

Unit 2.1 - Introduction to Trig Functions

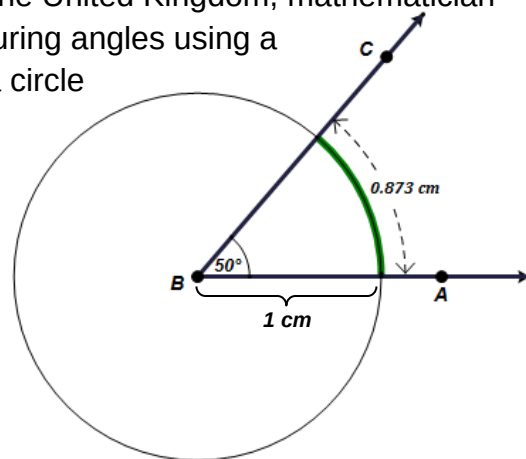
Degree & Radian Measures

Name: _____

- The Babylonian Degree method of measuring angles.** Around 1500 B.C. the Babylonians are credited with first dividing the circle up in to 360° . They used a base 60 (sexagesimal) system to count (i.e. they had 60 symbols to represent their numbers where as we only have 10 (a centesimal system of 0 through 9)). So, the number 360 was convenient as a multiple of 60. Additionally, according to Otto Neugebauer, an expert on ancient mathematics, there is evidence to support that the division of the circle in to 360 parts may have originated from astronomical events such as the division of the days of a year. So, that the earth moved approximately a degree a day around the sun. However, this would cause problems as years passed to keep the seasons accurately aligned in the calendar as there are 365.242 actual days in a year. Some ancient Persian calendars did actually use 360 days in their year further supporting this idea.

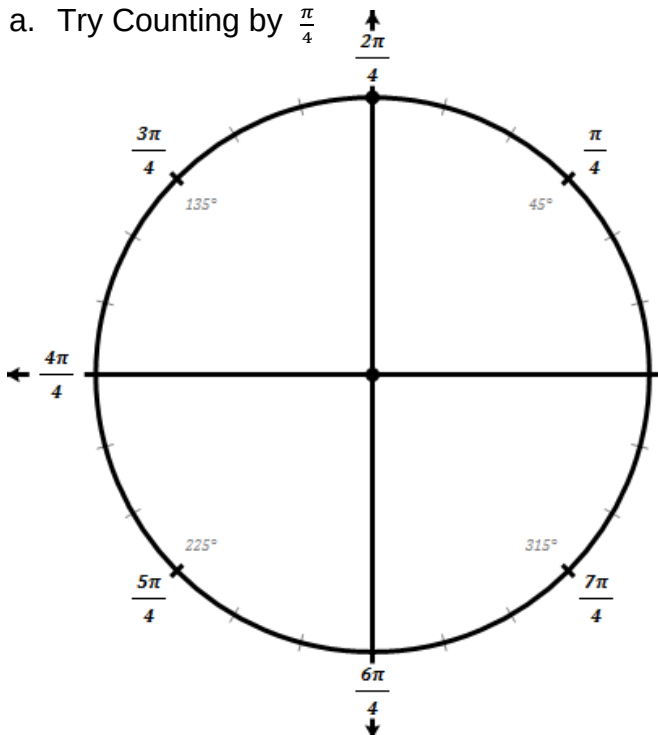


- The transition to Radian measure of angle:** Around 1700 in the United Kingdom, mathematician Roger Cotes saw some advantages in some situations to measuring angles using a radian system. A radian system simply put, drops a unit circle (a circle with a radius of 1) on to an angle such that the center is at the vertex and the length of the intercepted arc is the radian measure. So, a full circle of 360° is equivalent to $2\pi \cdot (1)$ radians. In the example at the right, an angle of 50° is shown. Then, a circle that has a radius of 1 cm is drawn with its center at the vertex. Finally, the intercepted arc length is determined to be approximately 0.873 or more precisely $\frac{5\pi}{18}$ radians.

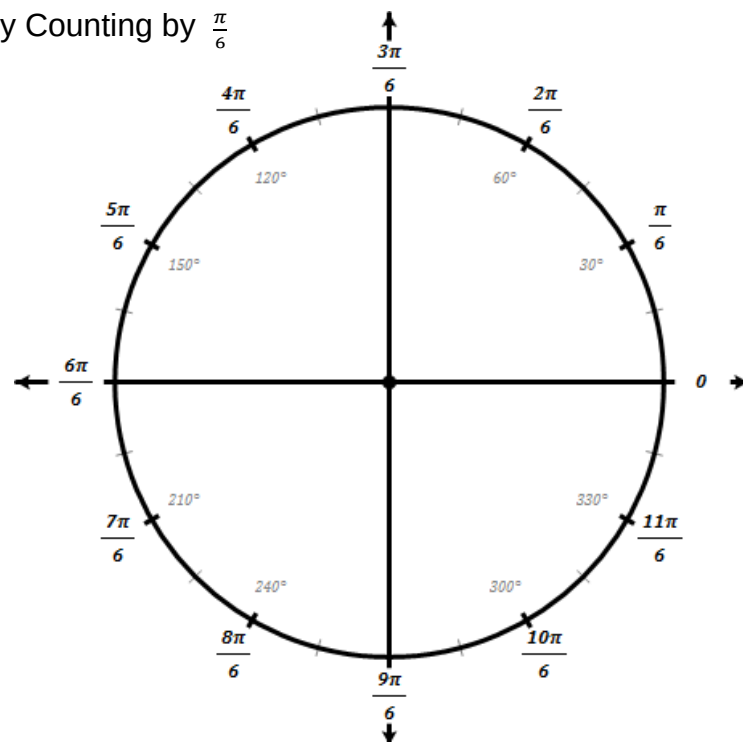


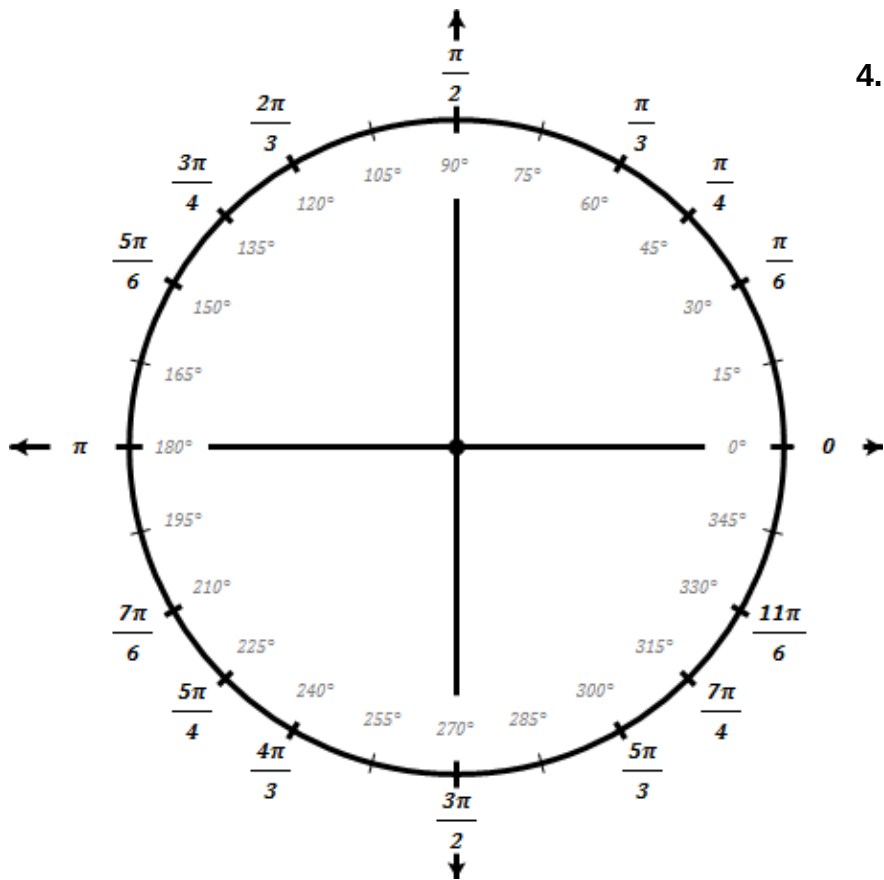
3. Common Radian Measures

- Try Counting by $\frac{\pi}{4}$



- Try Counting by $\frac{\pi}{6}$





4. Convert degree measures to radians:

a. 150°

4a.

b. 240°

4b.

c. 124°

4c.

d. 750°

4d.

5. Convert radian measure to degrees:

a. $\frac{7\pi}{3}$ rads

5a.

b. $\frac{8\pi}{11}$ rads

5b.

c. 1.87 rads

5c.

d. $\frac{15\pi}{4}$ rads

5a.

e. $-\frac{\pi}{5}$ rads

5b.

f. - 2 rads

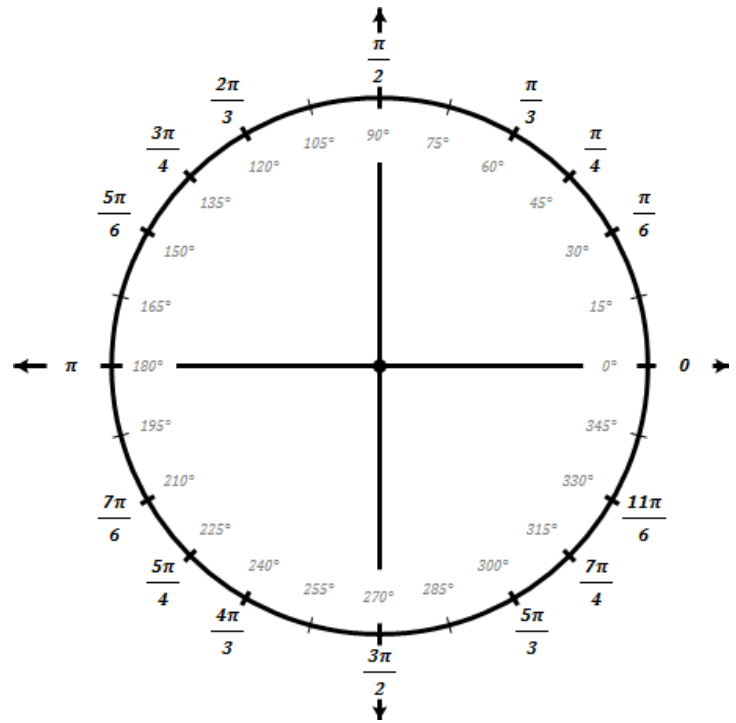
5c.

6. Determine the exact values of the following:

a. $\sin\left(\frac{\pi}{3}\right) =$

b. $\cos\left(\frac{3\pi}{4}\right) =$

c. $\tan\left(\frac{11\pi}{6}\right) =$



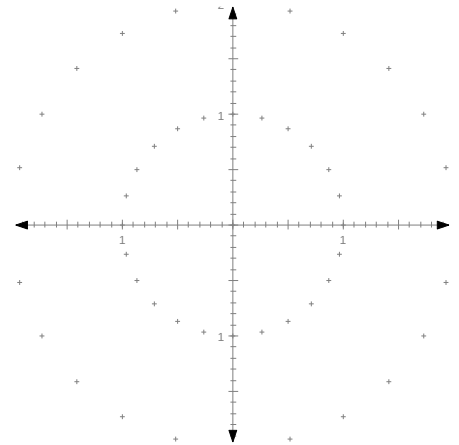
7. Determine the exact values of the following:

a. Given $\sin(x) = 0.361$ and x is in the first quadrant determine the following:

i. $\sin(x + \pi) =$

ii. $\sin(\pi - x) =$

iii. $\sin(2\pi - x) =$



b. Given $\cos(x) = p$ and x is in the first quadrant determine the following:

i. $\cos(x + \pi) =$

ii. $\cos(\pi - x) =$

iii. $\cos(2\pi - x) =$

