In Exercises 13–16, use a calculator to evaluate each expression. Then explain what the value means in the context of circles.

15. $0.5 \sin(537°)$

16. $(\cos(-203.6°), \sin(-203.6°))$

In Exercises 17–20, use a calculator to evaluate each expression. Then explain what the value means in the context of circles. The angles are all measured in radians.

17. $\cos\left(\frac{4\pi}{7}\right)$

18. $\sin\left(-\frac{\pi}{9}\right)$

In Exercises 37–40, you are given the cosine and sine value for the endpoint of an arc.

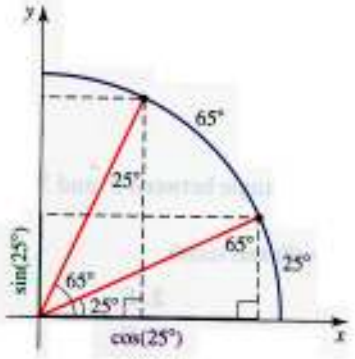
a. Find three angles between 0° and 360° with the same reference angles.

b. Find the cosine and sine values for each of the angles found in part (a).

c. Draw a diagram that shows all four angles and their cosine and sine values.

37. $\cos(53°) = 0.6018$ and $\sin(53°) = 0.7986$

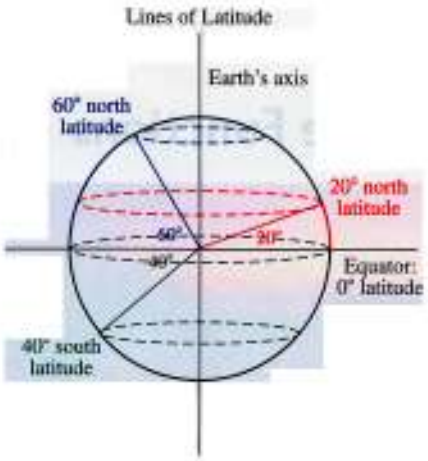
45. Throughout this section you may have noticed that the cosine value of one angle may be the same sine value as another angle. In fact, there is a pattern to when $\cos(\theta) = \sin(\phi)$. In the first quadrant, the rule is that th sine of an angle is the same as the cosine of its complen (complementary angles have a sum of 90° or $\frac{\pi}{2}$ radians Use the following diagram to explain why this is true.



50. Explain why it is impossible for $\cos(\theta) = 1.5$ or $\sin(\theta) = -3$.

51. Cosine and sine functions are periodic, meaning that their values repeat at regular intervals. Explain, with reference to the unit circle, why these functions are periodic and state the period of each function.

In Exercises 54–56, use the following information. The circumference of a circle is $C = 2\pi r$. Positions on Earth's surfac are described according to lines of latitude and longitude. Lines of latitude are drawn around the Earth parallel to the equator at regular intervals determined by the arc drawn from the equator (see the figure). Each line of latitude forms a circle around the Earth.



54. Earth's Circumference What is the circumference of Earth at the equator, assuming the Earth's radius is 3963 miles?