

Algebra 2 Honors

Name _____

Notes: 10.3

Date _____ Block _____

A _____ is a circle with a radius of 1 unit. For every point $P(x, y)$ on the unit circle, the value of r is 1. Therefore, for an angle θ in the standard position:

$$\sin \theta = \frac{y}{r} = \frac{y}{1} = y$$

$$\cos \theta = \frac{x}{r} = \frac{x}{1} = x$$

$$\tan \theta = \frac{y}{x}$$

Therefore, the coordinates of P can be written as _____.

Example 1: Using the Unit Circle to Evaluate Trigonometric Functions

Use the unit circle to find the exact value of each trigonometric function.

(a) $\cos 225^\circ$

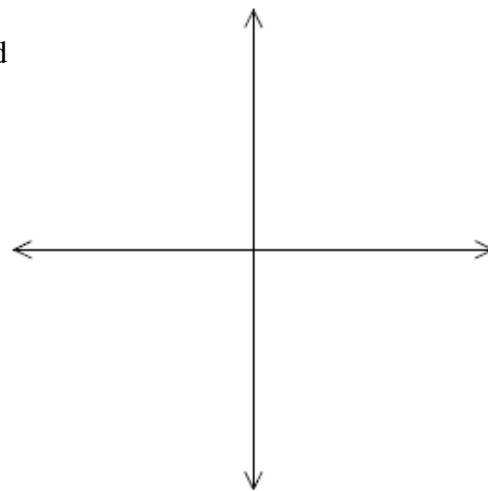
(b) $\tan \frac{5\pi}{6}$

(c) $\sin 315^\circ$

(d) $\tan 180^\circ$

(e) $\cos \frac{4\pi}{3}$

The diagram shows how the signs of the trigonometric functions depend on the quadrant containing the terminal side of θ in standard position.



Example 2: Using Reference Angles to Evaluate Trigonometric functions

(a) Use a reference angle to find the exact value of the sine, cosine, and tangent of 330° .

(b) Use a reference angle to find the exact value of the sine, cosine, and tangent of $\frac{4\pi}{3}$.

Arc Length

If you know the measure of a central angle of a circle, you can determine the length s of the arc intercepted by the angle.

Example 3:

- (a) A tire of a car makes 653 complete rotations in 1 min. The diameter of the tire is 0.65 m. To the nearest meter, how far does the car travel in 1 s?
- (b) A minute hand on Big Ben's Clock Tower in London is 14 ft long. To the nearest tenth of a foot, how far does the tip of the minute hand travel in 1 minute?