MAT 121 – Fall, 2010 Test 1
Chapter 1 Name_____

Solve the following equations. For each equation, state whether it is conditional, identity or inconsistent.

1. $\frac{3}{2}x+\frac{1}{3}=\frac{1}{4}x-\frac{1}{6}$

2. $\frac{1}{x-1}-\frac{1}{x+1}=\frac{2}{x^2-1}$

3. (5 pts bonus) Give an example of an equation in the variable *x* that is...

   a. ... an identity.

   b. ... inconsistent.

4. The old combine can harvest the crop in 96 hours, but a new one can do it in 72 hours. How many hours will it take the two of them operating at the same time to harvest the crop?

5. How much 75% antifreeze solutions should be added to 3 quarts of 30% antifreeze solution to yield a 50% antifreeze solution?

6. Find the *exact* distance between (- 2, 5) and (6, 8).

7. Determine the center and radius of the circle given by

$$x^2 - 4x + y^2 + 10y = 20$$

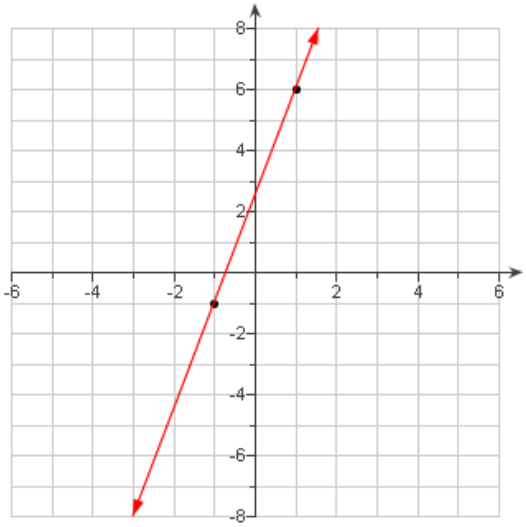
8. Sketch the graph of $(x+7)^2 + (y-8)^2 = 36$.

9. Sketch the graph of each of the following equations. Main points *I* want to see are the intercepts.

a. $2x + 5y = 10$

b. $y = \frac{2}{5}x - 2$

10. Find the equation of the line from the graph



a. Point-Slope form:

b. Slope-Intercept form:

c. Standard form (with integer coefficients):

11. Based on your answer to the previous question, find an equation of the line through (-1, -1) that is perpendicular to the one in the graph. Give your answer in slope-intercept form.

12. Compute the discriminant for each of the following quadratic equations, and determine the *nature* of the solutions (How many, and whether it/they is/are real or non-real):

a. $5x^2 - 38x + 21$

b. $9x^2 + 12x + 4$

c. $x^2 + 12x + 4$

13. Find all real or non-real solutions of the following quadratic equations by completing the square AND by quadratic formula. Write in the lowest terms possible, e.g. $\sqrt{12} = 2\sqrt{3}$. Do *not* use decimal approximations via calculator.

a. $x^2 - x + 1 = 0$

b. $x^2 - 2x - 2$

14. Solve the following inequalities. Write the solution set in interval notation.

a. $3-5x<6$

b. $\frac{x}{5}-7>\frac{2}{3}$

c. $|3x-2|<7$

d. $|3x-2|\le -7$

e. $|3x-2|>-7$

f. $|3x-2|-10\ge -7$