**4.4 Trig Functions of Any Angle**

**Objective: Evaluate trig functions of any angles**

**Definitions of Trigonometric Functions of Any Angle**

Let be an angle in standard position with (x, y) a point on the terminal side of and .

Note: See picture on page 310 for image of what is meant by x, y, and r.

Example:

Let (-6, 8) be a point on the terminal side of Find the cosine, sine, and tangent of Also find the secant, cosecant, and cotangent.

. . .

Example:

Given that tan and cos find sin and sec

Note that is in Quadrant II because that is the only quadrant in which tangent is negative and cos is negative.

so you know that

So,

sin

sec

**Reference Angles**

*Let be an angle in standard position. The reference angle is the acute angle formed by the terminal side of and the horizontal axis.*

Quadrant II Quadrant III Quadrant IV

Note: See Figure 4.39 on page 312 for a visual

**Example:**

Find the reference angle



Note:

Therefore 3.4 radians is between

**Evaluating Trig Functions of Any Angle**

To find the value of a trig function of any angle

1. Determine the function value for the associated reference angle
2. Depending on the quadrant in which lies, affix the appropriate sign to the function value.

**Example:**

Evaluate each trig function (could you just look at the unit circle?)

cos

is in Quadrant III so

Since cosine is negative in III

cos

**Homework**

Pg 316 #9, 11, 13, 19-24, 37-44, 45-51 (odd), 69, 71, 97