

Precalculus · Inverse Trigonometric Functions and Trigonometric Equations · Quiz

Common Core F-TF.B.6, F-TF.B.7 · mathovore.fr

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

This precalculus inverse trig quiz asks 10 multiple-choice questions on inverse trigonometric functions and trigonometric equations, and each answer comes with a short explanation.

Ten multiple-choice questions on inverse trigonometric functions, restricted ranges, and solving trig equations. Pick the one correct answer for each. Three questions include a figure.

Precalculus Common Core: F-TF.B.6 · F-TF.B.7

Questions

Question 1

What is the range of $y = \cos^{-1}x$?

- A. $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$
- B. $[0, \pi]$
- C. $[0, 2\pi]$
- D. $[-\pi, \pi]$

Question 2

What is $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$?

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

Question 3

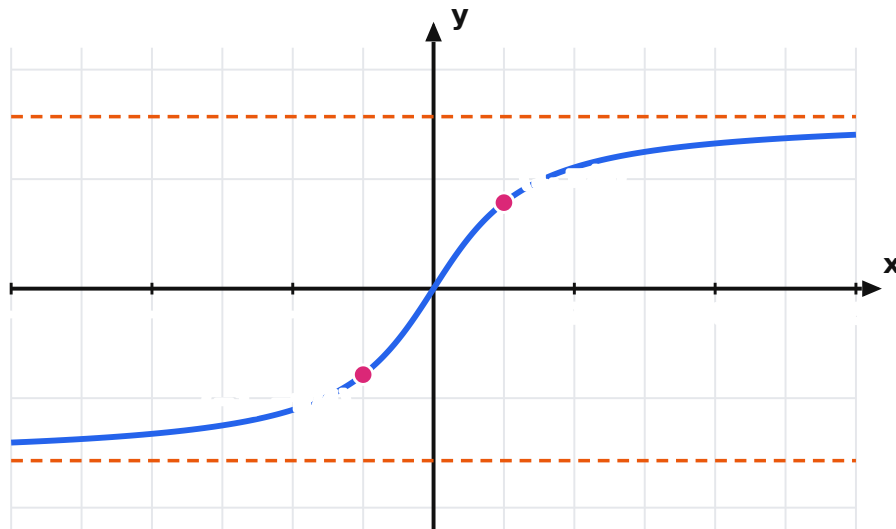
What is $\tan^{-1}(1)$?

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

D. 1

Question 4

Which function has the graph shown?



Curve that increases and levels off at two horizontal dashed lines.

- A. $y = \tan^{-1}x$
- B. $y = \sin^{-1}x$
- C. $y = \cos^{-1}x$
- D. $y = \tan x$

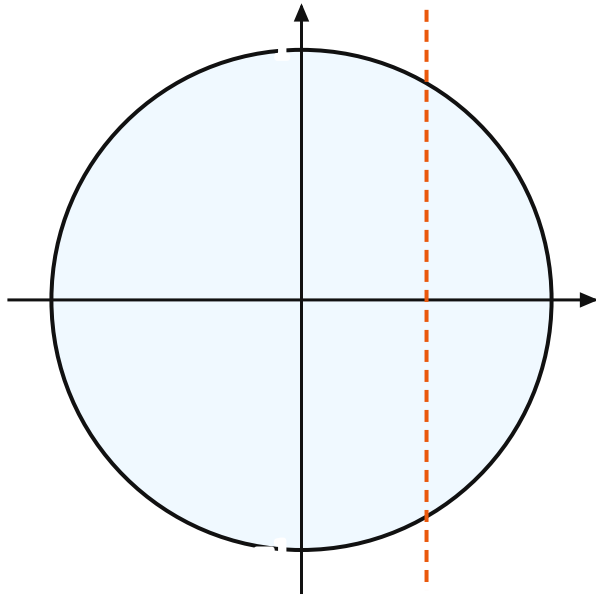
Question 5

What is $\cos^{-1}\left(\cos\frac{5\pi}{3}\right)$?

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

Question 6

The line $x = \frac{1}{2}$ is drawn on the unit circle. What are the solutions of $\cos x = \frac{1}{2}$ on $0 \leq x < 2\pi$?



- A. $\frac{\pi}{3}$ and $\frac{2\pi}{3}$
- B. $\frac{\pi}{6}$ and $\frac{11\pi}{6}$
- C. $\frac{2\pi}{3}$ and $\frac{4\pi}{3}$
- D. $\frac{\pi}{3}$ and $\frac{5\pi}{3}$

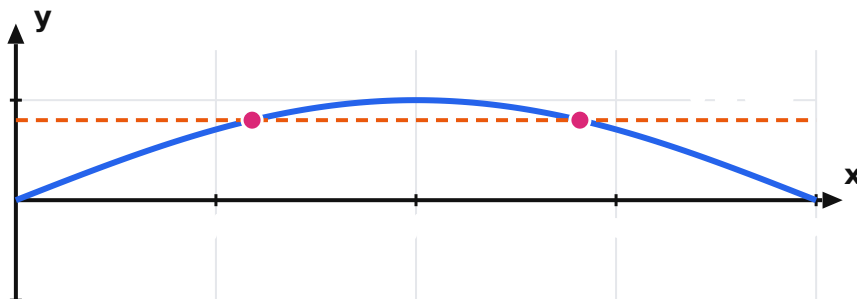
Question 7

What is $\sin(\cos^{-1}\frac{3}{5})$?

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

Question 8

The graph shows $y = \sin x$ and the line $y = 0.8$. Which values solve $\sin x = 0.8$ on $0 \leq x \leq \pi$, to the nearest hundredth?



The line meets the curve at two points.

- A. 0.93 and 4.07
- B. 0.93 and 5.36
- C. 53.13 and 126.87
- D. 0.93 and 2.21

Question 9

What are all solutions of $\tan x = 1$? Let k be any integer.

- A. $x = \frac{\pi}{4} + 2\pi k$
- B. $x = \frac{\pi}{4} + \pi k$
- C. $x = \pm \frac{\pi}{4} + 2\pi k$
- D. $x = \frac{\pi}{4} + \frac{\pi k}{2}$

Question 10

What is the domain of $f(x) = \tan^{-1} x$?

- A. $[-1, 1]$
- B. $(-\frac{\pi}{2}, \frac{\pi}{2})$
- C. all real numbers
- D. $[0, \pi]$

Answer key

1. **B** - Cosine is one-to-one on $[0, \pi]$, so $\arccos$ returns angles in that interval. $[-\frac{\pi}{2}, \frac{\pi}{2}]$ is the range of $\arcsin$.
2. **C** - The output must be in $[-\frac{\pi}{2}, \frac{\pi}{2}]$. $\frac{5\pi}{3}$ also has sine $-\frac{\sqrt{3}}{2}$ but lies outside that interval.
3. **C** - $\tan \frac{\pi}{4} = 1$ and $\frac{\pi}{4}$ is in $(-\frac{\pi}{2}, \frac{\pi}{2})$.
4. **A** - Only $\arctan$ is defined for all real inputs and levels off at $y = \pm \frac{\pi}{2}$.
5. **B** - $\cos \frac{5\pi}{3} = \frac{1}{2}$ and $\cos^{-1} \frac{1}{2} = \frac{\pi}{3}$. The answer must lie in $[0, \pi]$.
6. **D** - The reference angle is $\frac{\pi}{3}$, and cosine is positive in Quadrants I and IV, giving $\frac{\pi}{3}$ and $2\pi - \frac{\pi}{3} = \frac{5\pi}{3}$.
7. **A** - A right triangle with adjacent side 3 and hypotenuse 5 has opposite side 4, so the sine is $\frac{4}{5}$.
8. **D** - $\sin^{-1}(0.8) \approx 0.93$ and the second solution is $\pi - 0.93 \approx 2.21$. The values 53.13 and 126.87 are in degrees.
9. **B** - Tangent has period π , so solutions repeat every π . Using $2\pi k$ misses $\frac{5\pi}{4}$.
10. **C** - Every real number is the tangent of some angle in $(-\frac{\pi}{2}, \frac{\pi}{2})$, so $\arctan$ accepts all inputs. That interval is its range.

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:

- Sine, cosine, and tangent are not one-to-one, so each needs a restricted domain before it has an inverse.
- $\sin^{-1}$ and $\cos^{-1}$ have domain $[-1, 1]$; $\tan^{-1}$ accepts every real number.
- $\sin^{-1}(\sin x)$ equals x only when x is in $[-\pi/2, \pi/2]$; the same idea holds for the other two functions on their ranges.
- A calculator gives only one solution; symmetry and the period supply the rest.
- In applied problems, keep only the solutions that lie in the interval of the situation.

How to use this precalculus inverse trig quiz

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

