

Precalculus - Radians and the Unit Circle - Worksheet

Common Core F-TF.A.1, F-TF.A.2, F-TF.A.3, F-TF.A.4 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice radians and the unit circle (Common Core F-TF.A.1 through F-TF.A.4). You will convert angles, find arc length and sector area, use reference angles and evaluate exact trigonometric values.

Precalculus · Common Core State Standards: **F-TF.A.1, F-TF.A.2, F-TF.A.3, F-TF.A.4**

Exercise 1 - Degrees to radians

Convert 45° and 150° to radians.

Exercise 2 - Radians to degrees

Convert $\frac{\pi}{6}$ and $\frac{5\pi}{4}$ to degrees.

Exercise 3 - Calculator conversion

Convert 3 radians to degrees and 100° to radians, to the nearest hundredth.

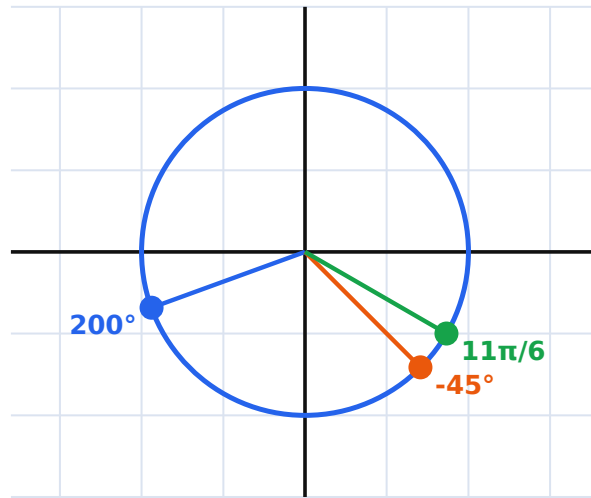
Exercise 4 - Coterminal angles

Find one positive and one negative angle coterminal with 50° , and one of each for $\frac{7\pi}{4}$ (measured in radians, using the next turn).

Exercise 5 - Reference angle

Find the reference angle for 150° and for $\frac{5\pi}{4}$.

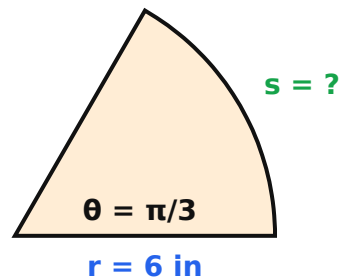
Exercise 6 - Quadrants



Three angles on the unit circle.

Name the quadrant of the terminal side of 200° , -45° and $\frac{11\pi}{6}$.

Exercise 7 - Arc length



Sector of a circle.

Find the arc length on a circle of radius 6 inches for a central angle of $\frac{\pi}{3}$.

Exercise 8 - Sector area

Find the area of a sector with radius 10 ft and central angle $\frac{2\pi}{5}$.

Exercise 9 - Find the angle

An arc of 15 ft is cut off on a circle of radius 6 ft. Find the central angle in radians and in degrees (nearest tenth).

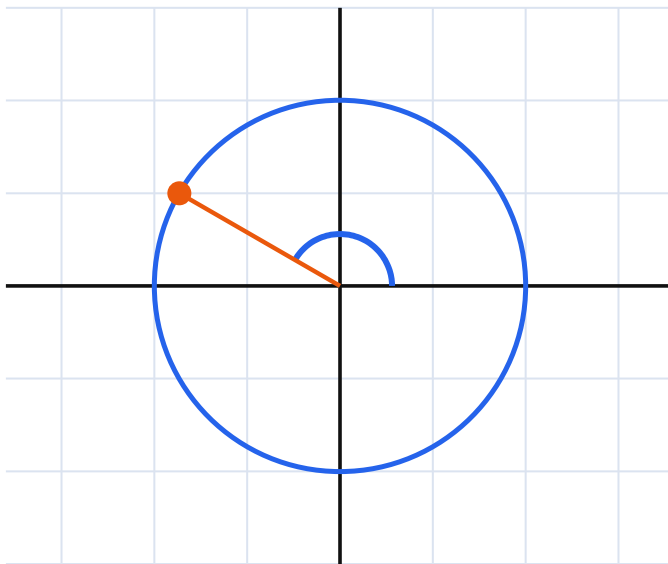
Exercise 10 - Exact values, first quadrant

Evaluate $\sin 30^\circ$, $\cos 45^\circ$ and $\tan 60^\circ$.

Exercise 11 - Exact values, other quadrants

Evaluate $\cos \frac{2\pi}{3}$, $\sin \frac{5\pi}{4}$ and $\tan \frac{3\pi}{4}$.

Exercise 12 - Point on the unit circle



Angle $5\pi/6$ on the unit circle.

The terminal side of $\theta = \frac{5\pi}{6}$ meets the unit circle at a point. Find its coordinates and $\tan \theta$.

Exercise 13 - Find the other values

If $\sin \theta = \frac{3}{5}$ and θ is in quadrant II, find $\cos \theta$ and $\tan \theta$.

Exercise 14 - Another quadrant

If $\cos \theta = -\frac{5}{13}$ and θ is in quadrant III, find $\sin \theta$ and $\tan \theta$.

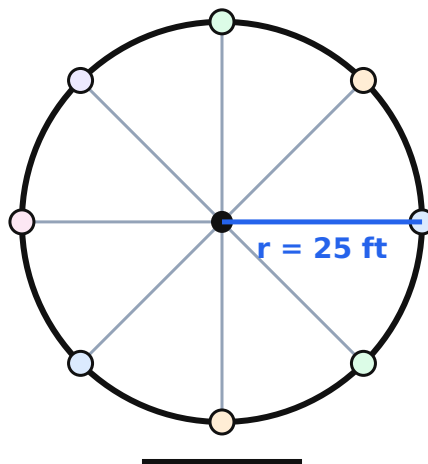
Exercise 15 - Negative angles

Evaluate $\sin\left(-\frac{\pi}{6}\right)$ and $\cos\left(-\frac{\pi}{3}\right)$.

Exercise 16 - Large and negative angles

Evaluate $\sin \frac{7\pi}{3}$ and $\cos\left(-\frac{5\pi}{6}\right)$.

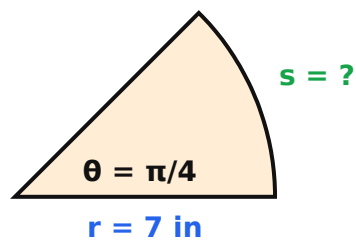
Exercise 17 - Ferris wheel



Ferris wheel of radius 25 feet.

A Ferris wheel of radius 25 ft turns 3 revolutions per minute. Find its angular speed in radians per second, and the distance a rider travels in 10 seconds.

Exercise 18 - Pizza slice



One slice of a 14-inch pizza.

A 14-inch pizza is cut into 8 equal slices. Find the crust length and area of one slice, to the nearest hundredth.

Exercise 19 - Windshield wiper

A wiper blade arm sweeps through 120° . The blade reaches 18 inches from the pivot. Find the area of the swept sector.

Exercise 20 - Distance on Earth

Two cities lie on the same meridian, 5° of latitude apart. Using Earth's radius of 3,959 miles, find the distance between them to the nearest mile.