

# Assignment: Problem Set X/Writing Assignment Y

Name: First Last

Due Date: 00/00/2018

## List Your Collaborators:

- Problem 1: Collaborator 1, Collaborator 2, etc.

- Problem 2: Collaborator 1, Collaborator 2, etc.

- Problem 3: Collaborator 1, Collaborator 2, etc.

- Problem 4: Collaborator 1, Collaborator 2, etc.

- Problem 5: Collaborator 1, Collaborator 2, etc.

- Problem 6: Collaborator 1, Collaborator 2, etc.

**Problem 7:** How do we use L<sup>A</sup>T<sub>E</sub>X to typeset vectors, or systems of equations?

*Solution:* There are a few ways to typeset math. Let's start with a simple vector. For example, we can define a vector in-line by: `\(\vec{v}=\langle \frac{2}{3},-3,1\rangle\)` whose output looks like:  $\vec{v} = \langle \frac{2}{3}, -3, 1 \rangle$ , in the same line as the text.

If, instead, we wanted this expression on its own line, we may use the code `\[\vec{v}=\Big\langle \frac{2}{3},-3,1\Big\rangle\]` which results in

$$\vec{v} = \left\langle \frac{2}{3}, -3, 1 \right\rangle.$$

Alternatively, if we want our equation to be numbered, we can use the `align` environment:

$$\vec{v} = \left\langle \frac{2}{3}, -3, 1 \right\rangle \tag{1}$$

Google is your friend, there are a lot of resources available to help answer questions about L<sup>A</sup>T<sub>E</sub>X.

If we want our vectors to be aligned vertically, we might use the `pmatrix` environment:

$$\begin{pmatrix} 2 \\ -3 \\ 1 \end{pmatrix}$$

The `align` environment is useful when we have equations or computations that span several lines. For example:

$$2x + 3y - z = 12 \tag{2}$$

$$x - y - 12z = 0 \tag{3}$$

$$12x + y + z = 5 \tag{4}$$

The `&` symbol sets an alignment marker. You can mess around with these to arrange the parts of your align environment. You can use the `align*` environment to omit equation numbers:

$$\begin{array}{ll} 2x + 3y - z = 12 & \text{(the first equation)} \\ x - y - 12z = 0 \\ 12x + y + z = 5 \end{array}$$

Or, you can use the `\nonumber` command on individual lines to suppress numbering.

$$\begin{array}{ll} 2x + 3y - z = 12 & \tag{5} \\ x - y - 12z = 0 & \tag{6} \\ 12x + y + z = 5 & \text{(the third equation has no number)} \end{array}$$

**Problem 13:** What if we want to write a bunch of matrices?

*Solution:* There are many variations of the matrix environment, each of which must live inside a math environment such as  $\backslash(\backslash)$  or  $\backslash[ \backslash]$  or `\align`.

$$\begin{array}{cc} \alpha & \beta^* \\ \gamma^* & \delta \end{array}$$

A matrix, in line:  $\begin{bmatrix} \alpha & \beta^* \\ \gamma^* & \delta \end{bmatrix}$

$$\left\{ \begin{array}{cc} \alpha & \beta^* \\ \gamma^* & \delta \end{array} \right\}$$

$$\left( \begin{array}{cc} \alpha & \beta^* \\ \gamma^* & \delta \end{array} \right)$$

$$\left| \begin{array}{cc} \alpha & \beta^* \\ \gamma^* & \delta \end{array} \right|$$

$$\left\| \begin{array}{cc} \alpha & \beta^* \\ \gamma^* & \delta \end{array} \right\|$$

$$\begin{smallmatrix} \alpha & \beta^* \\ \gamma^* & \delta \end{smallmatrix}$$

$$\begin{bmatrix} \alpha & \beta^* & 7 \\ \gamma^* & \delta & -i \end{bmatrix} \times \begin{bmatrix} 0 & 1 \\ -1 & 1 \\ 2 & 4 \end{bmatrix} \tag{7}$$