

Name: \_\_\_\_\_

Math 111, Intro to Math Methods and Applications – Crawford

Exam 3-A

13 November 2013

Score

1	/6
2	/10
3	/12
4	/10
5	/10
6	/10
7	/18
8	/16
9	/12
Total	/100

- Books or notes (in any form) are not allowed.
- Calculators are not allowed on Part A.
- You may use a calculator on Part B.
- Clearly indicate your answers.
- *Show all your work* – partial credit may be given for written work.
- Good Luck!

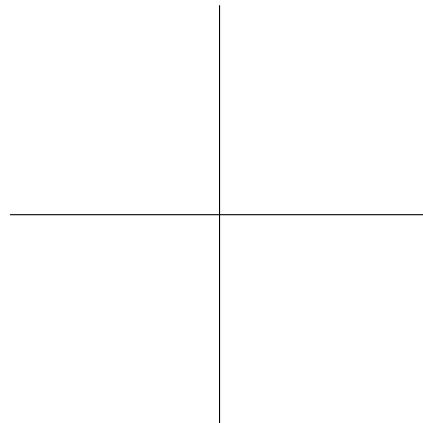
**Part A** Calculators are *not* allowed on Part A.

You must completely finish Part A and turn it in before you work on Part B.

1. (6 pts). Given  $2x - 3y = 8$

(a). Find the  $x$ - and  $y$ -intercepts.

(b). Graph the line and clearly indicate the intercepts.  
[Draw nicely – label marks on the axes.]

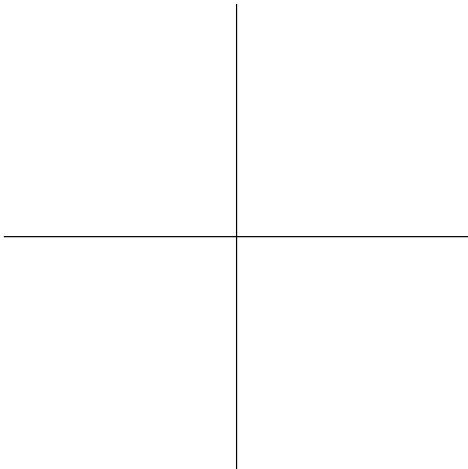


2. (10 pts). Given the quadratic function  $y = x^2 - 4$ ,

(a). Find the  $(x, y)$  coordinate of the vertex; Is it a maximum or a minimum?

(b). Find the  $x$ - and  $y$ - intercepts, if they exist. [If they do not exist, clearly state so.]

(c). Graph the function. Label the vertex and intercepts.



**Part B** You must completely finish Part A and turn it in before you may use a calculator on Part B. Show all of your work and clearly indicate your answers.

**3.** (12 pts). Find the equation of each of the lines given the following information.

[Write your answers in the form  $y = mx + b$ .]

(a). Line through the points  $(2, -4)$  and  $(3, 4)$ .

(b). Line parallel to  $y = -3x + 4$  with  $y$ -intercept  $-2$ .

**4.** (10 pts). A small company makes a profit of \$14,000 in its 1<sup>st</sup> year of operation and makes a profit of \$65,000 in its 4<sup>th</sup> year of operation.

(a). Write a linear equation for the profit as a function of the year.

(b). What will be the profit in the 5<sup>th</sup> year?

(c). When will the profit reach \$100,000?

5. (10 pts). Solve the following system of linear equations algebraically. Show all your work.

[If the system is dependent or has no solution, clearly state so.]

$$\begin{cases} 2x - y = 3 \\ -3x + 4y = 13 \end{cases}$$

6. (10 pts). A woman borrows money from her bank and an investor to start a business. The interest on the bank loan was 10% and the interest on the investor loan was 12%. The total amount borrowed was \$100,000 and her total yearly interest payment was \$10,900. Find the amount she borrowed from the bank and the investor.

[Clearly indicate what  $x$  and  $y$  represent. Write your final answer using the words of the problem.]

7. (18 pts). Solve the following equations using the method indicated. Simplify your answers and leave them in exact form. If no solution exists, clearly state so.

(a). By factoring:  $x^2 - 11x = -10$

(b). By using the quadratic formula:  $2x^2 - 8x - 3 = 0$

(c). By any method you choose:  $3x^2 + 5x - 2 = 0$

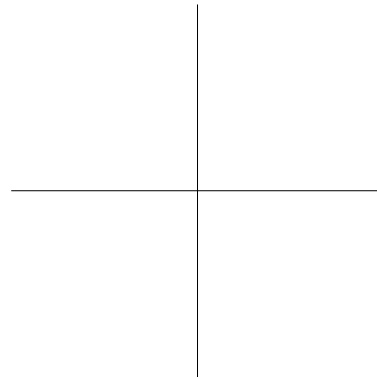
8. (16 pts).

(a). Solve the following inequality and graph the solution on the number on the number line.

$$\frac{-2x}{5} < -3 - x$$

(b). Graph the solution region of the following inequality.

$$3x - y \leq -2$$



9. (12 pts). The graph of the boundary equations for the following system of inequalities is shown below.

$$\begin{cases} x + 5y \leq 10 \\ 2x + y \leq 4 \\ x \geq 0 \\ y \geq 0 \end{cases}$$

(a). Label each line with the correct line from the system of equations.

(b). Shade the solution region.

(c). Find all of the corners of the solution region.

