

Algebra 2 · Radians and the Unit Circle · Quiz

Common Core F-TF.A.1, F-TF.A.2, F-TF.C.8 · mathovore.fr

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

Ten multiple-choice questions check radian conversion, arc length, unit circle coordinates, exact values and the Pythagorean identity. Pick the single best answer; each explanation points out the common mistake.

Algebra 2 Common Core: F-TF.A.1 · F-TF.A.2 · F-TF.C.8

Questions

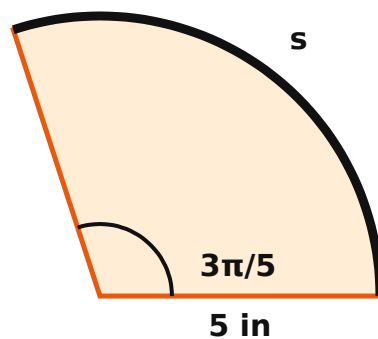
Question 1

What is 135° in radians?

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

Question 2

Find the arc length s of the sector.



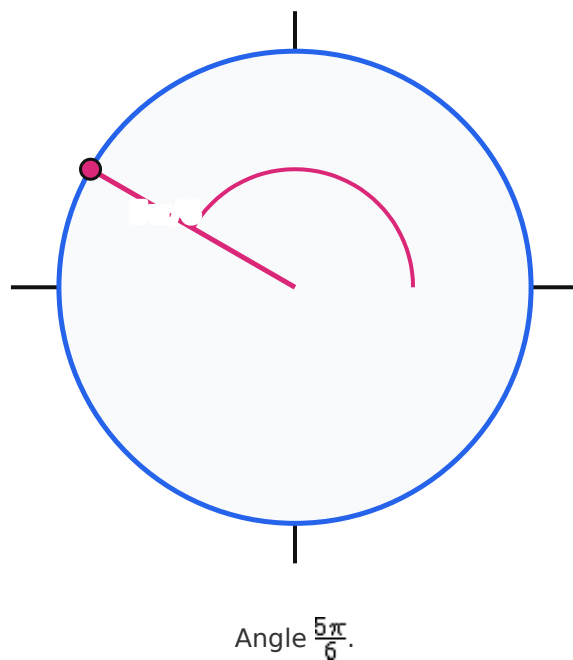
Radius 5 inches, angle $\frac{3\pi}{5}$.

- A. $\frac{3\pi}{5}$ in
- B. 15π in
- C. $\frac{25\pi}{3}$ in

D. 3π in

Question 3

What are the coordinates of the point on the unit circle for the angle shown?



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

Question 4

What is $\cos \frac{4\pi}{3}$?

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

Question 5

What is $\tan \frac{5\pi}{6}$?

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

Question 6

If $\sin\theta = \frac{5}{13}$ and θ is in Quadrant II, what is $\cos\theta$?

- A. $\frac{12}{13}$
- B. $-\frac{5}{12}$
- C. $-\frac{8}{13}$
- D. $-\frac{12}{13}$

Question 7

What is the reference angle for $\frac{11\pi}{6}$?

- A. $\frac{\pi}{3}$
- B. $\frac{\pi}{6}$
- C. $\frac{5\pi}{6}$
- D. $\frac{\pi}{12}$

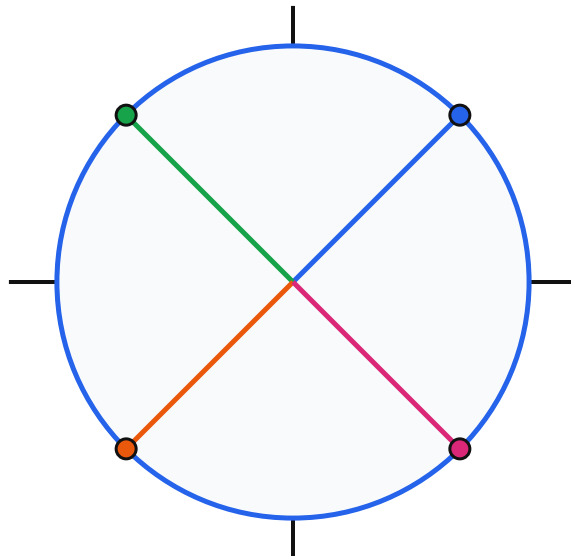
Question 8

In Quadrant IV, $\sin\theta = -0.6$. What is $\cos\theta$?

- A. -0.8
- B. 0.4
- C. 0.8
- D. 0.64

Question 9

Which labeled point has $\sin\theta < 0$ and $\cos\theta > 0$?

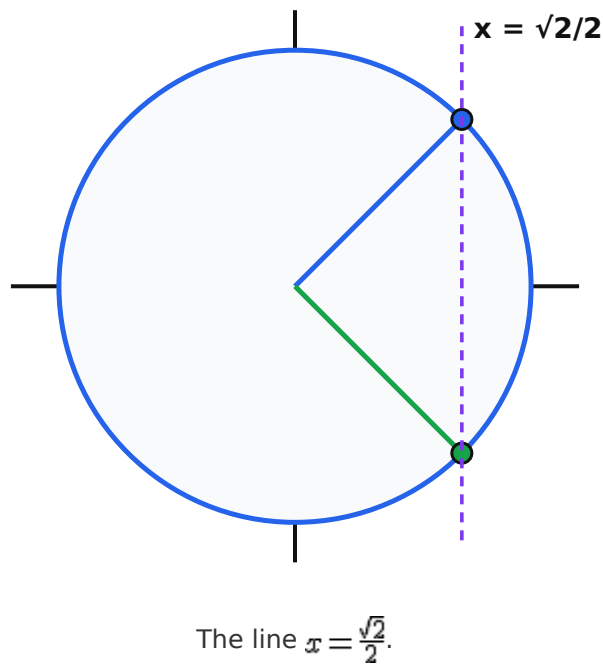


Four points on the unit circle.

- A. Point A
- B. Point B
- C. Point C
- D. Point D

Question 10

Which two angles in $0 \leq \theta < 2\pi$ satisfy $\cos \theta = \frac{\sqrt{2}}{2}$?



- A. $\frac{\pi}{4}$ and $\frac{7\pi}{4}$
- B. $\frac{\pi}{4}$ and $\frac{3\pi}{4}$
- C. $\frac{3\pi}{4}$ and $\frac{5\pi}{4}$
- D. $\frac{\pi}{4}$ and $\frac{5\pi}{4}$

Answer key

1. **B** - $135 \cdot \frac{\pi}{180} = \frac{3\pi}{4}$. The value $\frac{5\pi}{4}$ is 225° .
2. **D** - $s = r\theta = 5 \cdot \frac{3\pi}{5} = 3\pi$. Dividing by the radius instead of multiplying gives $\frac{3\pi}{25}$ style errors.
3. **C** - Reference angle $\frac{\pi}{6}$: cosine $\frac{\sqrt{3}}{2}$ and sine $\frac{1}{2}$, with x negative in Quadrant II. Swapping the coordinates is the typical mistake.
4. **A** - The reference angle is $\frac{\pi}{3}$ and cosine is negative in Quadrant III, so the value is $-\frac{1}{2}$.
5. **B** - $\tan = \frac{1/2}{-\sqrt{3}/2} = -\frac{\sqrt{3}}{3}$. Tangent is negative in Quadrant II.
6. **D** - $\cos 2\theta = 1 - \frac{25}{169} = \frac{144}{169}$ and cosine is negative in Quadrant II. The positive root ignores the quadrant.
7. **B** - It lies in Quadrant IV, so the reference angle is $2\pi - \frac{11\pi}{6} = \frac{\pi}{6}$.
8. **C** - $\cos 2\theta = 1 - 0.36 = 0.64$, so $\cos \theta = 0.8$, positive in Quadrant IV. The value 0.64 forgets the square root.
9. **D** - Positive cosine means the right half, and negative sine means the lower half, so Quadrant IV: point D.
10. **A** - Cosine is positive in Quadrants I and IV, with reference angle $\frac{\pi}{4}$: $\frac{\pi}{4}$ and $2\pi - \frac{\pi}{4} = \frac{7\pi}{4}$.

Remember:

- $\theta = \frac{s}{r}$, so $180^\circ = \pi$ radians and $360^\circ = 2\pi$ radians.
- Arc length is $s = r\theta$ when θ is in radians.
- The unit circle point at angle θ is $(\cos \theta, \sin \theta)$.
- Use the reference angle and the quadrant signs to evaluate any angle.
- Pythagorean identity: $\sin^2 \theta + \cos^2 \theta = 1$.