

⑦

$$x \geq 0 \quad x + 2y \leq 8$$

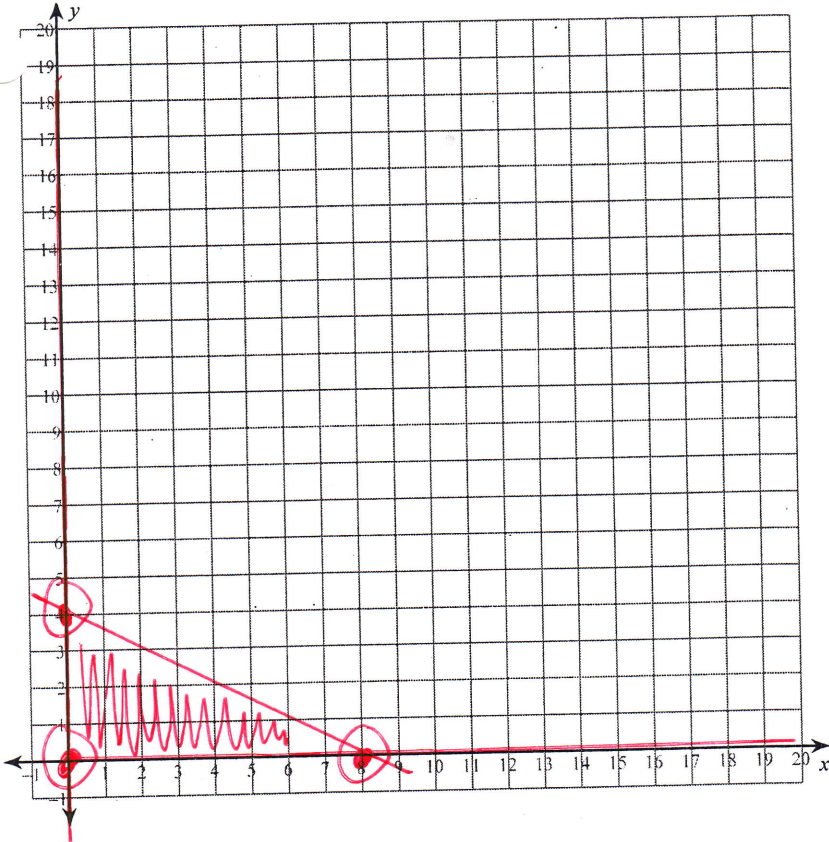
$$y \geq 0$$

$$C = 7x + 8y$$

$$(0,0) \quad C = 7(0) + 8(0) = 0 \quad \boxed{\text{min}}$$

$$(0,4) \quad C = 7(0) + 8(4) = 32$$

$$(8,0) \quad C = 7(8) + 8(0) = 56 \quad \boxed{\text{max}}$$



⑧

$$x \geq 0 \quad x + y \leq 5$$

$$y \geq 0 \quad x + 2y \leq 6$$

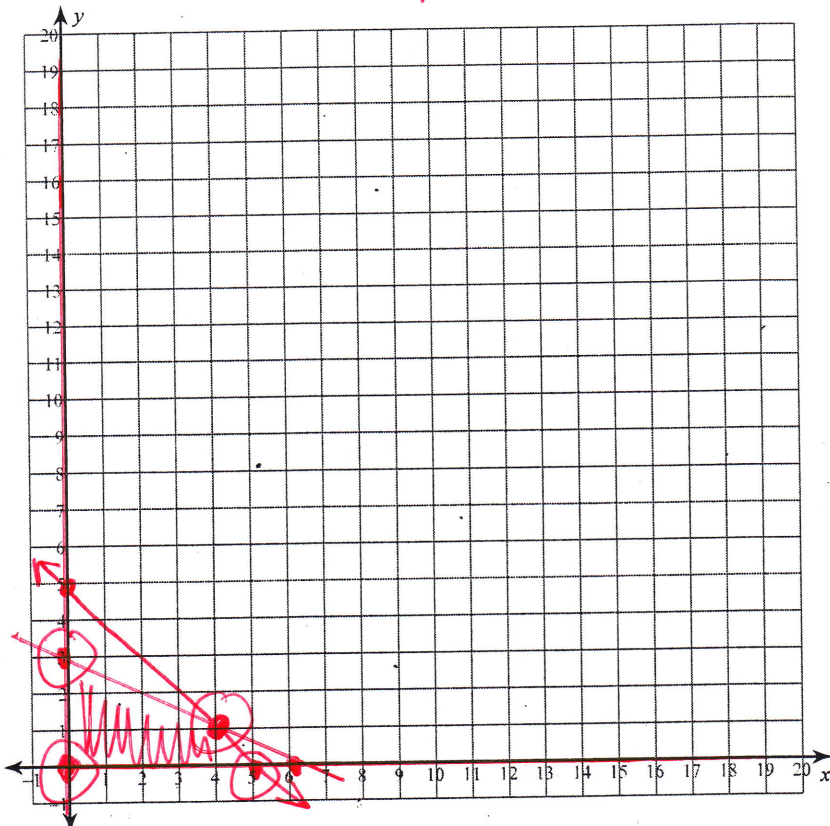
$$C = 4x + 5y$$

$$(0,0) \quad C = 4(0) + 5(0) = 0 \quad \boxed{\text{min}}$$

$$(4,1) \quad C = 4(4) + 5(1) = 21 \quad \boxed{\text{max}}$$

$$(5,0) \quad C = 4(5) + 5(0) = 20$$

$$(0,3) \quad C = 4(0) + 5(3) = 15$$

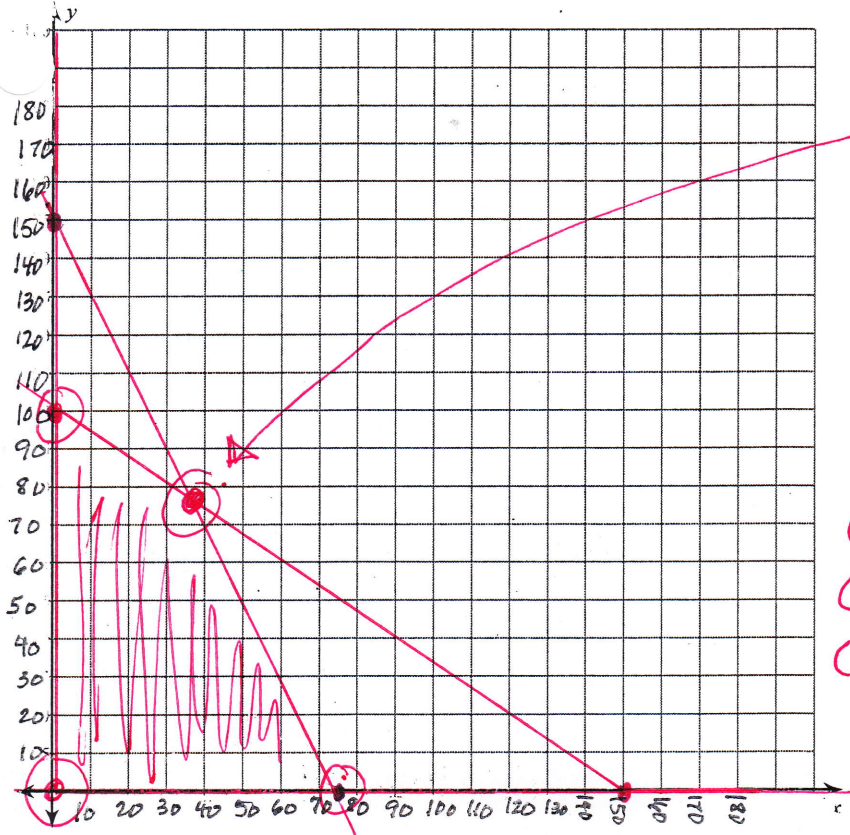


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$x \geq 0$
 $y \geq 0$

$2x + y \leq 150$ ($y_{int}: 150, x_{int}: 75$)
 $2x + 3y \leq 300$ ($y_{int}: 100, x_{int}: 150$)

$C: 3x + 2y$



To solve for point of intersection

$$\begin{array}{r} 2x + y = 150 \\ -2x - 3y = -300 \\ \hline -2y = -150 \\ y = 75 \end{array}$$

$$\begin{array}{r} 2x + 75 = 150 \\ 2x = 75 \\ x = 37.5 \end{array}$$

they intersect at (37.5, 75)

- (0,0) $C = 3(0) + 2(0) = 0$ min
- (75,0) $C = 3(75) + 2(0) = 225$
- (0,100) $C = 3(0) + 2(100) = 200$
- (37.5, 75) $C = 3(37.5) + 2(75) = 262.5$ max

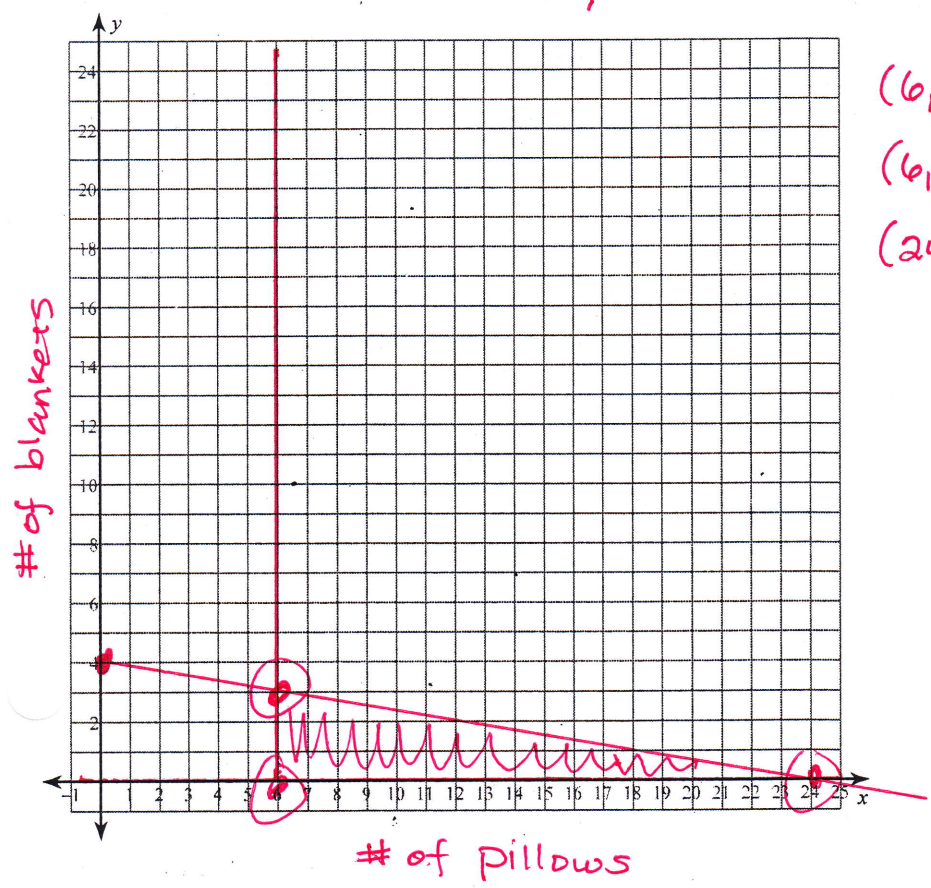
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$x = \text{pillows}$
 $y = \text{blankets}$

$x \geq 6$
 $y \geq 0$

$2x + 12y \leq 48$
($x_{int}: 24, y_{int}: 4$)

$C: 8x + 34y$



- (6,0) $C = 8(6) + 34(0) = 48$ min
- (6,3) $C = 8(6) + 34(3) = 150$
- (24,0) $C = 8(24) + 34(0) = 192$ max

LESSON
7.5**Practice** *continued*

Find the minimum and maximum values of the objective function subject to the given constraints.

7. Objective function:

$$C = 7x + 8y$$

Constraints:

$$x \geq 0$$

$$y \geq 0$$

$$x + 2y \leq 8$$

minimum
0 @ (0,0)

maximum
56 @ (8,0)

8. Objective function:

$$C = 4x + 5y$$

Constraints:

$$x \geq 0$$

$$y \geq 0$$

$$x + y \leq 5$$

$$x + 2y \leq 6$$

minimum
0 @ (0,0)

maximum
21 @ (4,1)

9. Objective function:

$$C = 3x + 2y$$

Constraints:

$$x \geq 0$$

$$y \geq 0$$

$$2x + y \leq 150$$

$$2x + 3y \leq 300$$

minimum
0 @ (0,0)

maximum
262.5 @ (37.5, 75)

10. **Quilting** A quilted pillow uses 2 square yards of fabric and produces a profit of \$8. A quilted blanket uses 12 square yards of fabric and produces a profit of \$34. The quilter has 48 square yards of fabric and wants to make at least 6 pillows. How many pillows and how many blankets should the quilter make in order to maximize profit?

Obj. Function: $8x + 34y$

Constraints: $x \geq 6$ $2x + 12y \leq 48$
 $y \geq 0$

minimum
\$48 @ 6 pillows &
0 blankets

maximum
\$192 @ 24 pillows
& 0 blankets

11. **Taxes** An accounting firm charges \$620 for a business tax return and \$200 for an individual tax return. The firm has 800 hours of staff time and 144 hours of review available each week. Each business tax return requires 40 hours of staff time and 8 hours of review time. Each individual tax return requires 6 hours of staff time and 2 hours of review time. What numbers of business and individual tax returns will produce a maximum revenue?

Obj. Function: $C = 620x + 200y$

Constraints: $x \geq 0$
 $y \geq 0$
 $40x + 6y \leq 800$
 $8x + 2y \leq 144$