Advanced Challenge Level 2 Problem #3   _____

Consider the following definition.

The inclination of a line is defined as follows:

If a line is horizontal, then its inclination is 0º.
If a line is not horizontal, then its inclination is the angle measured counter clockwise from the x-axis to the line.

Note that the inclination of a line is never negative and always less than 180º.

The symbol α is used to represent the inclination of a line. The inclination is usually expressed in degrees, but may also be expressed in radians.

Let α_1, α_2, and α_3 represent the inclinations of lines L_1, L_2, and L_3, shown below.
Since line L_1 is a horizontal line, its inclination $\alpha_1 = 0º$.
The inclination of line L_2 is an obtuse angle. $\alpha_2 \approx 153º$.
The inclination of line L_3 is an acute angle. $\alpha_3 = 45º$.
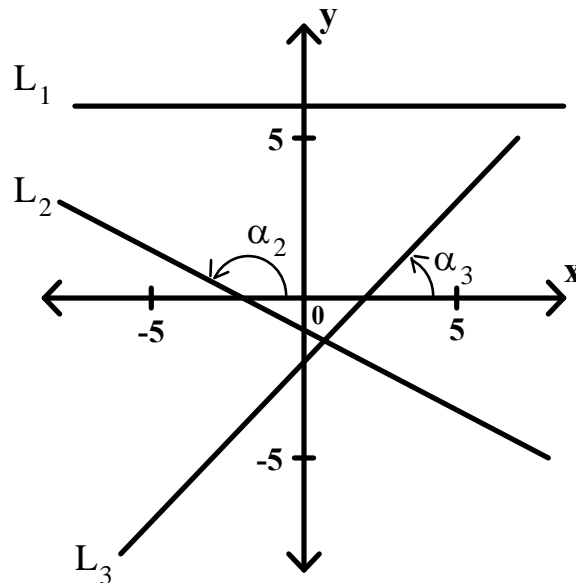
You have to do each of the following.

1. Derive a relationship between the slope of a line and its inclination.

2. Use your relationship to find the inclination of the following lines. Where appropriate, round your answers to three significant digits.

      (a) $y = 2x$ (b) $x = 3$ (c) $y = -5$

      (d) $y = -2x$ (e) $3x + 5y = -10$ (f) $5x - 2y = -6$

Show your complete process, including your reasoning, neatly organized.