

GRAPHING THE COSINE AND SINE

FOR THIS ACTIVITY YOU WILL NEED:

- a paper plate
- your special triangles
- approximately nine feet of string
- approximately nine feet of butcher paper
- markers
- ruler and meter stick

LABELING THE UNIT CIRCLE

- Place the paper plate face down and draw a diameter. This will be your x-axis. Label it.
- Draw and label the y-axis.
- Beginning at the x-axis and moving **counterclockwise**, use your special triangles draw and label a diameter with central angles of 30° , 45° , and 60° . Continue labeling through 360° .
- What happens as you label angles greater than 360° ? Continue labeling angles for two full revolutions.
- Beginning at the x-axis and moving (clockwise these angles will be negative) label the each angle for one revolution.
- How many names can an angle have?
- Use 1 for the radius of this circle.** (That is why it is called the unit circle.) Label the x and y coordinates where each of the central diameters meets the circle. Be careful of the signs for x and y when you move out of the first quadrant.

MAKING THE GRAPH

- Tie a knot in your string and place it at -360° . Now move to the next angle, -330° and mark the string. Continue marking your string at each angle through 720° (three full revolutions.)
- On the butcher paper draw an x-axis as long as your string.
- Draw the y-axis at the 0° mark.
- Use your string label each angle from -360° to 720° .
- Use your special triangles to plot the x-coordinate of each point. Use your paper plate to help label those x-coordinates.
- What patterns do you notice?
- Connect the points with a smooth curve. You have created the graph of the cosine function: $y = \cos x$.
- Using a second color plot, label and connect the y-coordinates. This is the sine function: $y = \sin x$.
- How are the two functions alike? How do they differ?