

3.4 Practice B

① $C(x,y) = x - y$ Vertices: $(0,6), (2,7), (0,0), (5,0)$

$C(0,6) = 0 - 6 = -6$ min
 $C(2,7) = 2 - 7 = -5$
 $C(0,0) = 0 - 0 = 0$
 $C(5,0) = 5 - 0 = 5$ max.

③ $C(x,y) = x + 5y$ Vertices: $(0,2), (6,4), (1,-1), (4,-1)$

$C(0,2) = 0 + 5(2) = 10$
 $C(6,4) = 6 + 5(4) = 26$ max
 $C(1,-1) = 1 + 5(-1) = -4$ min
 $C(4,-1) = 4 + 5(-1) = -1$

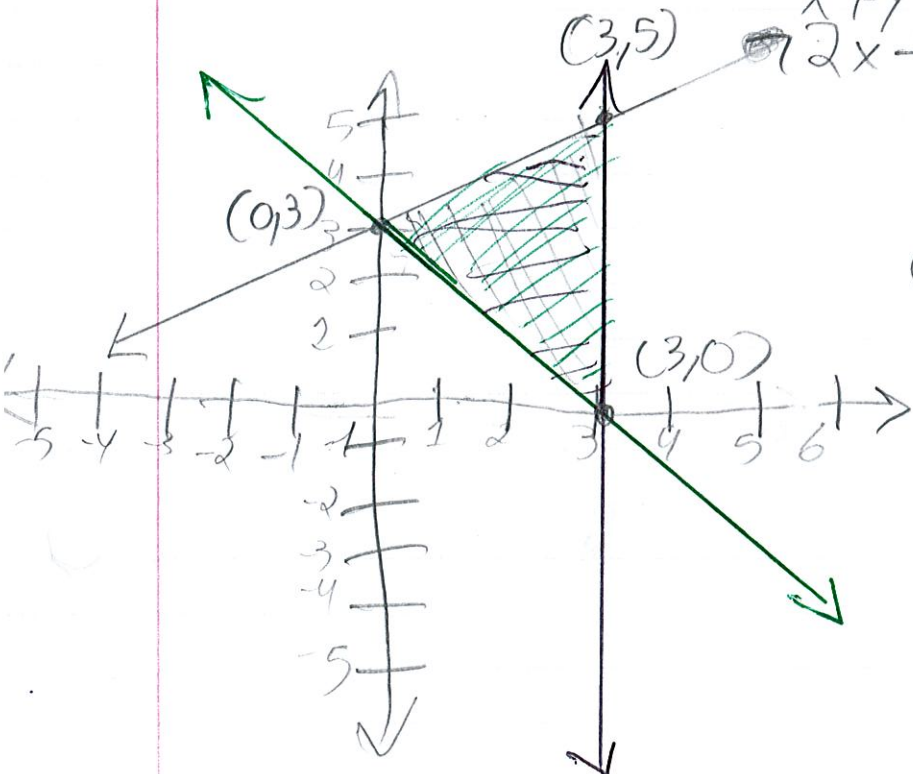
⑤ $C(x,y) = 2x + 4y$

Constraints

- $x \leq 3$
- $x + y \geq 3$
- $2x - 3y \geq -9$

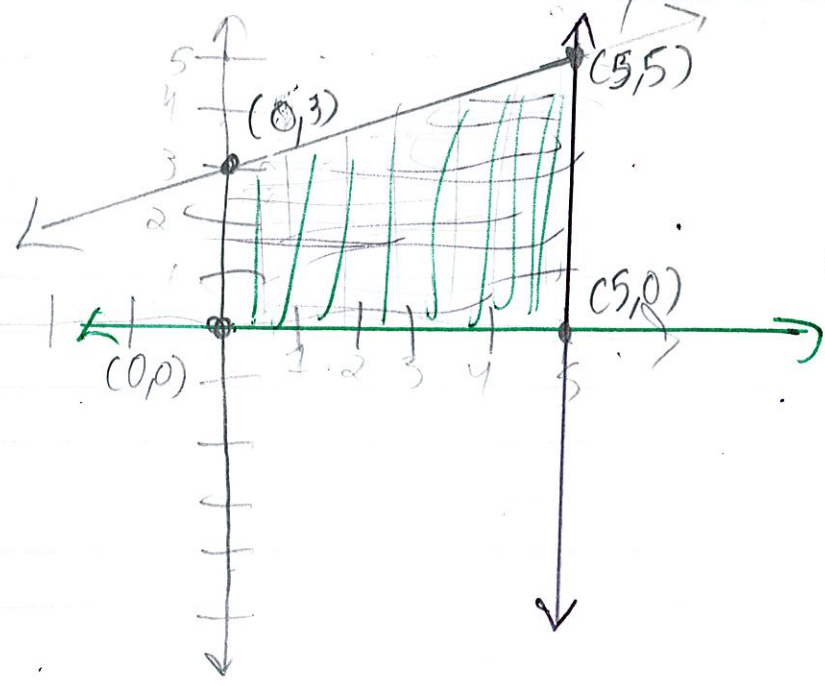
Solve systems of equations to find Vertices.

$C(0,3) = 2(0) + 4(3) = 12$
 $C(3,0) = 2(3) + 4(0) = 6$ min
 $C(3,5) = 2(3) + 4(5) = 26$ max



7) $C(x,y) = 4x - 3y$

Constraints
 $x \geq 0$ $x \leq 5$
 $y \geq 0$ $2x - 5y \geq -15$

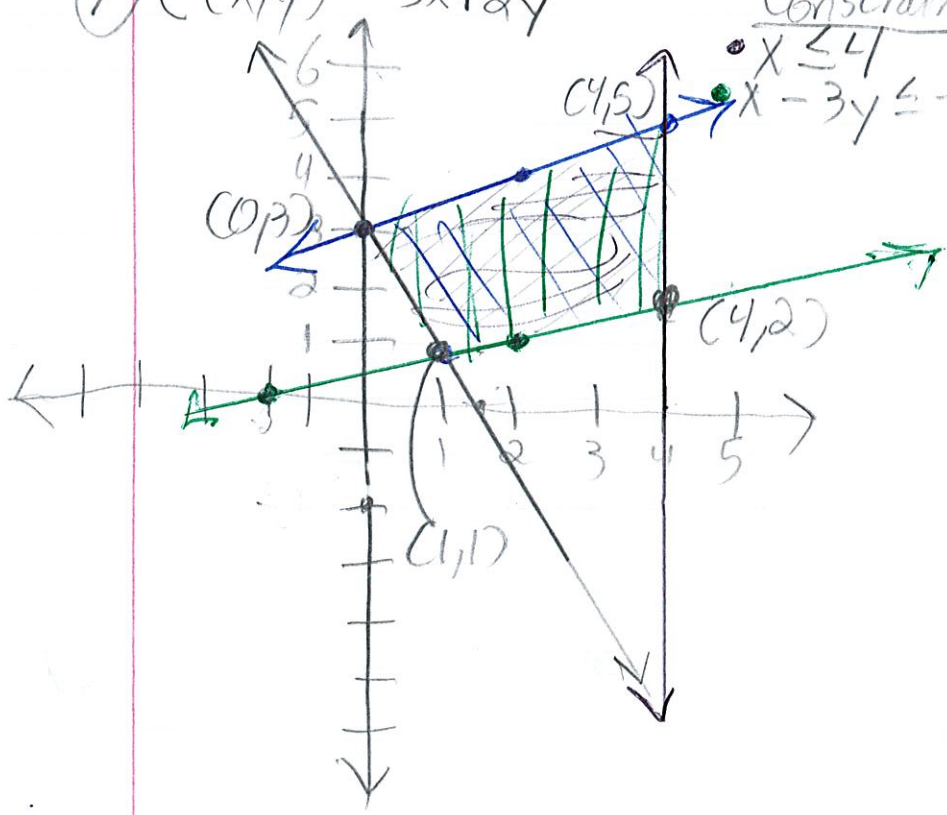


$C(0,0) = 4(0) - 3(0) = 0$
 $C(0,3) = 4(0) - 3(3) = -9$
 $C(5,0) = 4(5) - 3(0) = 20$
 $C(5,5) = 4(5) - 3(5) = 5$

K1

9) $C(x,y) = 5x + 2y$

Constraints
 $x \leq 4$ $2x + y \geq 3$
 $x - 3y \leq -2$ $-x + 2y \leq 6$



$C(0,3) = 5(0) + 2(3) = 6$
 $C(1,1) = 5(1) + 2(1) = 7$
 $C(4,2) = 5(4) + 2(2) = 24$
 $C(4,5) = 5(4) + 2(5) = 30$

b = batches of Bread
 m = batches of muffins

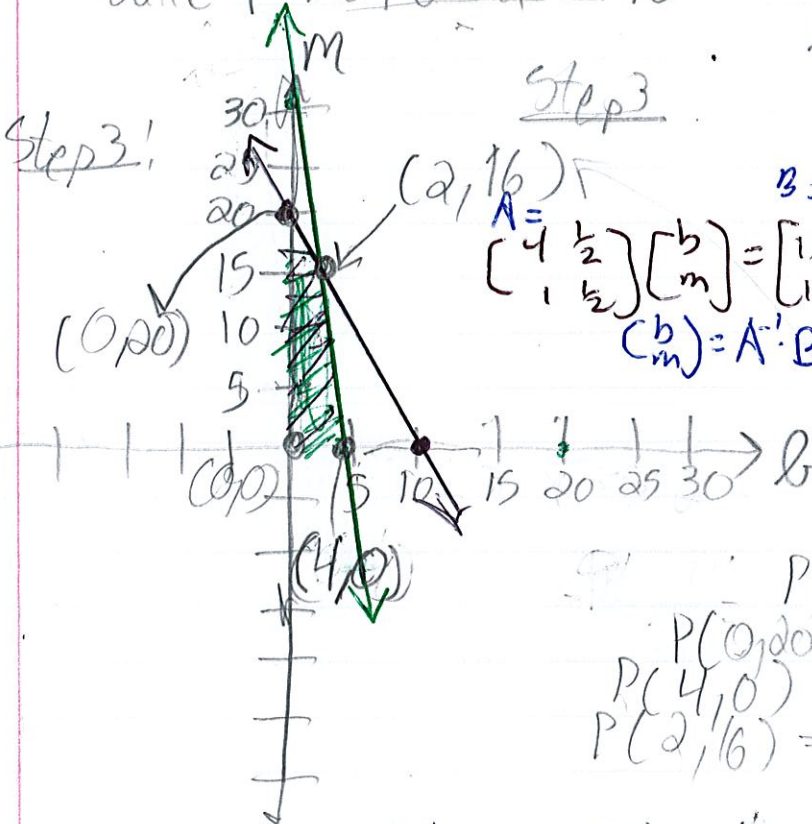
Step 1: Profit

(10) $P(b, m) = 35b + 10m$

Step 2: Bread Muffins

Prep.	4 hr	$\frac{1}{2}$ hr	≤ 16	$4b + \frac{1}{2}m \leq 16$
Bake	1 hr	$\frac{1}{2}$ hr	≤ 10	$b + \frac{1}{2}m \leq 10$

$b \geq 0 \quad m \geq 0$



Step 3:

$$A \begin{bmatrix} b \\ m \end{bmatrix} = \begin{bmatrix} 16 \\ 10 \end{bmatrix}$$

$$\begin{bmatrix} 4 & \frac{1}{2} \\ 1 & \frac{1}{2} \end{bmatrix} \begin{bmatrix} b \\ m \end{bmatrix} = \begin{bmatrix} 16 \\ 10 \end{bmatrix}$$

$$\begin{bmatrix} b \\ m \end{bmatrix} = A^{-1} \cdot B$$

$$A^{-1} \cdot A \begin{bmatrix} b \\ m \end{bmatrix} = A^{-1} \cdot B$$

$$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} b \\ m \end{bmatrix} = \begin{bmatrix} 2 \\ 16 \end{bmatrix}$$

Profit calculations:

$$P(0,0) = 35(0) + 10(0) = 0$$

$$P(0,20) = 35(0) + 10(20) = 200$$

$$P(4,0) = 35(4) + 10(0) = 140$$

$$P(2,16) = 35(2) + 10(16) = 230$$

Step 4: The bakery should make 2 batches of whole-wheat bread and 16 batches of apple bran muffins.

Answer Key

Chapter 3

Lesson 3.4

Practice B

1. minimum -6; maximum 5
2. minimum 0; maximum 24
3. minimum -4; maximum 26
4. minimum -6; maximum 9
5. minimum 6; maximum 26
6. minimum -2; maximum 20
7. minimum -9; maximum 20
8. minimum 8; maximum none
9. minimum 6; maximum 30
10. two batches of bread and 16 batches of muffins
11. zero long distance calls (0 minutes) and 24 local calls (240 minutes)

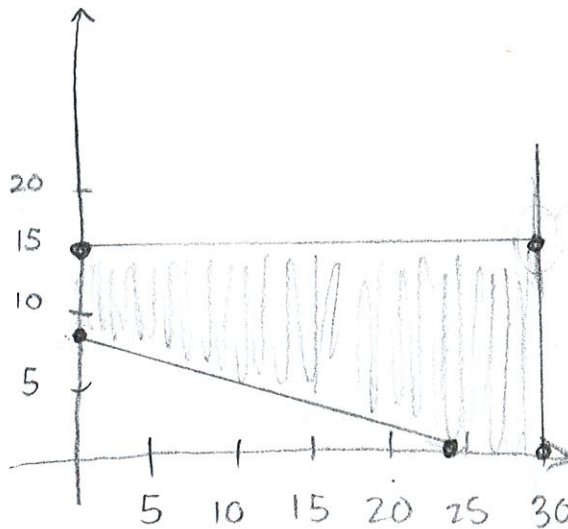
$$\textcircled{11} C = \overset{(.03)(10)}{0.3}x + \overset{(.08)(30)}{2.4}y$$

$x = \text{LOCAL}$
 $y = \text{LONG DISTANCE}$

CONSTRAINTS:

$$\begin{aligned} y &\leq 15 & x &\geq 0 \\ x &\leq 30 & y &\geq 0 \end{aligned}$$

$$240 \leq 10x + 30y$$



$$\begin{aligned} C &= 0.3(0) + 2.4(8) \\ &= 19.2 \end{aligned}$$

$$\begin{aligned} C &= 0.3(0) + 2.4(15) \\ &= 36 \end{aligned}$$

$$\begin{aligned} C &= 0.3(30) + 2.4(15) \\ &= 45 \end{aligned}$$

$$\begin{aligned} C &= 0.3(24) + 2.4(0) \\ &= 7.2 \end{aligned}$$

$$\begin{aligned} C &= 0.3(30) + 2.4(0) \\ &= 9.0 \end{aligned}$$