

Precalculus · Angles, Radians and the Unit Circle · Quiz

Common Core F-TF.A.1, F-TF.A.2, F-TF.A.3, F-TF.A.4 · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

This precalculus unit circle quiz asks 10 multiple-choice questions on angles, radians and the unit circle, and each answer comes with a short explanation.

Ten multiple-choice questions on radian conversion, special angles, reference angles, arc length, trigonometric equations and even, odd and periodic behavior. Choose one answer for each question, then read the explanations to see the typical slips.

PrecalculusCommon Core: F-TF.A.1 · F-TF.A.2 · F-TF.A.3 · F-TF.A.4

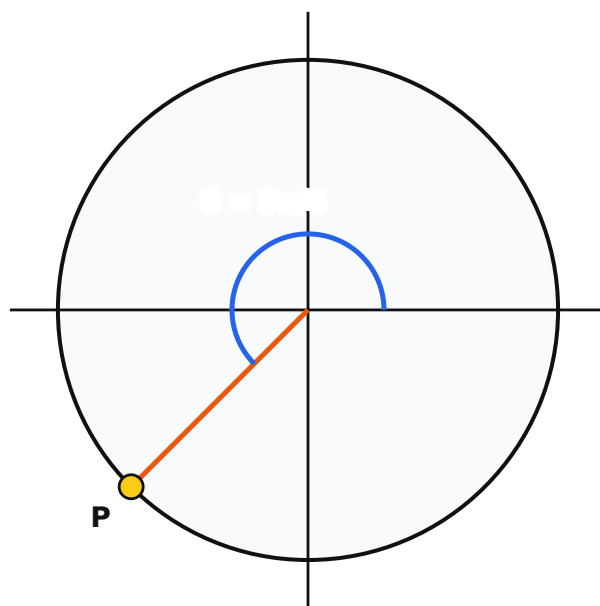
Questions

Question 1

What is 240° in radians?

- A. $\frac{4\pi}{3}$
- B. $\frac{2\pi}{3}$
- C. $\frac{5\pi}{3}$
- D. $\frac{3\pi}{4}$

Question 2



Angle $5\pi/4$ on the unit circle.

Which are the coordinates of point P ?

- A. $\left(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$
- B. $\left(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$
- C. $\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$
- D. $\left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$

Question 3

What is the reference angle of $\frac{5\pi}{3}$?

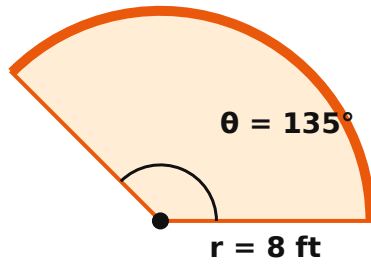
- A. $\frac{\pi}{3}$
- B. $\frac{2\pi}{3}$
- C. $\frac{\pi}{6}$
- D. $\frac{5\pi}{6}$

Question 4

What is the exact value of $\cos\left(-\frac{\pi}{3}\right)$?

- A. $-\frac{1}{2}$
- B. $\frac{1}{2}$
- C. $\frac{\sqrt{3}}{2}$
- D. $-\frac{\sqrt{3}}{2}$

Question 5



A sector with radius 8 ft and a 135 degree central angle.

What is the arc length of the sector?

- A. $\frac{3\pi}{4}$ ft
- B. 6π ft
- C. $\frac{3\pi}{32}$ ft
- D. 1080 ft

Question 6

A wheel turns 5 revolutions per second. What is its angular speed?

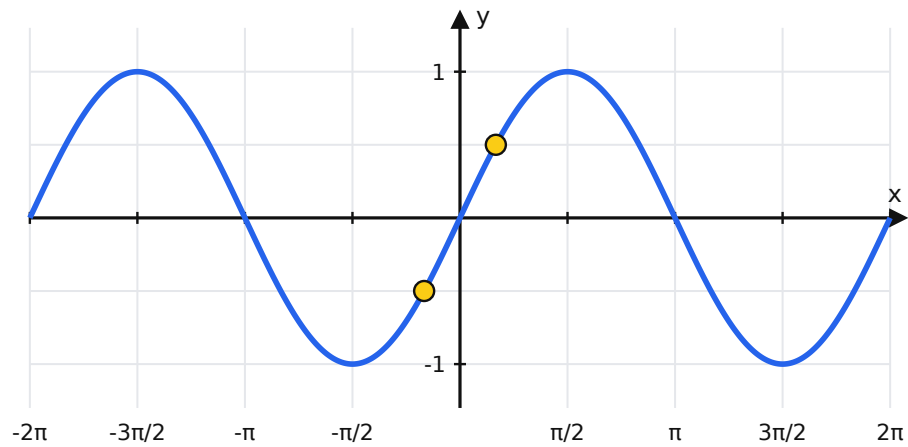
- A. 5π rad/s
- B. 5 rad/s
- C. 10π rad/s
- D. 20π rad/s

Question 7

Which pair lists every solution of $\sin\theta = -\frac{1}{2}$ in $[0, 2\pi)$?

- A. $\frac{\pi}{6}$ and $\frac{5\pi}{6}$
- B. $\frac{5\pi}{6}$ and $\frac{7\pi}{6}$
- C. $\frac{7\pi}{6}$ and $\frac{11\pi}{6}$
- D. $\frac{\pi}{6}$ and $\frac{11\pi}{6}$

Question 8



The sine graph is unchanged by a half-turn about the origin.

Which equation states the symmetry of this graph about the origin?

- A. $\sin(-x) = \sin x$
- B. $\cos(-x) = -\cos x$
- C. $\sin(x+\pi) = \sin x$
- D. $\sin(-x) = -\sin x$

Question 9

Which function is even?

- A. $f(x) = \sin x$
- B. $f(x) = \tan x$
- C. $f(x) = x \sin x$
- D. $f(x) = x \cos x$

Question 10

The point $(\frac{3}{5}, y)$ lies on the unit circle in Quadrant IV. What is y ?

- A. $\frac{4}{5}$
- B. $-\frac{16}{25}$
- C. $-\frac{4}{5}$
- D. $-\frac{16}{5}$

Answer key

1. **A** - Multiply by $\frac{\pi}{180}$: $\frac{240\pi}{180} = \frac{4\pi}{3}$. The other choices are 120 degrees, 300 degrees and 135 degrees.
2. **D** - The angle $\frac{5\pi}{4}$ is in Quadrant III with reference angle $\frac{\pi}{4}$, so both coordinates are negative with magnitude $\frac{\sqrt{2}}{2}$.
3. **A** - The angle is in Quadrant IV, so the reference angle is $2\pi - \frac{5\pi}{3} = \frac{\pi}{3}$.
4. **B** - Cosine is even, so $\cos(-\frac{\pi}{3}) = \cos\frac{\pi}{3} = \frac{1}{2}$. Treating cosine as odd gives the wrong sign.
5. **B** - The angle is $\frac{3\pi}{4}$ radians, so $s = r\theta = 8 \cdot \frac{3\pi}{4} = 6\pi$. Forgetting the radius, dividing by it, or using degrees gives the wrong choices.
6. **C** - One revolution is 2π radians, so $5 \cdot 2\pi = 10\pi$ rad/s.
7. **C** - Sine is negative in Quadrants III and IV, where the reference angle $\frac{\pi}{6}$ gives $\pi + \frac{\pi}{6} = \frac{7\pi}{6}$ and $2\pi - \frac{\pi}{6} = \frac{11\pi}{6}$.
8. **D** - The points $(\frac{\pi}{6}, \frac{1}{2})$ and $(-\frac{\pi}{6}, -\frac{1}{2})$ show that sine is odd.
9. **C** - In $x \sin x$, both factors change sign when x becomes $-x$, so $f(-x) = f(x)$. The other three functions are odd.
10. **D** - From $\frac{9}{25} + y^2 = 1$, $y^2 = \frac{16}{25}$, and y is negative in Quadrant IV.

How does this quiz work?

Read each question, choose one answer among A, B, C and D, then check it: a short explanation appears after every answer. Your score out of 10 is shown at the end, and you can restart the quiz as often as you like.

What should you review before the quiz?

Reread the key facts of the lesson and the worked example. If a question is hard, go back to the matching part of the lesson, then try the quiz again. Write your work on scrap paper: most mistakes come from skipping a step, not from the idea itself.

Remember:

- 180 degrees = π radians; multiply degrees by $\pi/180$ to get radians.
- The point at angle θ on the unit circle is $(\cos \theta, \sin \theta)$, and $\tan \theta = \sin \theta / \cos \theta$.
- Special values: $\sin$ and $\cos$ of $\pi/6$, $\pi/4$, $\pi/3$ are $1/2$, $\sqrt{2}/2$, $\sqrt{3}/2$ in some order.
- Arc length is $s = r \cdot \theta$ and linear speed is $v = r \cdot \omega$, with θ in radians.
- Sine and cosine have period 2π , tangent has period π ; cosine is even, sine and tangent are odd.

How to use this precalculus unit circle quiz

Retake this precalculus unit circle quiz until every answer is right, then move on to the worksheet and the test.

