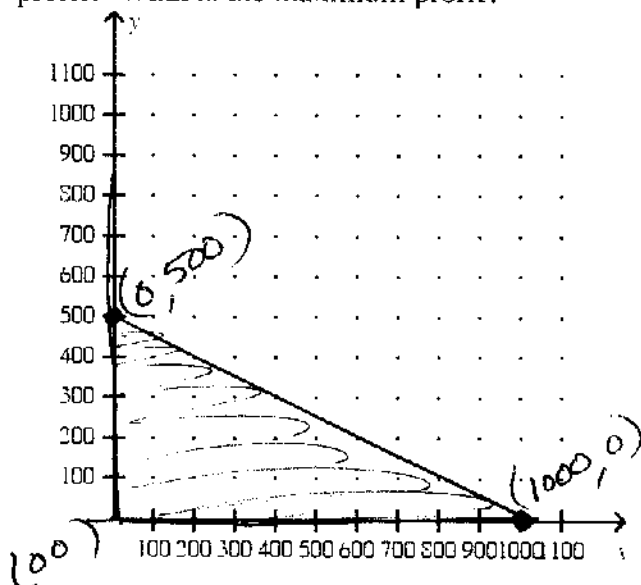


Agriculture Maximizing Profits Quiz

Name

Key

1. A factory can produce two products, x and y , with a profit approximated by $P = 12x + 23y - 900$. The production of y can exceed x by no more than 200 units. Moreover, production levels are limited by the formulas, $x \geq 0$, $y \geq 0$, and $x + 2y \leq 1000$. What production levels yield maximum profit? What is the maximum profit?



$$x + 2y \leq 1000$$

$$x = 0 \quad y = 500$$

$$\frac{2y}{2} = \frac{1000}{2}$$

$$y = 500$$

$$(0, 500)$$

$$x = ? \quad y = 0$$

$$x \leq 1000$$

$$(1000, 0)$$

$$(x, y)$$

$$P = 12x + 23y - 900$$

$$(0, 0)$$

$$-900$$

$$(0, 500)$$

$$10600$$

$$(1000, 0)$$

$$11,100 \text{ max}$$

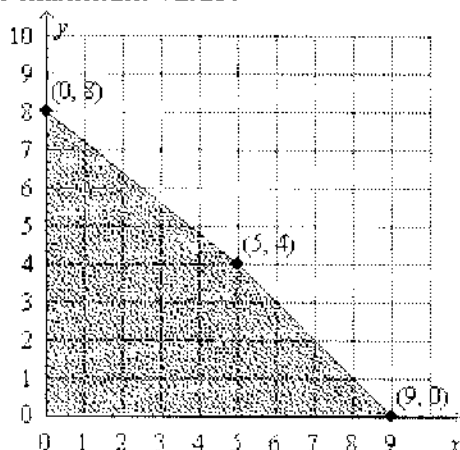
$$12(0) + 23(0) - 900 = -900$$

$$12(0) + 23(500) - 900 = 10600$$

$$12(1000) + 23(0) - 900 = 11100$$

Max of \$11,100 when 1000 product x & 0 product y produced

2. Find the values of x and y that maximize the objective function $P = 3x + 2y$ for the graph. What is the maximum value?



$$(x, y)$$

$$P = 3x + 2y$$

$$(0, 8)$$

$$16$$

$$3(0) + 2(8) = 16$$

$$(5, 4)$$

$$23$$

$$3(5) + 2(4) = 23$$

$$(9, 0)$$

$$27$$

$$3(9) + 2(0) = 27$$

Max of 27 at (9, 0)

- a. maximum value at (5, 4); 32
- b. maximum value at (0, 8); 16

c.

- c. maximum value at (9, 0); 27
- d. maximum value at (0, 0); 0

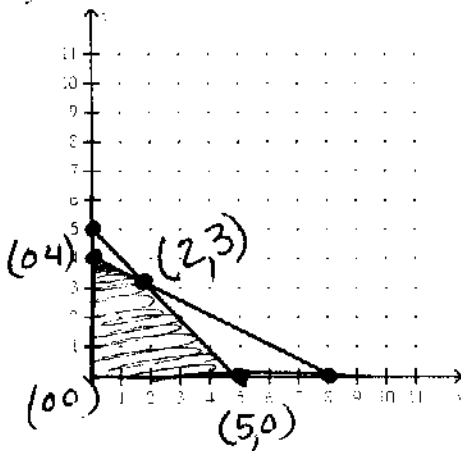
3. If profit is $P = x + 3y$, find the maximum profit under the following constraints:

$$x + y \leq 5 \quad (0, 5) \quad (5, 0)$$

$$x + 2y \leq 8 \quad (0, 4) \quad (8, 0)$$

$$x \geq 0$$

$$y \geq 0$$



(x, y)	$P = x + 3y$
$(0, 0)$	0
$(0, 4)$	12
$(5, 0)$	5
$(2, 3)$	8

$$0 + 3(0) = 0$$

$$0 + 3(4) = 12$$

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

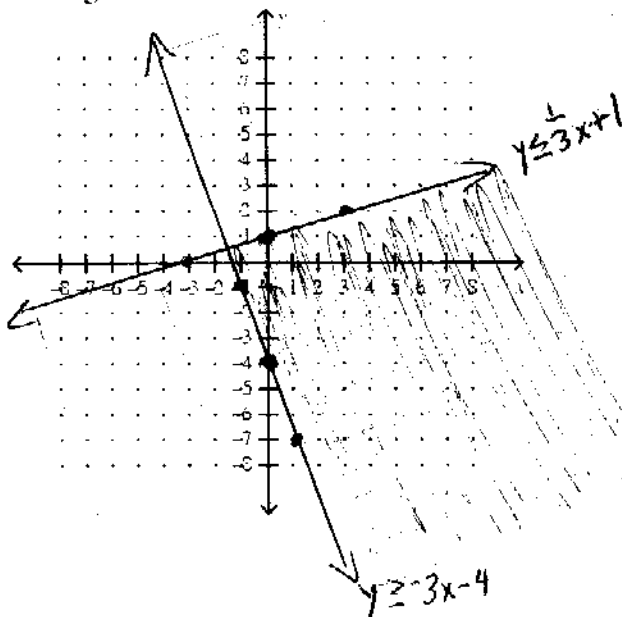
$$2 + 3(3) = 8$$

Max profit of 12 at $(0, 4)$

test $(0, 0)$ 4. Graph the inequalities.

$$0 \geq -4 \quad y \geq -3x - 4 \quad b = -4 \quad m = -\frac{3}{1}$$

$$0 \leq 1 \quad y \leq \frac{1}{3}x + 1 \quad b = 1 \quad m = \frac{1}{3}$$



5. Graph the inequalities.

$$3x + y \geq 3 \quad (0, 3) \quad (1, 0)$$

$$y \geq x + 2 \quad b = 2 \quad m = 1$$

test $(0, 0)$

$$0 \geq 3 \quad F$$

$$0 \geq 2 \quad F$$

