PRACTICE & PROBLEM SOLVING

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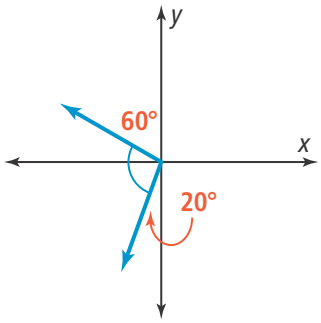
Practice Tutorial

Additional Exercises Available Online

UNDERSTAND

16. Make Sense and Persevere If the given angle were drawn in standard position, in what quadrant would the terminal side be?



17. Look for Relationships Explain why the length of an intercepted arc on the unit circle always equals the corresponding central angle measure in radians.

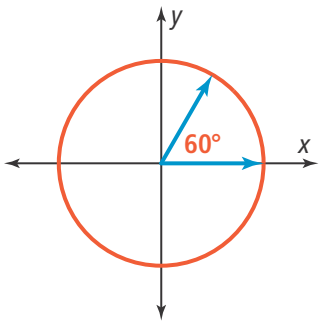
18. Error Analysis Describe and correct the error a student made in converting $\frac{\pi}{2}$ radians to degrees.

$$\frac{\pi}{2}\text{ radians} = x^\circ$$
$$\frac{\pi}{2} \times \frac{\pi}{180} = x^\circ$$
$$\frac{\pi^2}{360} = x^\circ$$
$$\frac{25}{0.66} \approx 0.03^\circ$$

✗

19. Generalize What is the relationship between a positive angle and a negative angle that share a common terminal side? Write a formula that relates the two measures.

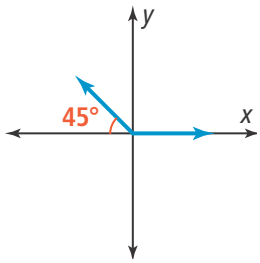
20. Higher Order Thinking At what coordinates does the terminal side of a 60° angle intersect the unit circle?



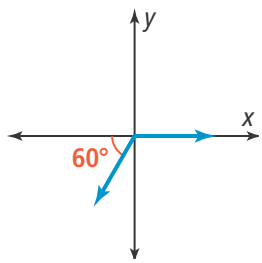
PRACTICE

Find the measure of each angle as a positive angle measure, a negative angle measure, and an angle measure that is greater than 360°. SEE EXAMPLE 1

21.



22.



Find the measure of an angle in standard position for each reference angle. SEE EXAMPLE 2

23. 15° in Quadrant II

24. 75° in Quadrant IV

25. 8° in Quadrant III

26. 56° in Quadrant I

Sketch each angle in standard position. SEE EXAMPLE 3

27. 30°

28. −45°

29. −210°

30. 130°

Sketch each angle in standard position. SEE EXAMPLE 4

31. $\frac{3\pi}{4}$

32. $\frac{\pi}{3}$

33. $\frac{-2\pi}{3}$

34. $\frac{3\pi}{2}$

Convert each angle measure to radians. Round to the nearest hundredth. SEE EXAMPLE 5

35. 148°

36. 20°

Convert each angle measure to degrees. SEE EXAMPLE 5

37. $\frac{2\pi}{3}$

38. $\frac{5\pi}{6}$

Solve using the formula given. SEE EXAMPLE 6

39. Earth's radius is 6,400 km. If a satellite is orbiting at 200 km above Earth's surface and can be tracked while it orbits through a $\frac{\pi}{3}$ radian angle, what is the distance the satellite travels while being tracked? Round your answer to the nearest tenth.

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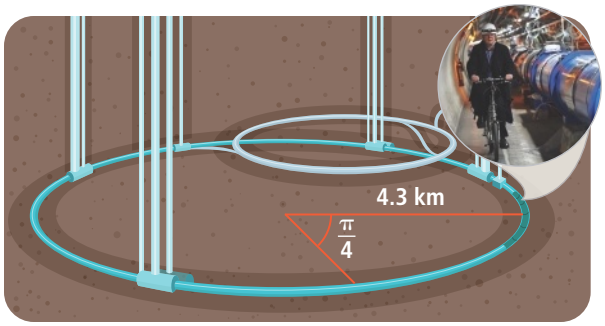
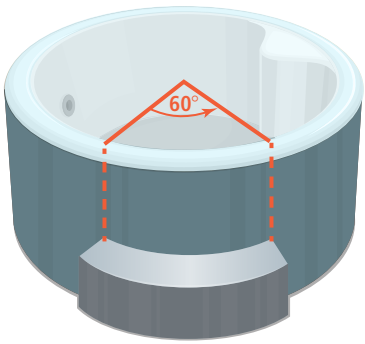
Mixed Review Available Online

APPLY

40. Make Sense and Persevere Physicists use the Large Hadron Collider in France and Switzerland to observe particle collisions. A circular chamber with beam pipes to track the particles circular path has a radius of 4.3 km. One beam pipe tracks a particle's movement over an angle of $\frac{\pi}{4}$ radians. What is the distance traveled by the particle being tracked by the one beam pipe?



41. Reason The steps into a hot tub need to span a 60° section of the tub. How can you modify the formula for finding the intercepted arc length from an angle in radians to use degrees instead?



42. Make Sense and Persevere Riders on a Ferris wheel get on a seat, then the Ferris wheel turns and stops to load the next seat. The radius of the Ferris wheel is 18 m. The riders travel 5.5 m in a circular path before stopping. What angle is the Ferris wheel turning between stops?

ASSESSMENT PRACTICE

43. Match each angle measure in degrees in the left column with its corresponding measure in radians in the right column.

I. 60°	A. $\frac{\pi}{8}$
II. −15°	B. $-\frac{\pi}{12}$
III. −200°	C. $\frac{4\pi}{3}$
IV. −108°	D. $-\frac{10\pi}{9}$
V. 22.5°	E. $-\frac{3\pi}{5}$
VI. 240°	F. $\frac{\pi}{3}$

44. SAT/ACT What is another way to represent an angle in standard position that has a measure of 530°?

Ⓐ 370°

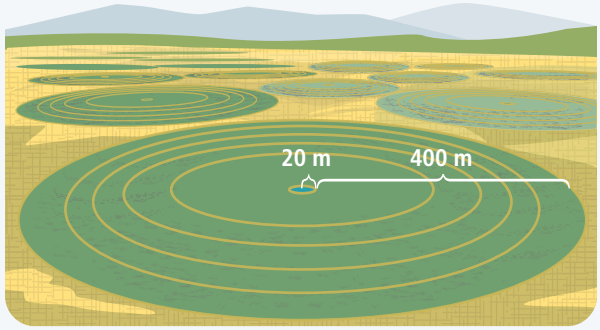
Ⓑ 170°

Ⓒ 10°

Ⓓ −10°

Ⓔ −170°

45. Performance Task A center-pivot circular irrigator has sprayers that follow concentric circular paths as the irrigator rotates. The radius of the innermost path is 20 m and to the outermost path is 420 m more.



Part A What is the length of the path covered by the innermost sprayer when the irrigator rotates through an angle of $\frac{3\pi}{2}$ radians?

Part B What angle must the irrigator rotate through for the outermost sprayer to cover a path of the same length?