Radian and Degree Measure (Section 4.1)

Common Degree Measures of Angles

1. One full revolution corresponds to _____ degrees.

2. Fill out the common degree measures on the circle below.

Converting Between Degrees and Radians

3. One full revolution is _____ radians or _____ degrees. This leads to the

following equations: _____ and _____.

Conversion Factors that are Equal to 1
$\dfrac{\pi}{180}$ and $\dfrac{180}{\pi}$

Example 1: Convert from degrees to radians.

    a) 135 degrees   b) 540 degrees   c) -270 degrees

Example 2: Convert from radians to degrees.

    a) $-\dfrac{\pi}{2}$ radians   b) 2 radians   c) $\dfrac{9\pi}{2}$ radians

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Complementary and Supplementary Angles

Complementary Angles: _____

Supplementary Angles: _____

Example 3: Find the complement and supplement of each angle.

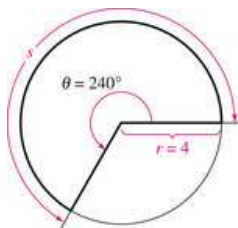   a) 72 degrees   b) 148 degrees   c) $\dfrac{2\pi}{5}$ rad   d) $\dfrac{4\pi}{5}$ rad

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Arc Length

$$s = r\theta$$

Linear Speed

$$\text{Linear speed} = \frac{arclength}{time} = \frac{s}{t}$$

Example 4: A circle has a radius of 4 inches. Find the length of the arc intercepted by a central angle of 240 degrees.

Example 5: The second hand of a clock is 10.2 cm long. Find the linear speed of the tip of this second hand.

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Class Work

1. The second hand of a clock is 9 cm long. Find the linear speed of the tip of this second hand as it passes around the clock face.

2. A circle has a radius of 27 inches. Find the length of the arc intercepted by a central angle of 160 degrees.

3. Determine two coterminal angles in radian measure (one positive and one negative) for each angle.

  a) $\dfrac{\pi}{6}$ b) $\dfrac{2\pi}{3}$ c) $\dfrac{5\pi}{4}$

4. Convert from degrees to radians.

  a) 30 degrees   b) -20 degrees   c) 315 degrees

5. Convert from radians to degrees.

  a) $\dfrac{3\pi}{2}$ b) -4π c) $\dfrac{7\pi}{3}$

6. Find the complement and supplement.

  a) 24 degrees   b) $\dfrac{\pi}{3}$ radians   c) $\dfrac{\pi}{6}$

7. A satellite in a circular orbit 1250 km above Earth makes one complete revolution every 110 minutes. What is its linear speed? Assume that Earth is a sphere of radius 6400 km.