PreCalculus Name: Period: Date:

Warm Up 2/4

Lesson 6-1: Angles and Trigonometry

Objectives

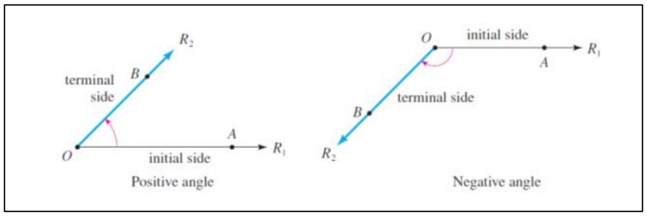
Students will…

- Be able to understand radian angle measure as distance traveled or rotated.
- Be able to convert radian into degrees and vice-versa.
- Be able to find coterminal angles.

Angles

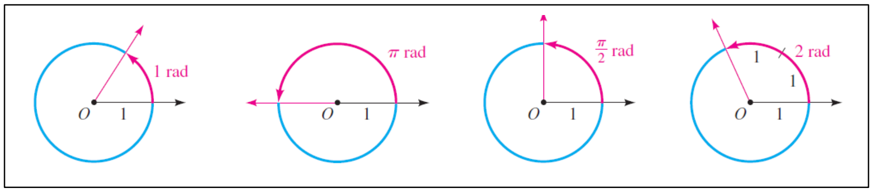
Back in geometry, we studied angles and their measurements. We mainly viewed angle measurements as the "space" between the two lines sharing a same point, namely, the vertex.

In trigonometry, however, angles are viewed as ________________ of **one** line. In other words, angle measurement represents the _____________ travelled, or rotated. The beginning, or the stationary, position is known as the ______________**side**, while the line at its finishing position is known as the ______________**side**. In this case, rotating **counter-clockwise** is ____________, while rotating __________________ is negative.



Radians

With that said, the amount of rotation, or the distance travelled in a ____________ motion is measured in ______ (sometimes abbreviated **rad**). As we remember from the unit circle, one full counter-clockwise rotation is _____ rad. Half-way around is ____ rad. See the figure below.



Degrees vs Radians

Of course, it's not hard to understand that, when measured in degrees, one full revolution around a circle is ______. With that said, consider the following:

$$360° = 2\pi \text{ rad} \quad \rightarrow 180° = \pi \text{ rad}$$

So, we conclude the following:

1. To convert from deg to rad, multiply by

2. To convert from rad to deg, multiply by

Example

1. Express $60°$ in radians

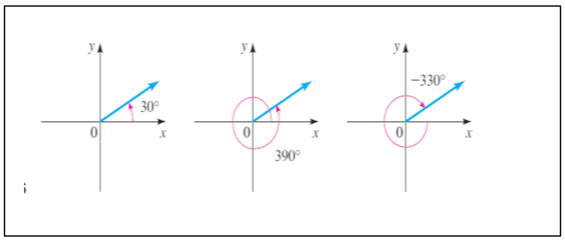
2. Express $\frac{\pi}{6}$ in degrees

3. Express $20°$ in radians

4. Express $\frac{11\pi}{7}$ degrees

Coterminal Angles

Going back to the idea of angles moving in rotations, in any type of circular rotation, the line (or whatever object is movie) is bound to return to the __________________ over and over again. Take a trivial example of 2π. We know that the angles measuring 0 rad and 2π rad are in the exact _______ position. Same goes for $4\pi = 8\pi = 22\pi = \cdots$ This can also be easily seen in degree measurements as well. A line rotating $30°$ counter-clockwise would be in the same position if it were to rotate $390°$, or going the opposite direction, $330°$ clockwise ($-330°$).
These angles are known as _____________, meaning that the angles have the same terminal, or _______ position.



Finding Coterminal Angles

Now, finding coterminal angles is easy. No matter where the initial position is, if a line was to rotate $\underline{\mathbf{360°}}$ or $\mathbf{2\pi}$ rad, it would naturally end up in the **same** position.

Degrees- When finding coterminal angles in degrees, we can simply add any **multiples of _______**.
Radians- When finding coterminal angles in radians, we can simply add any **multiples of _____.**

Examples

1. Find one positive and one negative angle that is coterminal with $30°$

2. Find one positive and one negative angle that is coterminal with $\frac{\pi}{3}$

3. Find one positive and one negative angle that is coterminal with $111°$

4. Find one positive and one negative angle that is coterminal with $-\frac{7\pi}{2}$

5. Find an angle between 0 and 2π that is coterminal with 111π rad.

6. Find an angle between $0°$ and $360°$ that is coterminal with -3624

7. Find an angle with measure between $0°$ and $360°$ that is coterminal with the angle of measure $1290°$ in standard position.

Homework 2/4
TB pg. 474-475 #1-21 (e.o.o), 25, 29, 35, 41, 47