

## 2.2 Trigonometric Ratios of Any Angle

Suppose  $\theta$  is any angle in standard position and,  $P(x, y)$  is a point on its terminal arm at a distance  $r$  from the origin:

By Pythagorean theorem:  $r =$

$\sin \theta =$

$\cos \theta =$

$\tan \theta =$

### Example 1:

The point  $P(5, -12)$  lies on the terminal arm of an angle,  $\theta$  in standard position. Determine the exact trigonometric ratios for  $\sin \theta$ ,  $\cos \theta$  and  $\tan \theta$ .

### Example 2:

Determine the exact value of

a.)  $\cos 60^\circ$

b.)  $\sin 135^\circ$

**Try:**

Determine the exact value of the following:

a.)  $\tan 60^\circ$

b.)  $\sin 330^\circ$

c.)  $\cos 225^\circ$

**Example 3:**

Suppose  $\theta$  is an angle in standard position with terminal arm in quadrant IV and  $\sin \theta = -\frac{4}{7}$ . Determine the exact values of  $\cos \theta$  and  $\tan \theta$ .

**Example 4:**

Determine the trigonometric values of the **quadrantal angles** ( $0^\circ, 90^\circ, 180^\circ, 270^\circ$  and  $360^\circ$ )

	$0^\circ$	$90^\circ$	$180^\circ$	$270^\circ$	$360^\circ$
$\sin \theta$					
$\cos \theta$					
$\tan \theta$					

**Example 5:**

Solve for  $\theta$ , where  $0^\circ \leq \theta < 360^\circ$

a.)  $\sin \theta = \frac{\sqrt{3}}{2}$

b.)  $\cos \theta = -\frac{1}{2}$

c.)  $\tan \theta = \sqrt{3}$

**Try:**

d.)  $\sin \theta = -\frac{1}{\sqrt{2}}$