Handout for MATH 1300 (Barsamian) Lecture L29 Thu Oct 22, 2026 Sections 4.1, 4.2

Meeting Part 1: More of Section 4.1: Arc Length, Area

[1] A circle has a radius of 11 centimeters . Find the radian measure of the central angle θ that intercepts an arc of length 6 centimeters. Give an exact answer in symbols, not a decimal approximation.

[2] A bicycle tire has a diameter of 56 centimeters . The tire rolls without sliding along a road. Let x be the distance (in centimeters) the bicycle travels as the tire rotates θ radians.
Assume that the distance x and the angle measure θ are positive.

(a) Find θ as a function of x . Give an exact answer in symbols.

(b) If the bicycle rolls forward 151 centimeters , what is the angle that the tire rotates (in degrees)? Give an exact answer in symbols.

[3] The area of a sector of a circle with a central angle of $\frac{5\pi}{4}$ radians is 22 square inches . Find the radius of the circle. Give an exact answer in symbols.

Meeting Part 2: Section 4.2 The Unit Circle

[4] (a) Draw a 45-45-90 triangle with hypotenuse 1. Label the angles with their degree measure and radian measure. label the three sides of the triangle with their lengths. (Exact expressions, not decimal approximations.) **(b)** Do the same thing for a 30-60-90 triangle with hypotenuse 1.

[5] The objective is to draw a big unit circle and label it for use in trig problems.

(a) Draw a pair of x, y axes and then draw a big circle centered at the origin.

(b) Draw lines (not rays) through the origin at $30°, 45°, 60°, 120°, 135°, 150°$.

(c) There are twelve rays emanating from the origin. Label each ray with its degree measure and its radian measure. (Exact expressions, not decimal approximations.)

(d) Label the points where each ray crosses the unit circle with their (x, y) coordinates. (Exact expressions, not decimal approximations.)

[6] Find the following values (exact expressions)

$(a) \sin\left(\frac{3\pi}{4}\right) =$

$(b) \sec\left(\frac{3\pi}{4}\right) =$

$(c) \tan\left(\frac{3\pi}{4}\right) =$

$(d) \csc\left(\frac{5\pi}{6}\right) =$

$(e) \cot\left(\frac{5\pi}{6}\right) =$