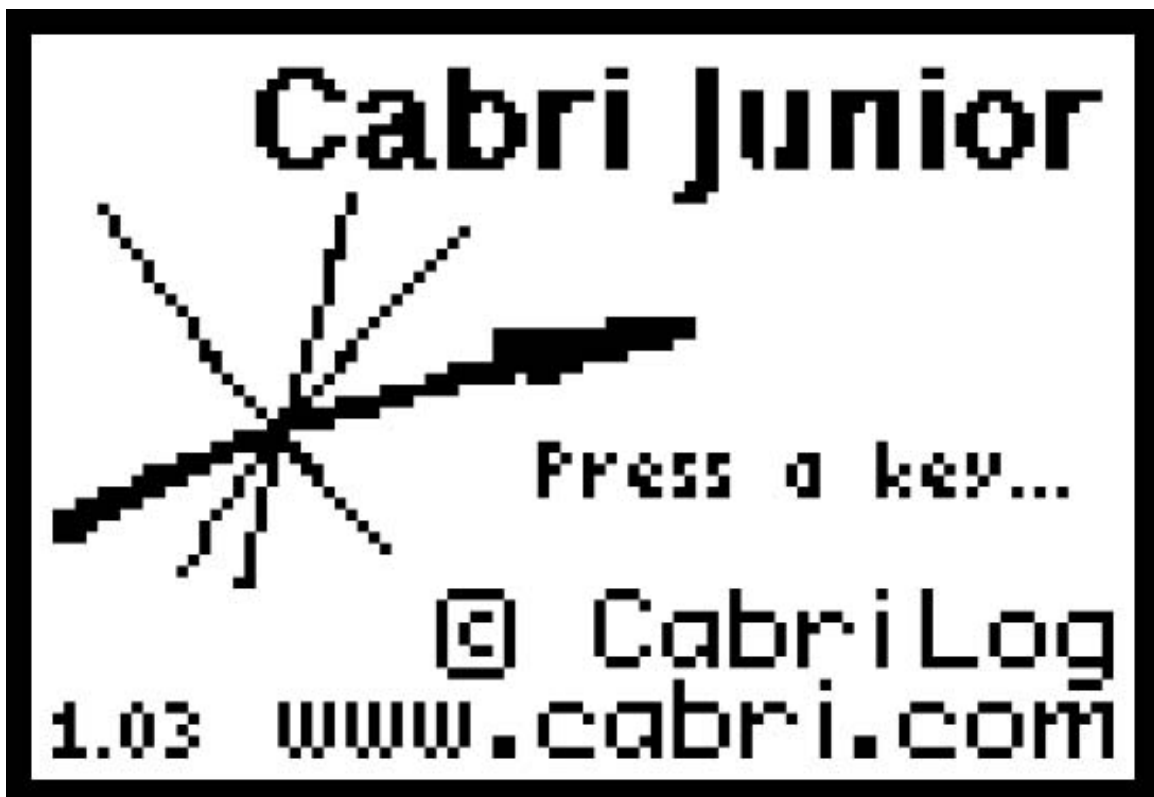# Coordinate Geometry

The Equation of a Line
A Sixty-Minute Presentation
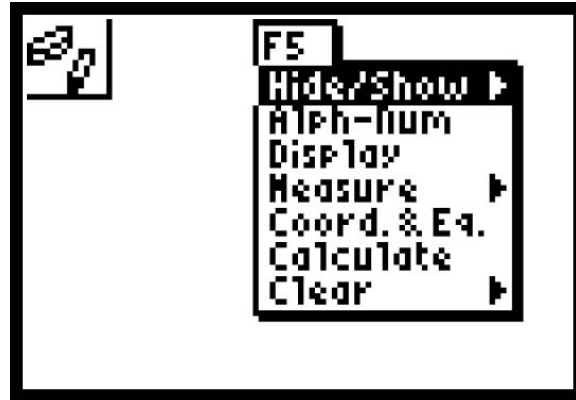
**Featuring Cabri® Jr.,
An "APPS" Program
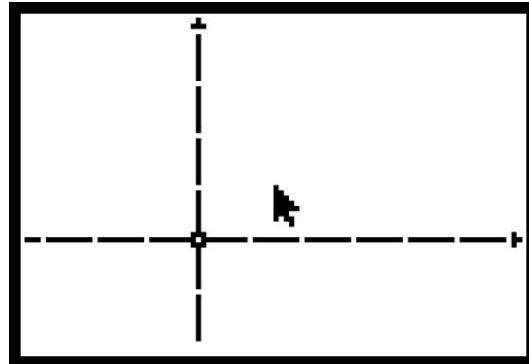For the TI-83 Plus ™ and TI-84™**

- Open Cabri® Jr. and press any key to display the graphing screen.

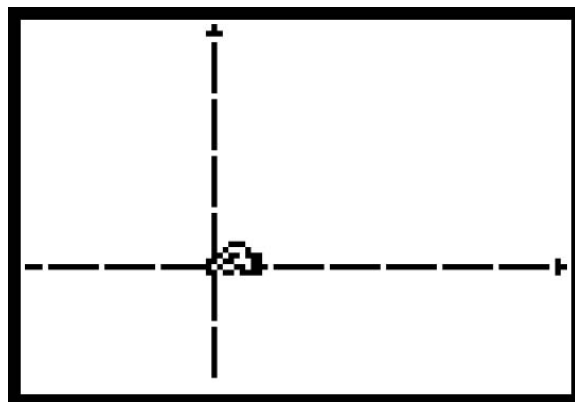If your screen does not display coordinate axes, follow the directions below.

- Select **Hide/Show** (**F5**).

- Use the right arrow to display the **Hide/Show** submenu, select **Axes** and press **ENTER**

- Use arrows to move the cursor to the origin, and then press **ALPHA** to attach the hand to the origin.
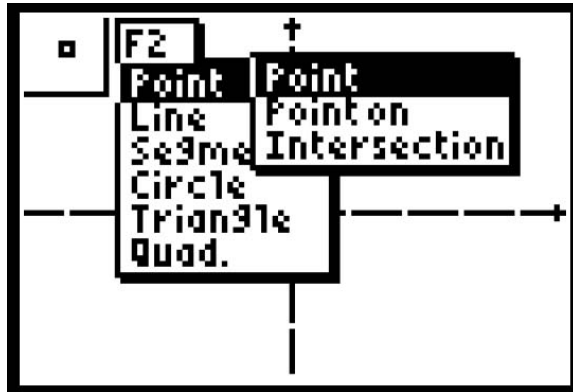
- Use the right arrow to move the *y*-axis toward the center of the screen, and then use the up arrow to move the x-axis toward the center of the screen.
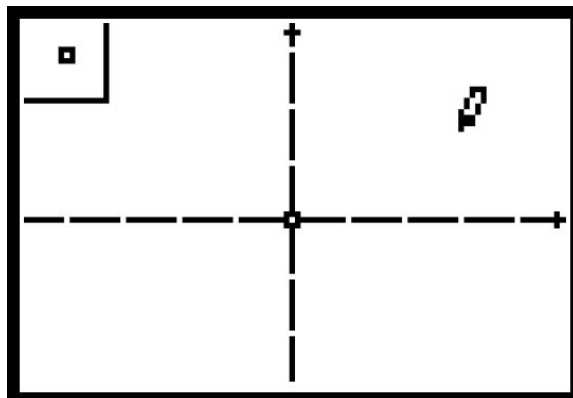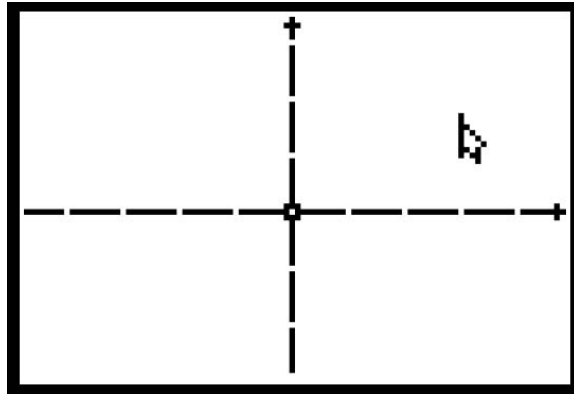- Press **CLEAR** to disengage the hand.
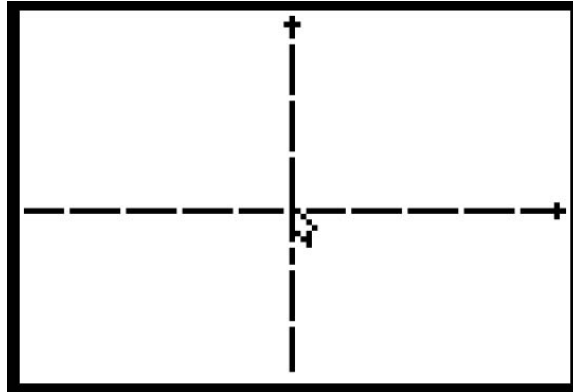
Place a point in quadrant I.
- Select **Point** (**F2**), press the right arrow to select the submenu, and then select **Point** and press **ENTER**.
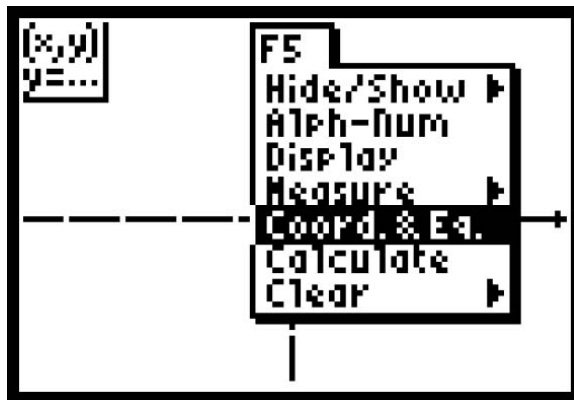
- Move the **Pen** cursor to quadrant I.
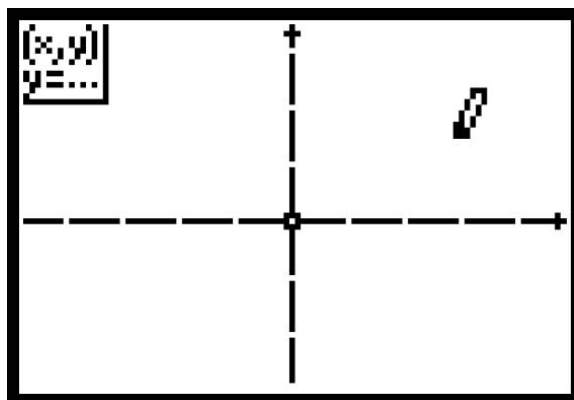- Press **ENTER** to establish the point.
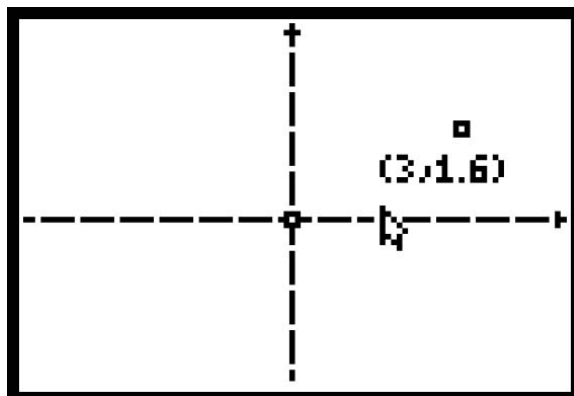
- Press **CLEAR** to disengage the **Point** tool.

- Select **Coord.&.Eq.** (**F5**) while the point is select.

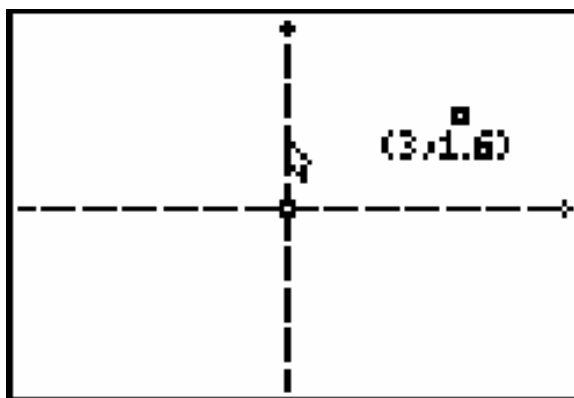- Press **ENTER** to select the highlighted menu item.

- Press **ENTER** to display the coordinates with the hand attached.
- Using the arrow keys, move the coordinates so that the coordinates are away from the point.
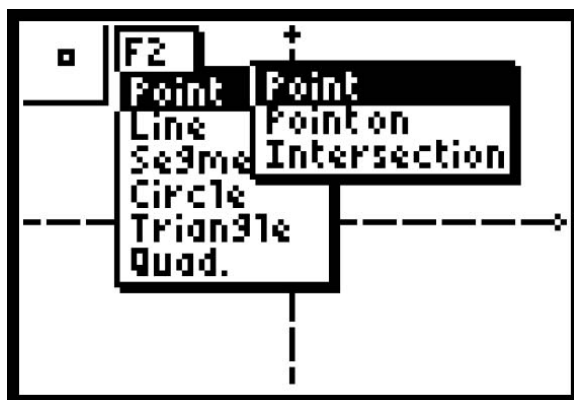- Press **CLEAR**.
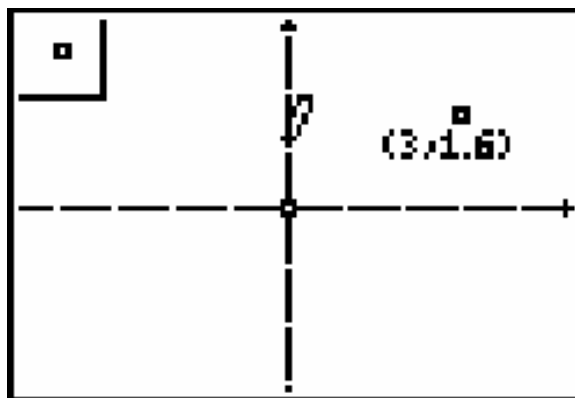
Place a point on the *y*-axis.
- Move the cursor to the *y*-axis. Be sure you have selected the *y*-axis.

- Select **Point** (**F2**), use the right arrow key to display the submenu, and then choose **Point**
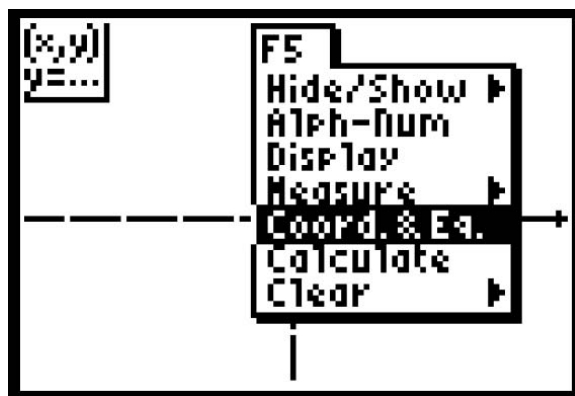.

- Press **ENTER** to select the **Point:Point** tool and then press **ENTER** to create a point on the *y*-axis as indicated by the cursor.
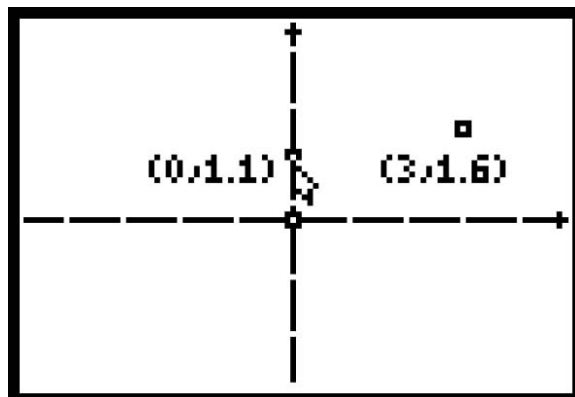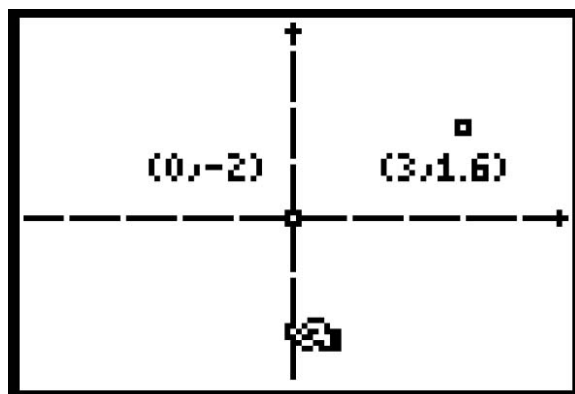
Display the coordinates of the point just created.
- Select **Coord. & Eq.** (**F5**).

- Press **ENTER** to display the coordinates and use the left arrow key to move the coordinates to the left of the point.
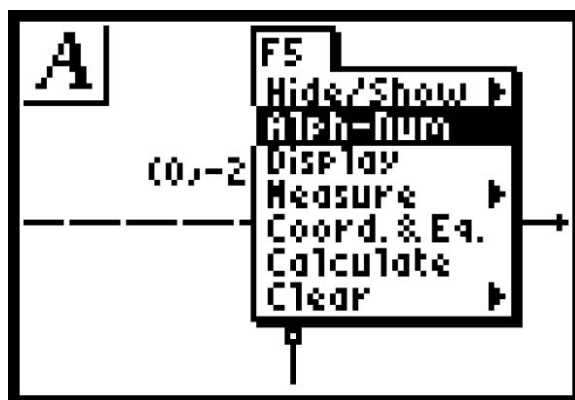
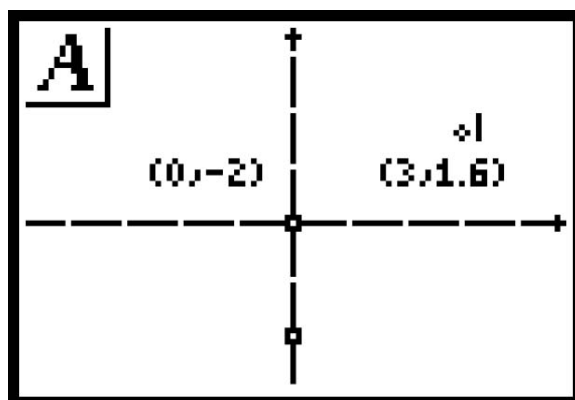- Press **ALPHA** to grab the point and move the point down the *y*-axis.
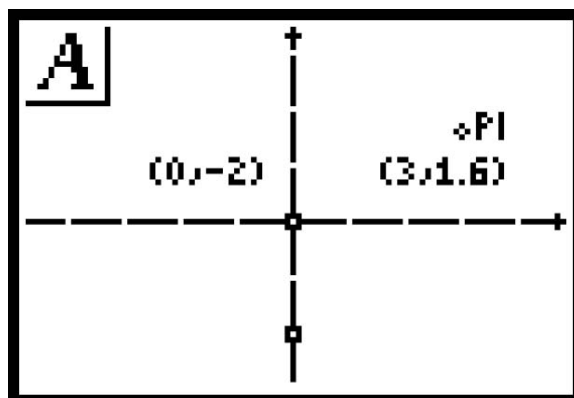
Label the two points.
- Press **CLEAR** and select the point in quadrant I.
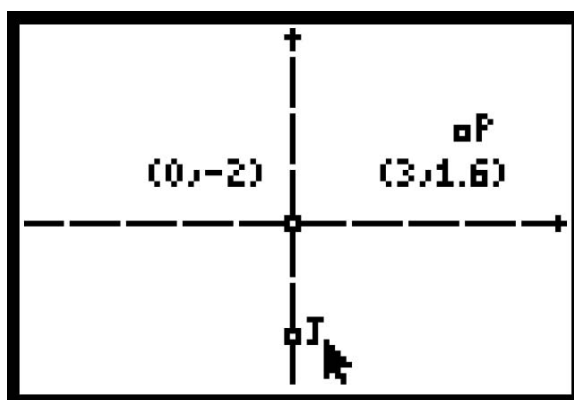- Select **Alph-num** (F5).

- Press **ENTER** to select the **Alph-num** menu option and then press **ENTER** again to position the I-cursor.

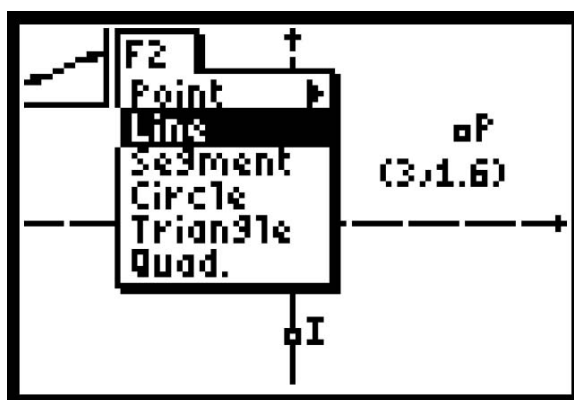- Press the "P" key, which is above the number 8, to name the point **P**.

- Press **ENTER** and move the cursor to the point on the *y*-axis.
- Press **ENTER** to select the point.
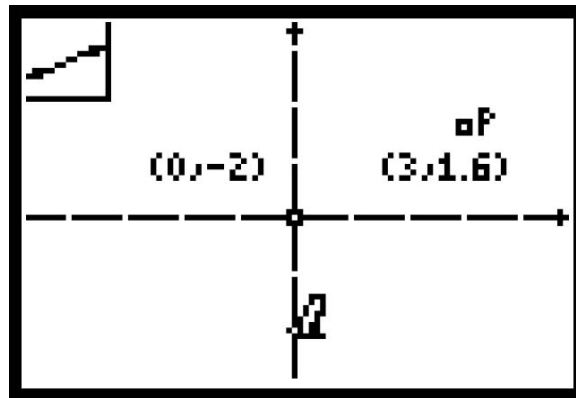- Press the "I" key, which is above ○, and then press **ENTER**.
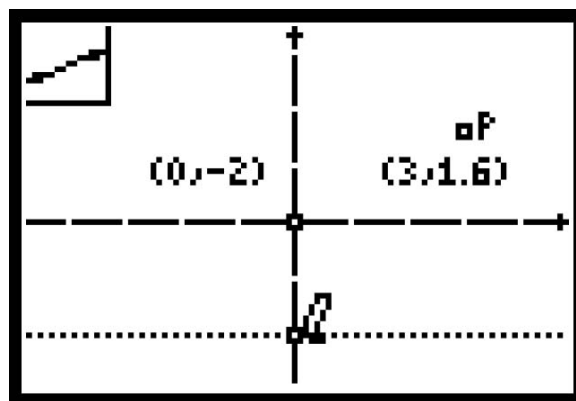

Draw line **IP**.
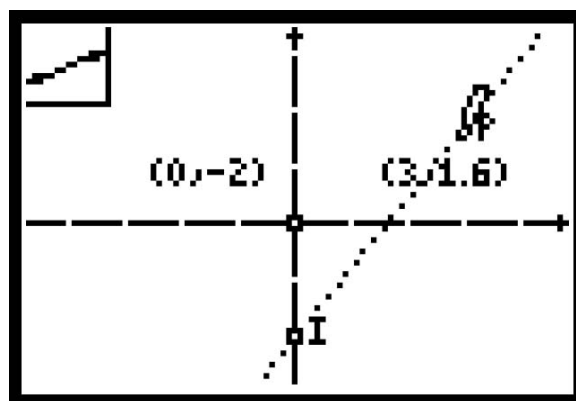- Select **Line** (**F2**).

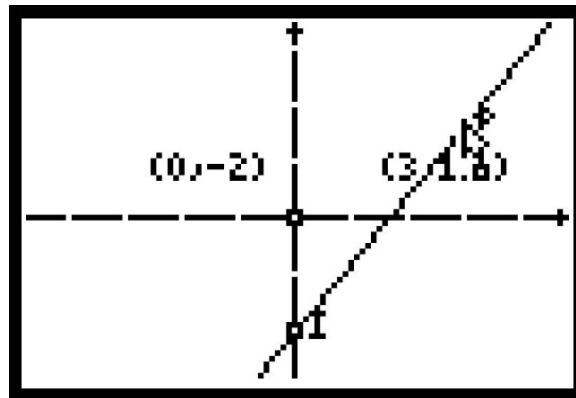- Press **ENTER**. If necessary, move the cursor to select point **I**.
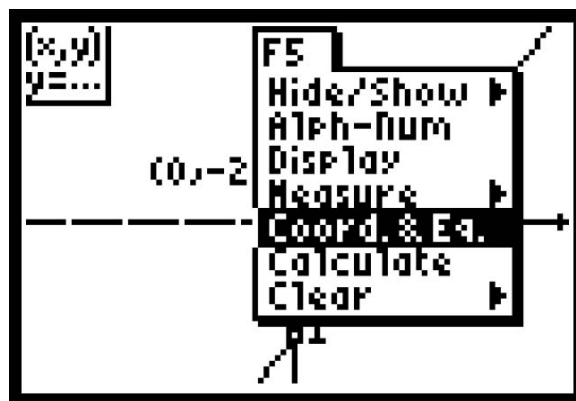
- Press **ENTER**.

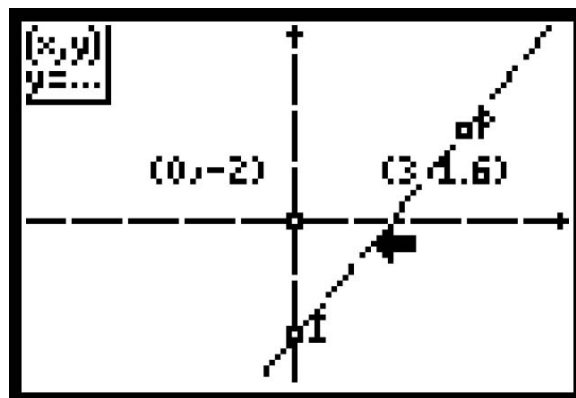- Move the cursor to point **P**.

- Press **ENTER**. The line is defined with **I** and **P**.

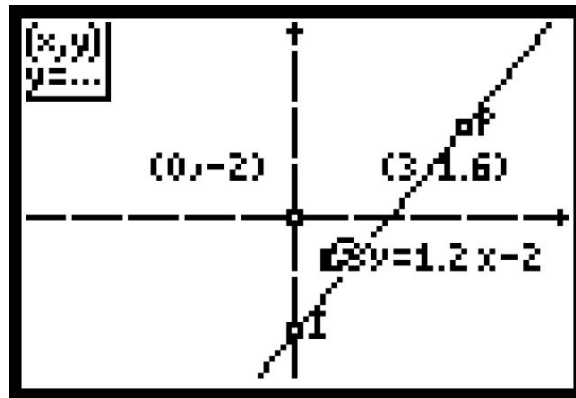- Select **Coord.&.Eq** (**F5).**

- Press **ENTER**.
- Move the cursor away from point **P** and select the line **IP**.
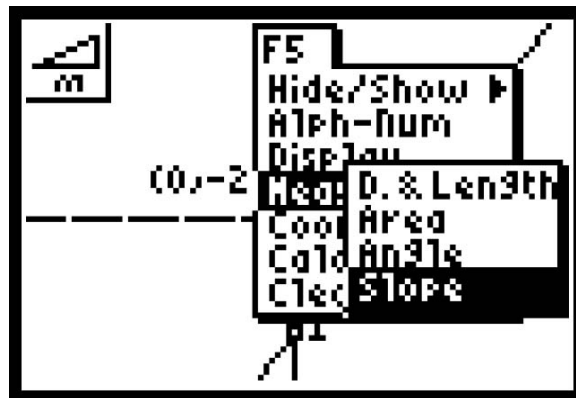

- Press **ENTER**.

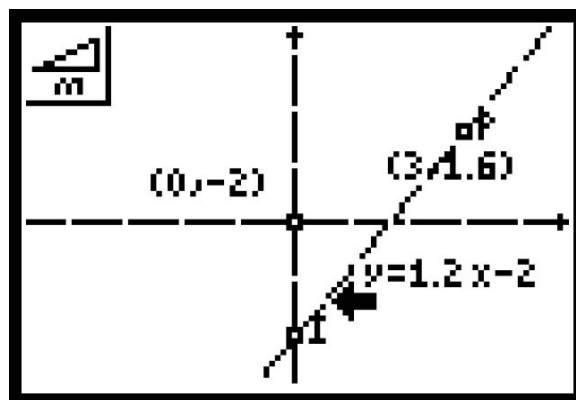The equation of line **IP** appears on the screen with the hand attached.

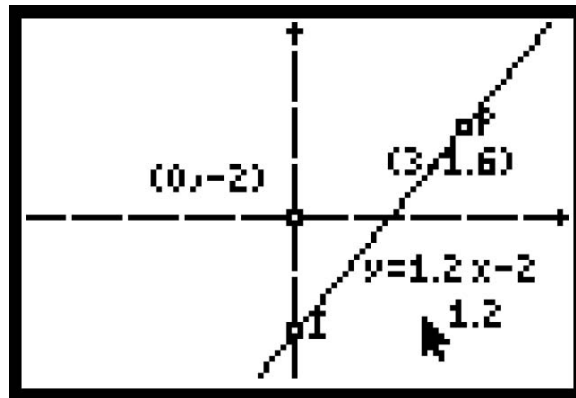Display the slope of the line on the screen.
- Press **CLEAR** to disengage the hand.
- Select **Measure** (**F5**), and choose **Slope**.

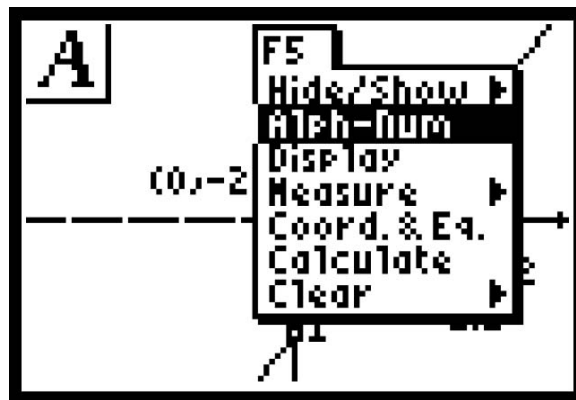- Press **ENTER** and move the cursor so the line is selected.

- Press **ENTER**. The slope appear with the hand connected.
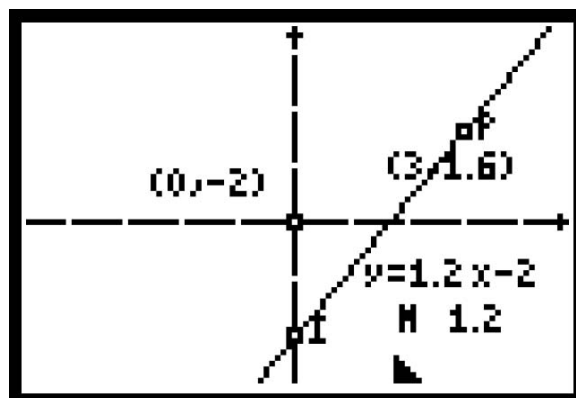- Move the slope under the equation and press **CLEAR**.

Place the letter "M" left of the slope.
- Select **Alph-num** (**F5**).

- Press **ENTER**.
- Move the cursor left of the slope, leaving enough room so the letter will not intersect the number.
- Press **ENTER** and then press M, which is above ⊚.
- Press **ENTER** and then press **CLEAR**.

"M" represents the slope in the slope-intersect-form of an equation $y = mx + b$, where b is the y-intercept.
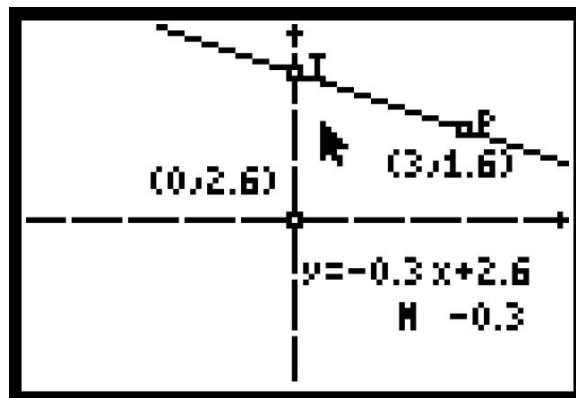
- Select point **P** and press **ALPHA** to engage the dragging hand.
- Move **P** around the screen.
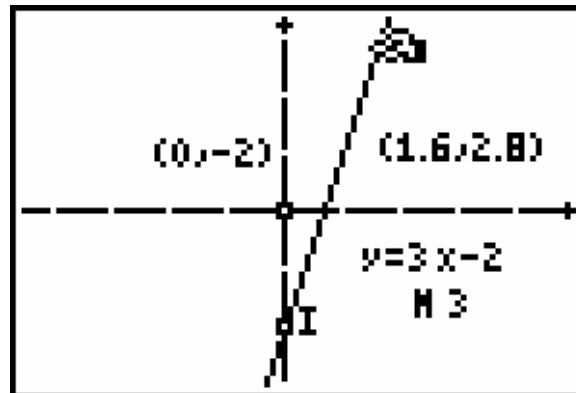
Make a conjecture about the effect of moving point P on the equation of the line.

- Move the point **P** back to its original position and press **CLEAR**.
- Move the cursor to the point **I**. Press **ALPHA** to engage the dragging hand.
- Move the point up and down the *y*-axis.

Make conjectures about the slope and *y*-intercept.