

Bonus Chapter 3

Finding Measurements

In This Chapter

- ▶ Evaluating length and area
- ▶ Measuring an angle
- ▶ Determining the coordinates of a point or the slope of a line
- ▶ Finding the equation of a line or a circle

The **Appearance** menu in Cabri Jr. houses the tools you use to find the length of a segment, degree measure of an angle, or area of a circle, triangle, or quadrilateral. It also contains a tool that allows you to add and subtract like measurements. It even has a tool that gives you the equation of a line or a circle or the coordinates of a point. This chapter explains how to use these tools.

Finding Length and Distance

The **D. & Length** tool in the **Measure** submenu of the **Appearance** menu is used to find the following measurements:

- ✓ The distance between two points
- ✓ The length of a segment
- ✓ The circumference of a circle
- ✓ The perimeter of a triangle or quadrilateral

To use the **D. & Length** tool, follow these steps:

1. Press **GRAPH** to select the **Appearance** menu. Use the **▲▼** keys to place the cursor on the **Measure** option. Press **▶** to display the **Measure** submenu. Use the **▲▼** to place the cursor on the **D. & Length** option, and then press **ENTER** to select that option.

A symbol of the tool appears in the upper-left corner of the screen, as illustrated in the first picture of Figure B3-1.

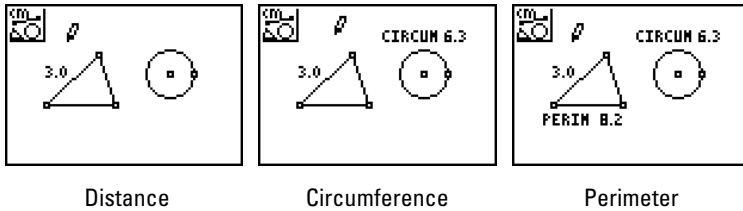


Figure B3-1: Using the D. & Length tool.

2. **Select the object you want to measure and press `ENTER` to display the measurement. Use the arrow keys to move the measurement to a better location and press `ENTER` to anchor that location.**

If you are measuring the distance between two points, use the arrow keys to move the cursor to the first point and press `ENTER` to select that point. Then move the cursor to the second point and press `ENTER`. The distance between the points appears on the screen. Use the arrow keys to move the measure of that distance to a better location and press `ENTER` to anchor that location. This is illustrated in the first picture in Figure B3-1, where I found the distance between the points on the left side of the triangle.

If you are measuring the length of a segment, the circumference of a circle, or the perimeter of a polygon, use the arrow keys to move the cursor to that object. The cursor is on the object when the object blinks. Press `ENTER` to select the blinking object. The requested measurement appears on the screen. Use the arrow keys to move that measurement to a better location and press `ENTER` to anchor that location. This is illustrated in the second picture in Figure B3-1, where Cabri Jr. found the circumference of the circle. In this picture, I labeled the circumference. (Labeling objects is explained in Chapter 9.)

3. **To measure another object, repeat Step 2.**

This is illustrated in the third picture of Figure B3-1, where I found the perimeter of the triangle.

4. **When you are finished taking measurements, press `CLEAR` or select another menu item.**



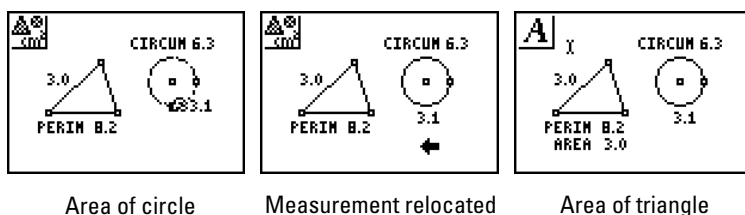
All measurements displayed on the screen of the calculator are only a one decimal place *approximation* of the true measure. So if, for example, you want to show that your right triangle satisfies the Pythagorean Theorem, you most likely will not be able to do this using the measurements displayed on the calculator's screen.

Determining Area

The **Area** tool in the **Measure** submenu of the **Appearance** menu is used to find the area of an already constructed circle, triangle, or quadrilateral. To use this tool, follow these steps:

1. Press **GRAPH** to select the **Appearance** menu. Use the **▲▼** keys to place the cursor on the **Measure** option. Press **▶** to display the **Measure** submenu. Use the **▲▼** to place the cursor on the **Area** option, and then press **ENTER** to select that option.

A symbol of the tool appears in the upper-left corner of the screen, as illustrated in the first picture of Figure B3-2.



Area of circle

Measurement relocated

Area of triangle

Figure B3-2: Finding area.

2. Use the arrow keys to move the cursor to the object whose area you want to find and press **ENTER** to select that object.

The object is displayed as a blinking object, and the requested area appears on the screen. This is illustrated in the first picture in Figure B3-2, where Cabri Jr. found the area of the circle.

3. Use the arrow keys to relocate that measurement on the screen and press **ENTER** to anchor that location.

This is illustrated in the second picture in Figure B3-2.

4. To find the area of another object, repeat Steps 2 and 3.

This is illustrated in the third picture in Figure B3-2, where the area of the triangle was found and labeled. Labeling objects is explained in Chapter 9.

5. When you are finished finding areas, press `CLEAR` or select another menu item.

Measuring an Angle

For Cabri Jr. to recognize the existence of an angle, that angle must contain three defining points — the vertex and a point on each side of the angle. Also, Cabri Jr. recognizes a point only if it appears on the screen as a small square, such as the three points defining the triangle in Figure B3-1. If the angle you want to measure does not contain the small squares representing these three defining points, then Cabri Jr. cannot measure it. But all is not lost. Bonus Chapter 2 tells you how to establish the point of intersection of two lines and how to place a point on a line. After you have constructed the three points defining your angle, Cabri Jr. can find its measure.



Cabri Jr. measures all angles in degrees — even if the Mode is set to radian measure. Chapter 3 tells you how to convert degrees to radians and how to convert degree measures to degrees, minutes, and seconds.

To find the degree measure of an already constructed angle containing three defining points, follow these steps:

- 1. Press `GRAPH` to select the Appearance menu. Use the `▲▼` keys to place the cursor on the Measure option. Press `▶` to display the Measure submenu. Use the `▲▼` to place the cursor on the Angle option, and then press `ENTER` to select that option.**

A symbol of the **Angle** tool appears in the upper-left corner of the screen.

- 2. Use the arrow keys to move the cursor to an existing point on one side of the angle and press `ENTER` to select that point.**

Cabri Jr. uses a small square to indicate that a point exists. If you don't see a small square on the side of the angle, the first paragraph in this section tells you what to do about the situation.

- Use the arrow keys to move the cursor to the vertex of the angle and press **[ENTER]** to select the vertex.

The vertex must always be the second point that defines the angle.

- Use the arrow keys to move the cursor to an existing point on the other side of the angle and press **[ENTER]** to select that point.

The measure of the angle appears on the screen.

- Use the arrow keys to relocate that measurement on the screen and press **[ENTER]** to anchor that location.

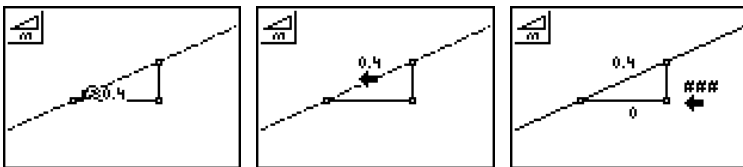
- To find the measure of another angle, repeat Steps 2 through 5. When you are finished measuring angles, press **[CLEAR]** or select another menu item.

Finding Slope

The **Slope** tool in the **Measure** submenu of the **Appearance** menu is used to find the slope of a line, segment, or side of a triangle or quadrilateral. To find the slope, follow these steps:

- Press **[GRAPH]** to select the **Appearance** menu. Use the **[↑]** **[↓]** keys to place the cursor on the **Measure** option. Press **[→]** to display the **Measure** submenu. Use the **[↑]** **[↓]** to place the cursor on the **Slope** option, and then press **[ENTER]** to select that option.

A symbol of the **Slope** tool appears in the upper-left corner of the screen, as illustrated in the first picture in Figure B3-3.



Slope of a line

Measurement relocated

Slope of a segment

Figure B3-3: Finding the slope of a line or a segment.

- Use the arrow keys to move the cursor to the line, segment, or side of a triangle or quadrilateral and press **[ENTER]**.

The slope appears at the location of the cursor, as illustrated in the first picture in Figure B3-3.

- Use the arrow keys to move the slope to a better location and press **ENTER** to anchor that location.

This is illustrated in the second picture in Figure B3-3.

- To find the slope of another line, repeat Steps 2 and 3. When you are finished finding slopes, press **CLEAR** or select another menu item.

This is illustrated in the third picture of Figure B3-3, where Cabri Jr. found the slopes of the horizontal and vertical segments.



Cabri Jr. uses the symbol ### to indicate that a slope is undefined.

Performing Calculations

Cabri Jr. is capable of adding, subtracting, multiplying, and dividing any two measurements appearing on the screen. It can also find the square root of a measurement appearing on the screen. To perform such calculations, follow these steps:

- Press **GRAPH** to select the Appearance menu. Use the **▲▼** keys to place the cursor on the Calculate option and press **ENTER** to select that option.

A symbol of the **Calculate** tool appears in the upper-left corner of the screen, as illustrated in the first picture in Figure B3-4.

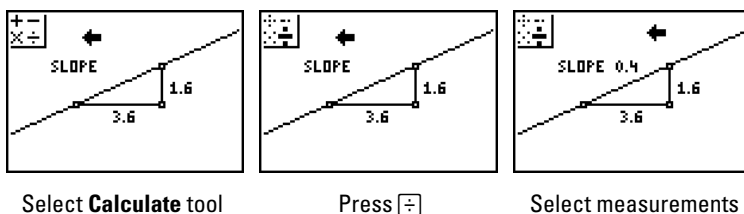


Figure B3-4: Using the Calculate tool to find the slope of a line.

- Press the key for the arithmetic operation you want to perform. That is, press **+**, **-**, **×**, **÷**, or **2nd****x²** (for finding a square root).

This is illustrated in the second picture in Figure B3-4, where the **÷** key was pressed. In this figure, I am finding the slope of the line, so I need to calculate $1.6 \div 3.6$.

3. Use the arrow keys to move the cursor to the first measurement in the arithmetic expression and press **ENTER** to select that measure. If you are adding, subtracting, multiplying, or dividing, select the second measurement in the arithmetic expression in the same way.

The measurement blinks when the cursor is placed on it. If you are calculating a square root, the calculation appears on the screen after you select the first measurement. For other operations, the calculation appears after the second measurement is selected.



To square a measurement, press **⊗** and then select that measurement two times.

All calculations are rounded to one decimal place. For example, the product of 0.2×0.1 (or 0.02) is rounded to zero.

4. Use the arrow keys to move the calculation to a better location and press **ENTER** to anchor that location.

This is illustrated in the third picture in Figure B3-4, where the calculation is placed after the word SLOPE.

5. Repeat Steps 2 through 4 to perform more calculations. When you are finished performing calculations, press **CLEAR** or select another menu item.

Finding the Equation of a Line or Circle or the Coordinates of a Point

The **Coord. & Eq.** tool in the **Appearance** menu is used to find the equation of an already constructed line or circle or to find the coordinates of a point appearing on the screen. To find the equation of a line or circle or the coordinates of a point, follow these steps:

1. Press **GRAPH** to select the **Appearance** menu. Use the **⬆****⬇** keys to place the cursor on the **Coord. & Eq.** option and press **ENTER** to select that option.

A symbol of the **Coord. & Eq.** tool appears in the upper-left corner of the screen, as illustrated in the first picture in Figure B3-5.

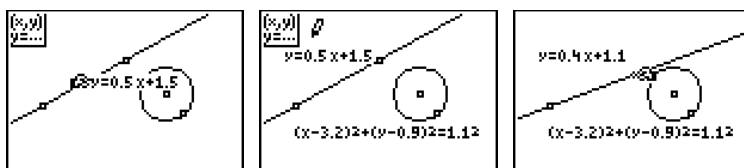


Figure B3-5: Finding the equation of a line and a circle.

2. Use the arrow keys to move the cursor to the object whose equation or coordinates you want to find and press **ENTER**.

The object blinks when the cursor is placed on it. After pressing **ENTER**, the equation or coordinates appear at the location of the cursor, as illustrated in the first picture of Figure B3-5 for the equation of the line.

3. Use the arrow keys to move the equation or coordinates to a better location and press **ENTER** to anchor that location.

This is illustrated in the second picture of Figure B3-5 for the equation of the line.

4. Repeat Steps 2 and 3 to find the equation of another line or circle or the coordinates of another point. When you are finished finding equations and coordinates, press **CLEAR** or select another menu item.

This is illustrated in the second picture in Figure B3-5 for the equation of the circle.



After you have found the equation of a line or circle or the coordinates of a point, you can move the object and watch the equation or coordinates change accordingly. This is illustrated in the third picture in Figure B3-5, where the line is moved. Moving objects is explained in Chapter 9.