

## Quiz 1

Answer the follow questions about the equations below without using your calculator.

$$\begin{cases} 3x_1 - 4x_2 + x_3 = 11 \\ -x_1 - 3x_2 + 2x_3 = 2 \end{cases} \implies \begin{cases} x_1 + 3x_2 - 2x_3 = 2 \\ 3x_1 - 4x_2 + x_3 = 11 \end{cases}$$

1. (3 points) Is this a system of linear equations?

yes, because all exponents on  $x_1, x_2,$  and  $x_3$  are 1

2. (4 points) Is the system consistent?

yes.

way 1: because equation 2 is not a multiple of equation 1 with 1 of the #'s changed

way 2: solve the system

$$\begin{array}{r} -3x_1 + -9x_2 + 6x_3 = -6 \\ \underline{3x_1 - 4x_2 + x_3 = 11} \\ -11x_2 + 7x_3 = -5 \end{array}$$

$$\text{so } x_1 = 2 - 3x_2 + 2x_3$$

$$x_2 = \frac{7}{11}x_3 + \frac{5}{11}$$

$$\text{or } \begin{cases} x_1 = \frac{1}{11}x_3 + \frac{7}{11} \\ x_2 = \frac{7}{11}x_3 + \frac{5}{11} \\ x_3 = \text{anything we want} \end{cases}$$

3. (3 points) If the system is consistent, does it have a unique solution?

No.

way 1: because there are only 2 equations but 3 unknowns

way 2: in our solution,  $x_3$  could be anything we wanted