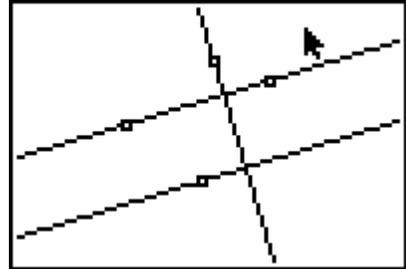# CABRI™ JR. ACTIVITY 23: INVESTIGATING THE SLOPES OF PARALLEL AND PERPENDICULAR LINES

ACTIVITY OVERVIEW:
In this activity we will
- Draw a line
- Draw a line parallel to the original line
- Draw a line perpendicular to the original line
- Explore the relationships between the slopes of parallel and perpendicular lines

Press [APPS]. Move down to the CabriJr APP and press [ENTER]. Press [Y=] for the F1 menu and select **New**. (If asked to **Save changes?** press [◄] [ENTER] to choose "No.")
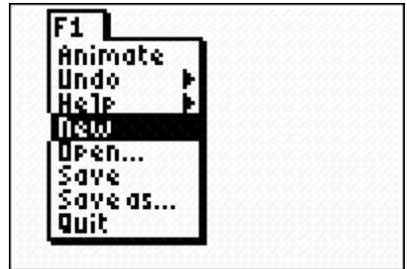
Press [WINDOW] for F2, move to **Line** and press [ENTER]. Move to the desired location and press [ENTER] to mark one point on the line. Move the pencil to the desired location of the other point defining the line and press [ENTER].
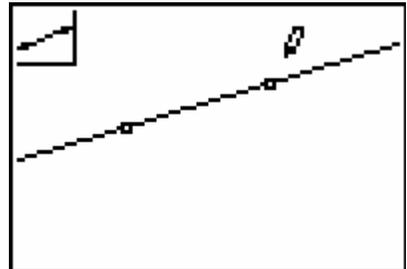
Press [ZOOM] for the F3 menu, move **Parallel** and press [ENTER]. Move until the line is flashing and press [ENTER]. Move the pencil to a new location to mark a point through which the parallel line will pass, then press [ENTER].
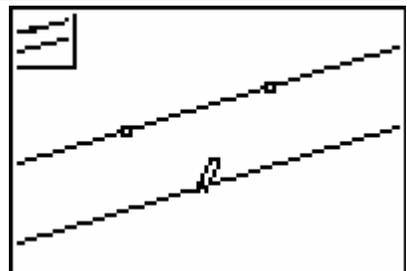
Press [ZOOM] for the F3 menu, move **Perp.** and press [ENTER]. Move until the original line is flashing and press [ENTER]. Move the pencil to a new location to mark a point through which the perpendicular line will pass, then press [ENTER].
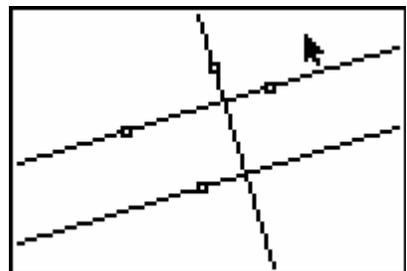
How are the slopes of these lines related?

Press GRAPH for F5 and move to **Measure** then right and down to **Slope**. Press ENTER. Move the arrow until one line is flashing and press ENTER. Move the measurement to a convenient location then press CLEAR to turn off the *hand*. With the **Slope** tool still active, move until another line is flashing and press ENTER. Move the measurement to a convenient location then press CLEAR to turn off the *hand*. The **Slope** tool is still active so move to the third line is flashing and press ENTER. Move this measurement and press CLEAR to turn off the *hand*.
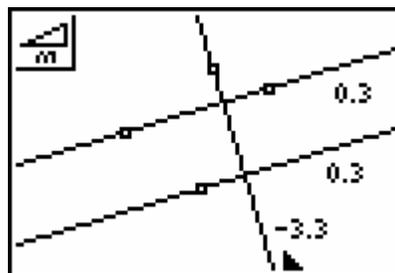
The parallel lines have the same slopes, but the perpendicular lines do not. To explore the relationship between the slopes of the perpendicular lines, we can find the product of their slopes.
Press GRAPH for the F5 menu and move to **Calculate** then press ENTER.
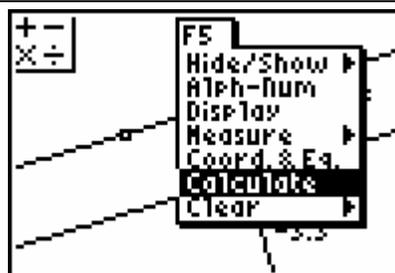
Move until one of the slope values has a flashing underline then press ENTER. Move until the slope of a perpendicular line has a flashing underline and press ENTER. At this time, both of the slope values should be flashing. Press ⊠ and the product of these slopes will be displayed. Move this value to a convenient location and press CLEAR to turn off the *hand*. Press CLEAR again to turn off the **Calculate** tool.
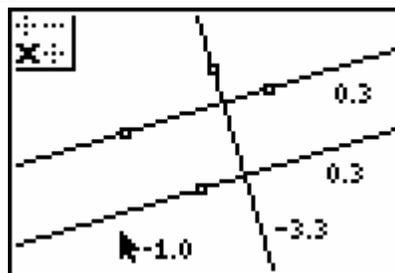
Move the pointer to the first point marked on the original line. Press ALPHA to activate the *hand* and move the point around the screen. Since the parallel line and the perpendicular line were drawn with respect to the original line, they will both move as you move the point on the original line. Observe the changes in the slopes and in the product. Press CLEAR to deactivate the *hand*.
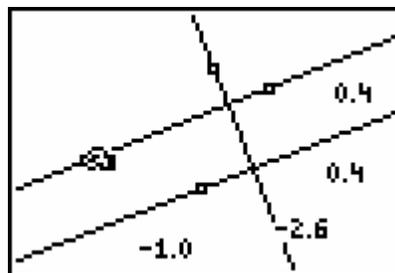
When using the **Calculate** tool, rounding errors may occur. To display the values rounded to hundredths, move until the value has a flashing underline and press +. Repeat this for the remaining values. (This can also be done when the slope values are originally found by pressing + when the *hand* is on the value.)
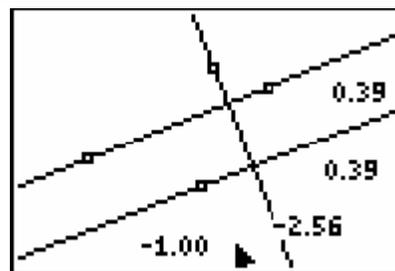
To exit the APP, press Y= for the F1 menu. Move to **Quit**, then press ENTER. (Or you can press 2nd MODE for [QUIT].)