

Practice 6.2.3

9 Degree measure of angles is more familiar to you than radian measure. But the difference between the two is just a matter of scale. That is, $1^\circ = \frac{\pi}{180}$, or about 0.0175 radians, and 1 radian = $\left(\frac{180}{\pi}\right)^\circ$, or about 57.3° . The following tasks may help you better understand radians.

a. Each of the following is the radian measure of an angle in standard position. Give the quadrant in which the terminal side of each angle lies.

i. 5

ii. -5

iii. $-\frac{4\pi}{3}$

iv. $\frac{7\pi}{3}$

b. The measure of an angle in standard position is p radians, and the angle's terminal side is in the second quadrant. In what quadrant is the terminal side of an angle with each of the following radian measures? Give all possibilities and explain.

i. $p + 2\pi$

ii. $p - \frac{\pi}{2}$

iii. $p + 9\pi$

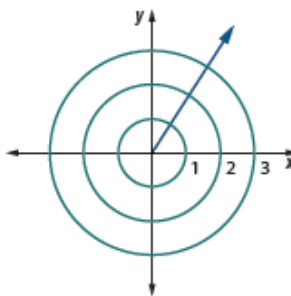
iv. $p - 2$

16 An angle of 1 radian is shown in standard position below.

a. What is the length of the arc in the circle of radius 1 traversed by rotating through 1 radian?

b. What transformation takes the circle of radius 1 to that of radius 2? What transformation takes the circle of radius 3 to the circle of radius 2?

c. What are the lengths of the arcs in the circles of radii 2 and 3 traversed by rotating through an angle of 1 radian? Explain why this answer makes sense using the transformations in Part b.



22 Karen wishes to evaluate $\sin 25^\circ$ using her calculator. She presses **SIN** **25** **)** **ENTER**. The calculator displays the screen below. What indicates that there must be an error? What do you think the error is?



23 According to Morris Kline, a former Professor of Mathematics at New York University, "The advantage of radians over degrees is simply that it is a more convenient unit. ... The point involved here is no different from measuring a mile in yards instead of inches."

Why do you think Kline believes the radian is a "more convenient unit"? (Source: Morris Kline, *Mathematics for Liberal Arts*, Addison Wesley, 1967. page 423)

40 Simplify each algebraic fraction as much as possible.

a. $\frac{16x + 12}{3x + 15}$

b. $\frac{x^2 - 9x}{x^2 - 81}$

c. $\frac{x^2 + 8x + 15}{x^2 + 2x - 3}$

d. $\frac{x - 1}{4x - 4}$