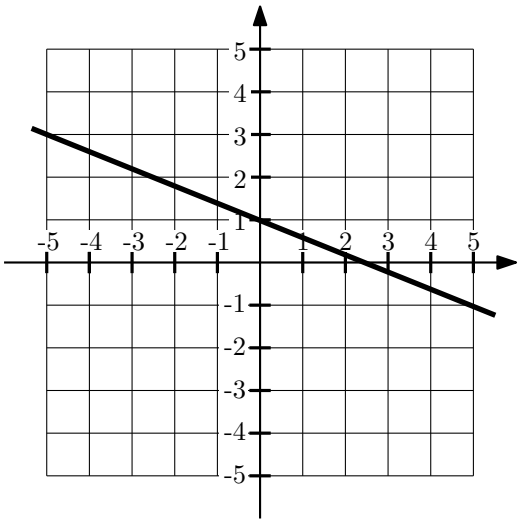
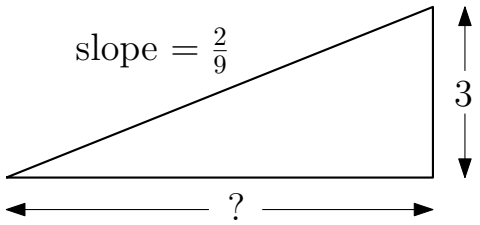
Math 102 Midterm 1 name_____
February 1, 2012

Instructions: Show all your work, and draw a box around your final answer. No calculators are allowed.

1. Find the slope and y-intercept of the line below:



2. A section of road has a slope of $\frac{2}{9}$. The change in height (Δy) is 3 yards. Find Δx.



3. Find a value for n so that $-7x + 3y = 5$ and $nx + 2y = 0$ are perpendicular.

4. Find equations for the following lines:

(a) The line parallel to $9x + 3y = 6$, passing through $(-2, 2)$.

(b) The line through $(0, 0)$ and $(-3, -4)$.

(c) The line perpendicular to $3x - 2y = 5$, with the same x-intercept as $2x + y = -8$.

5. Solve the following systems of equations, and check your answers if possible. If there is no solution, write "no solution." Similarly, write "many solutions" if there are infintely many solutions.

(a) $\begin{cases} 2x + 2y = 4 \\ 3x + 4y = 5 \end{cases}$

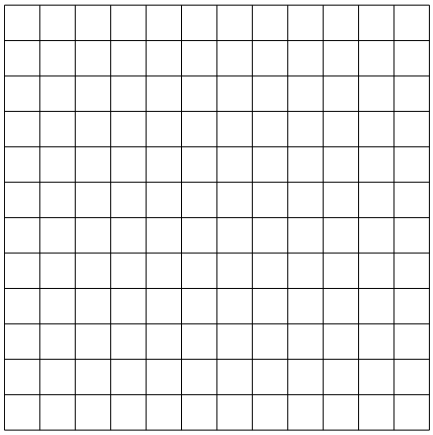
(b) $\begin{cases} x - 5y = -3 \\ -2x + 10y = 6 \end{cases}$

(c) $\begin{cases} x - y = 1 \\ 3x - y = 2 \end{cases}$

6. (a) Solve this system of equations graphically:

$$\begin{cases} 3x - 2y = -4 \\ y = -1 \end{cases}$$

You don't have to check your answer.



(b) Now solve the system of equations from (a) algebraically.

Check your answer (it should be the same as your answer from (a)).

Extra credit. This system of equations has three equations and three variables: x, y, and z:

$$\begin{cases} x + y + z = 2 \\ x - y + z = 4 \\ x - y - z = 0 \end{cases}$$

A solution to this system is a set of values for x, y and z that make all three equations true. Using the same methods we used for systems with two equations, try to solve this system.