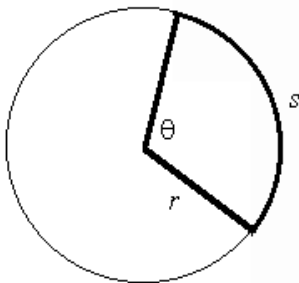# MHF 4UI
Trigonometric Functions

Day 2 - Radian Measure

A brief introduction of radians
from Khan Academy:

Arc length: Length of an arc on a circle
(i.e. s in the diagram below)

The ratio of any arc length to the radius, $\dfrac{s}{r}$, will be the radian measure of the central angle which that arc subtends

Circumference of a circle: $C = 2\pi r \qquad \Rightarrow 2\pi = \dfrac{C}{r}$

so, since C is an arc length (the entire circle), the radian measure of $360° = 2\pi$

Other notable angles (in radians):

$$180° = \pi \qquad 90° = \frac{\pi}{2} \qquad 60° = \frac{\pi}{3} \qquad 45° = \frac{\pi}{4} \qquad 30° = \frac{\pi}{6}$$

$$\frac{180}{\pi} = 1 \; rad \quad \Longleftrightarrow \quad \frac{\pi}{180} = 1^{o}$$

Conversion

1. Convert the following angle measures from radians to degrees:

a. $\dfrac{3\pi}{4}$

b. $\dfrac{11\pi}{8}$

c. 4.7 radians

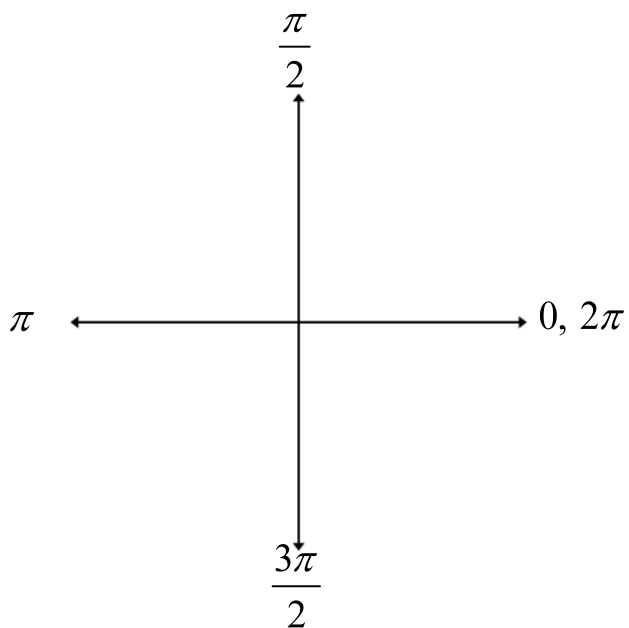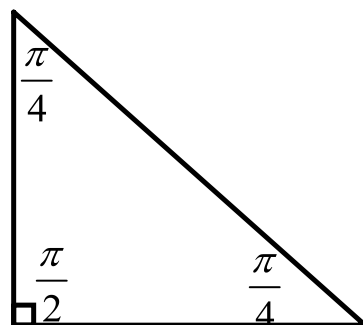2. Convert the following angle measures from degrees to radians:

a. 120°

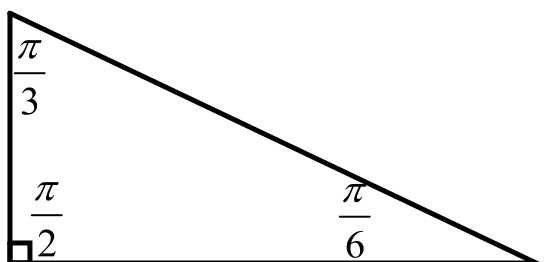b. 225°

c. 75°

Evaluate each of the following to 3 decimal places:

a. sin(5.3)   b. tan(0.4)   c. sec(-2.4)

Special Triangles... with radians

$\dfrac{\pi}{3}$

$\dfrac{\pi}{2}$

$\dfrac{\pi}{6}$

$\dfrac{\pi}{4}$

$\dfrac{\pi}{2}$

$\dfrac{\pi}{4}$

$\dfrac{\pi}{2}$

π

$0,\ 2\pi$

$\dfrac{3\pi}{2}$

Evaluate each of the following (give an exact answer):

a. $\sin\left(\dfrac{2\pi}{3}\right)$

b. $\csc\left(\dfrac{3\pi}{4}\right)$

c. $\tan\left(\dfrac{7\pi}{6}\right)$