

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

**Directions:** All answers must be handwritten in your own hand. Show all work. No credit for answers without work.

1. [3.5 points] Determine if the following system is consistent.

$$\begin{array}{rcccccc} 2x_1 & - & x_2 & - & 4x_3 & = & 0 \\ x_1 & - & x_2 & - & 3x_3 & = & 2 \\ 3x_1 & + & 2x_2 & + & x_3 & = & -11 \end{array}$$

2. [3 points] A linear equation of the form  $ax_1 + bx_2 = c$  is *degenerate* if  $a = 0$  and  $b = 0$ . Let  $E_1$ ,  $E_2$ , and  $E_3$  be nondegenerate linear equations in the variables  $x_1$  and  $x_2$ . Suppose that  $E_1$  and  $E_2$  form an inconsistent system, and also  $E_2$  and  $E_3$  form an inconsistent system. What can you conclude about the size of the solution set of the system formed by  $E_1$  and  $E_3$ ? Justify your answer.

3. [3.5 points] Solve the following system.

$$\begin{array}{rclcl} x_1 & + & 2x_2 & - & x_3 & = & 10 \\ 2x_1 & + & x_2 & + & x_3 & = & -1 \\ -2x_1 & & & & + & x_3 & = & -1 \end{array}$$