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### Directions for Graphing $f(x) = \sin x$ :

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1. Using the unmarked ruler, measure the vertical height from the positive  $x$  – axis to the end point of the terminal side of radian measure  $\frac{\pi}{6}$  . Mark the height off with your pen and transfer the same height and mark off a point above the corresponding radian measure, i.e.  $\frac{\pi}{6}$  for the first radian measure.
2. Repeat this process for all of the angle marks around the circle until all vertical heights have been measured.
3. For the lower half of the circle, i.e. from  $\frac{7\pi}{6}$  to  $\frac{11\pi}{6}$  , mark off the point of the measured vertical height below the  $x$  – axis in the coordinate plane. This will indicate the negative sine values in the third and fourth quadrants.
4. Connect all the points with a smooth curve with vertical height of 0 at  $x = 0$  and  $x = 2\pi$ .

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### Directions for Graphing $f(x) = \cos x$ :

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1. Using the unmarked ruler, measure the horizontal distance from the origin to the base of the vertical segments formed.
2. Mark off the horizontal distance with your pen and transfer the same distance marking off a point above the corresponding radian measure, i.e.  $\frac{\pi}{6}$  for the first radian measure.
3. Repeat this process for all of the angles around the circle until all horizontal lengths have been measured.
4. For the left half of the circle, i.e. from  $\frac{2\pi}{3}$  to  $\frac{4\pi}{3}$  , mark off the point of the measured distance below the  $x$  – axis in the coordinate plane. This will indicate the negative cosine values in the second and third quadrants.
5. Connect all the points with a smooth curve with horizontal distance of 1 at  $x = 0$  and  $x = 2\pi$ .

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### Questions for Investigation:

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1. How are the graphs of sine and cosine alike?
2. How are the graphs of sine and cosine different?
3. Since the two graphs are similar, what is one way to tell the sine graph from the cosine graph?
4. After how many radians does each graph start to repeat? How do you know it repeats after this point?
5. At what radian measured do the graphs intersect the  $x$  – axis? (Remember:  $x$  – intercepts are zeros of the functions)

$f(x) = \sin x$  \_\_\_\_\_

$f(x) = \cos x$  \_\_\_\_\_