

Name _____ Page 1 of 8

Test is marked out of 50

Part I: Selected Response

Place your answers on the answer sheet provided for Part I. Do not return the sheets containing the questions for part I.

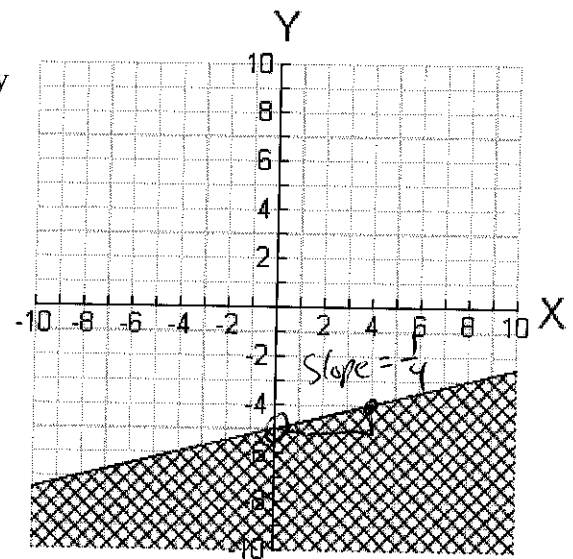
- 1) Glenda has a summer job drawing cartoons (C) and portraits (P). It takes 30 minutes to draw a cartoon and two hours to draw a portrait. She has to work at least 30 hours in a week. Which inequality below best describes Glenda's situation?

- a) $30C + 2B \leq 30$
 b) $0.30C + 2B \leq 30$
 c) $0.50C + 2B \leq 30$
 d) $0.50C + 2B \geq 30$

$$0.50C + 2P \leq 30$$

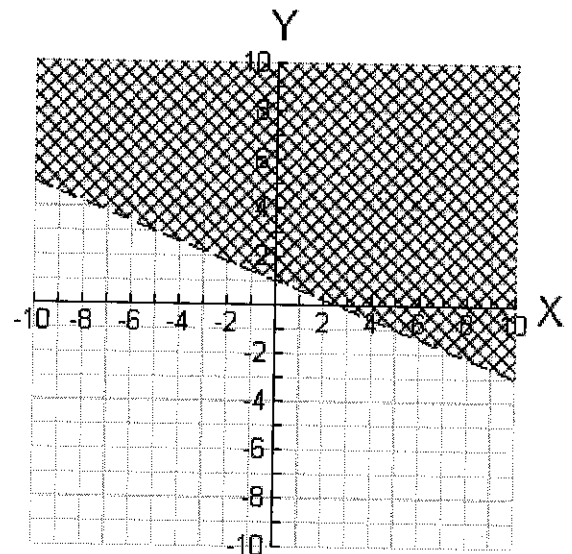
- 2) Which answer below would best represent the inequality graphed to the right?

- a) $y \leq \frac{1}{4}x - 5$
 b) $y \leq 4x - 5$
 c) $y \leq -\frac{1}{4}x - 5$
 d) $y \leq -4x - 5$



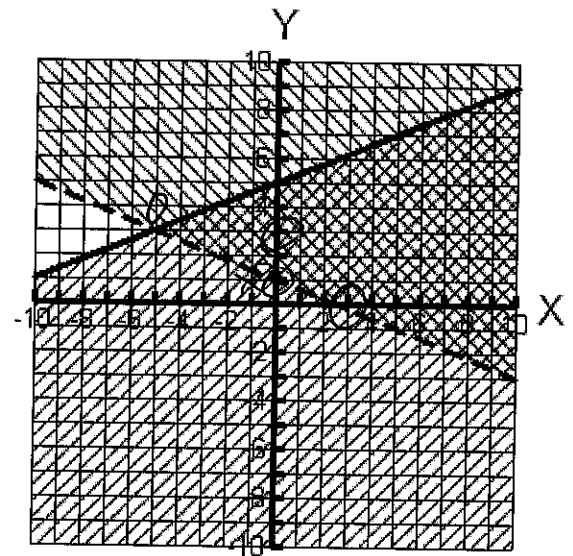
- 3) Which answer below would best represent the inequality graphed to the right?

- a) $y \leq -\frac{2}{5}x + 1$
 b) $y \geq -\frac{2}{5}x + 1$
 c) $y < -\frac{2}{5}x + 1$
 d) $y > -\frac{2}{5}x + 1$



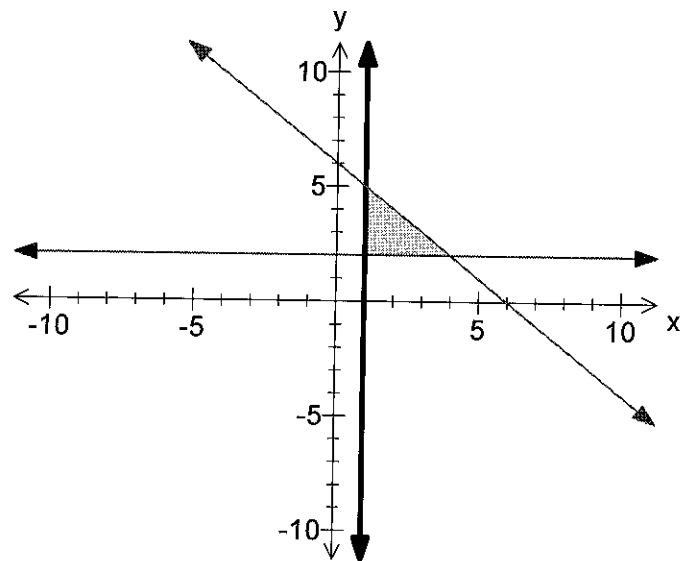
4) Which point below would be a possible solution, given the feasible region graphed to the right?

- a) $(-5, 4)$ ✗
- b) $(3, 0)$ ✗
- c) $(0, 3)$ ✓
- d) $(0, 1)$ ✗



5) Which system of inequalities is represented by the feasible region graphed to the right?

- a) $x \geq 1$ ✓
 $y \geq 2$ ✓
 $x + y \leq 6$ ✓
 $y \leq -x + 6$
- b) $x \geq 1$ ✓
 $y \geq 2$ ✓
 $x + y \geq 6$ ✗
 $y \geq -x + 6$
- c) $x \leq 1$ ✗
 $y \leq 2$ ✗
 $x + y \leq 6$ ✓
- d) $x \leq 1$ ✗
 $y \leq 2$ ✗
 $x + y \geq 6$ ✗



Name _____ Page 3 of 8

Test is marked out of 50

- 6) In trying to simplify an inequality to slope-intercept form, Jessica made a slight error. In which step did the error occur?

$$3x - 5y + 10 \geq 0$$

$$3x - 5y \geq -10 \dots \text{Step 1}$$

$$-5y \geq -3x + -10 \dots \text{Step 2}$$

$$\frac{-5y}{-5} \geq \frac{-3x}{-5} + \frac{-14}{-5} \dots \text{Step 3}$$

$$y \geq \frac{3x}{5} + 2 \dots \text{Step 4}$$

NO sign change

- a) 1
b) 2
c) 3
d) 4

or 4 I'll accept

- 7) Kevin is trying to do the same problem as Jessica and also has made a slight error. In which step did the error occur?

$$3x - 5y + 10 \geq 0$$

$$3x - 5y \geq -10 \dots \text{Step 1}$$

$$-5y \geq -3x + -10 \dots \text{Step 2}$$

$$\frac{-5y}{-5} \leq \frac{3x}{-5} + \frac{-14}{-5} \dots \text{Step 3}$$

$$y \leq -\frac{3x}{5} + 2 \dots \text{Step 4}$$

NO sign change

- a) 1
b) 2
c) 3
d) 4

Name _____ Page 4 of 8

Test is marked out of 50

- 8) If the objective function is defined as $P = 2x + 3y$, which answer below would best represent this function in slope-intercept form?

a) $y = \frac{2}{3}x + \frac{P}{3}$

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

c) $y = \frac{2}{3}x - \frac{P}{3}$

d) $y = -\frac{3}{2}x + \frac{P}{2}$

$$P = 2x + 3y$$

$$-2x + P = 2x - 2x + 3y$$

$$-2x + P = 3y$$

$$\frac{-2x}{3} + \frac{P}{3} = \frac{3y}{3}$$

$$-\frac{2}{3}x + \frac{P}{3}$$

1. d	5. a
2. a	6. c
3. d	7. b
4. c	8. b

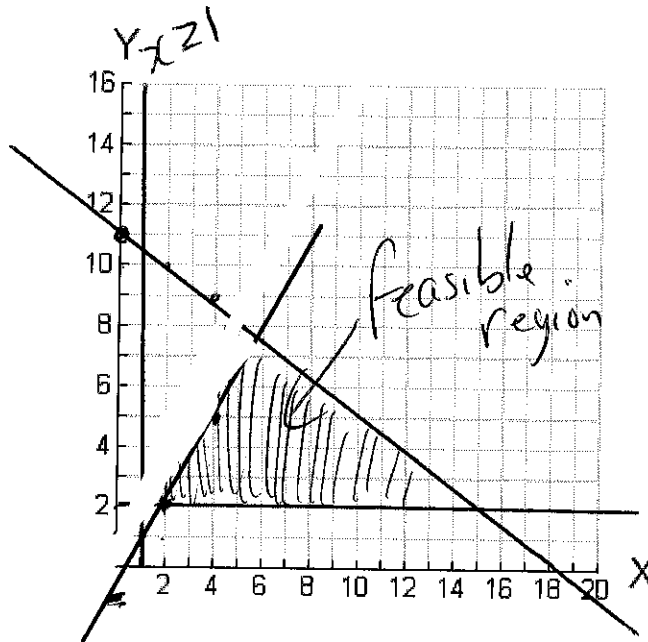
Name _____

Test is marked out of 50

2) Graph the following system of inequalities. Be sure to outline the feasible region. Use a ruler and be neat for full marks. (10 marks)

$$\begin{aligned} x &\geq 1 \\ y &\geq 2 \\ x + 2y &\leq 22 \\ 3x - 2y &\geq 2 \end{aligned}$$

$$\begin{aligned} x + 2y &\leq 22 \\ x - x + 2y &\leq 22 - x \\ 2y &\leq \frac{-x + 22}{2} \\ y &\leq -\frac{1}{2}x + 11 \end{aligned}$$

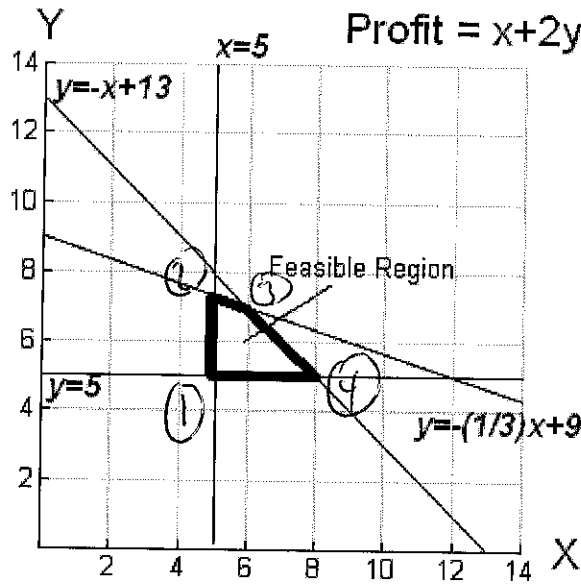


$$x \geq 2$$

$$\begin{aligned} 3x - 2y &\geq 2 \\ 3x - 3x - 2y &\geq 2 - 3x \\ -2y &\geq -3x + 2 \\ \frac{-2y}{-2} &\geq \frac{-3x + 2}{-2} \\ y &\leq \frac{3}{2}x + 1 \end{aligned}$$

3) Find the maximum and minimum profit using the feasible region and the profit equation below. (10 marks)

Maximum profit = 2
Minimum profit = 15



④ $y = 5$
 $5 = -x + 13$
 $5 - 13 = -x + 13 - 13$
 $-8 = -x$
 $\frac{-8}{-1} = \frac{-x}{-1}$
 $8 = x$
 $P = 8 + 2(5)$
 $P = 8 + 10 = 18$

① $x = 5$
 $y = 5$
 $P = 5 + 2(5)$
 $P = 5 + 10$
 $P = 15$

② $x = 5$ $y = -\frac{1}{3}x + 9$
 $y = -\frac{1}{3}(5) + 9$
 $y = -\frac{5}{3} + 9$
 $y = -\frac{5}{3} + \frac{27}{3}$
 $y = \frac{22}{3}$
 $P = 5 + 2(\frac{22}{3})$
 $P = 5 + \frac{44}{3}$
 $P = \frac{15}{3} + \frac{44}{3} = \frac{59}{3} = 19.67$

③ $y = -x + 13$
 $y = -\frac{1}{3}x + 9$
 $-x + 13 = -\frac{1}{3}x + 9$
 $-x + \frac{1}{3}x + 13 = -\frac{1}{3}x + \frac{1}{3}x + 9$
 $-\frac{2}{3}x + 13 = 9$
 $-\frac{2}{3}x + 13 - 13 = 9 - 13$
 $-\frac{2}{3}x = -4 + \frac{-3}{2}$
 $x = \frac{12}{2} = 6$
 $y = -6 + 13$
 $y = 7$
 $P = 6 + 2(7)$
 $P = 6 + 14$
 $P = 20$

- 4) You need to buy some filing cabinets. You know that Cabinet X costs \$10 per unit, requires 6 m^2 of floor space, and holds 8 m^3 of files. Cabinet Y costs \$20 per unit, requires 8 m^2 of floor space, and holds 12 m^3 of files. You have been given \$140 for this purchase, though you don't have to spend that much. The office floor has room for no more than 72 m^2 of cabinets.

- a) Write inequalities to represent all constraints. Define your variables. (8 marks)

$$\begin{aligned}
 x &= \text{one cabinet (cabinet X)} \\
 y &= \text{other cabinet (cabinet Y)} \quad \leftarrow \text{cost constraint} \\
 10x + 20y &\leq 140 \\
 6x + 8y &\leq 72 \quad \leftarrow \text{floor space constraint} \\
 x &\geq 0 \\
 y &\geq 0
 \end{aligned}$$

- b) The objective function for this problem would be used to find the maximum volume. Write the objective function that would be used to determine the maximum volume. (2 marks)

$$\begin{aligned}
 V &= 8x + 12y \\
 V &= \text{Volume} \\
 x &= \text{Cabinet X} \\
 y &= \text{Cabinet Y}
 \end{aligned}$$