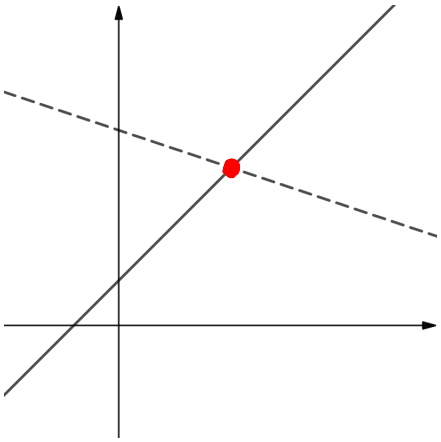
Math 2210-002/010 Quiz 1 **Name:** Key **Due:** 2/1/17

This is a two-stage quiz. You will receive this back with each question graded pass/fail in our next class meeting. You have until the date specified above to submit corrections for partial credit.

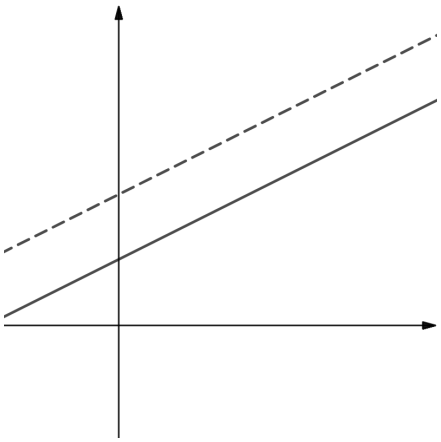
1. (4 points) Below you will find two linear systems and corresponding figures. In each the solid graph is determined by the first equation and the dashed graph by the second. In the blanks provided, specify the *exact* number of solutions for each system.

$$-x_1 + x_2 = 2$$
$$x_1 + 3x_2 = 27$$



Exactly one solution

$$-x_1 + 2x_2 = 6$$
$$-x_1 + 2x_2 = 12$$



No solutions

Recall that the graph of an equation are all points which satisfy that equation, thus the number of intersections of each graph determine the number of solutions.

2. (6 points) Consider the following linear system

$$\begin{aligned} x_1 \qquad - 3x_3 &= 8 \\ 2x_1 + 2x_2 + 9x_3 &= 7 \\ x_2 + 5x_3 &= -2 \end{aligned}$$

(i) (3 points) Give the corresponding coefficient matrix and the corresponding augmented matrix.

Coeff.: $\begin{pmatrix} 1 & 0 & -3 \\ 2 & 2 & 9 \\ 0 & 2 & 5 \end{pmatrix}$

Aug.: $\left(\begin{array}{ccc|c} 1 & 0 & -3 & 8 \\ 2 & 2 & 9 & 7 \\ 0 & 2 & 5 & -2 \end{array}\right)$

(ii) (3 points) Below is the reduced echelon form of the augmented matrix for this system.

$$\begin{bmatrix} 1 & 0 & 0 & 5 \\ 0 & 1 & 0 & 3 \\ 0 & 0 & 1 & -1 \end{bmatrix}$$

Use this to solve the system, i.e. give the solution, a parametric description of the solution set, or justify why there is no solution.

translating

$x_1 = 5$

$x_2 = 3$

$x_3 = -1$

This is the unique solution to the system.