2(0) - 3(0) = 0$	$f(0, 0) = 0$
$(0, 2)$	$2(0) - 3(2) = -6$	$f(0, 2) = -6$
$(2, 4)$	$2(2) - 3(4) = 4 - 12 = -8$	$f(2, 4) = -8$ min
$(5, 1)$	$2(5) - 3(1) = 10 - 3 = 7$	$f(5, 1) = 7$ max
$(5, 0)$	$2(5) - 3(0) = 10$	$f(5, 0) = 10$

The max is 7 at $(5, 1)$

$f(5, 1) = 7$

The min is -8 at $(2, 4)$

$f(2, 4) = -8$