

Precalculus · Trigonometric Identities · Quiz

Common Core F-TF.C.8, F-TF.C.9 · mathovore.fr

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

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

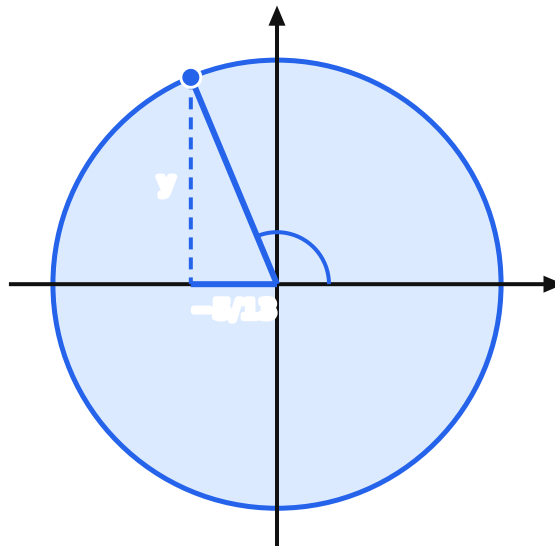
Ten multiple-choice questions on trigonometric identities: Pythagorean and reciprocal identities, sum and difference formulas, and double angles. Choose the single best answer, then read the explanation to learn the typical mistake.

Precalculus Common Core: F-TF.C.8 · F-TF.C.9

Questions

Question 1

Point P is on the unit circle in Quadrant II and its x-coordinate is $-\frac{5}{13}$. What is $\sin\theta$?



Point P on the unit circle.

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

Question 2

Simplify $\sin\theta \cot\theta$.

- A. $\sec\theta$
- B. $\tan\theta$
- C. $\cos\theta$
- D. 1

Question 3

Which equation is true for every angle where both sides are defined?

- A. $1 + \tan\theta = \sec\theta$
- B. $\sin\theta + \cos\theta = 1$
- C. $1 + \tan^2\theta = \sec^2\theta$
- D. $\sin^2\theta - \cos^2\theta = 1$

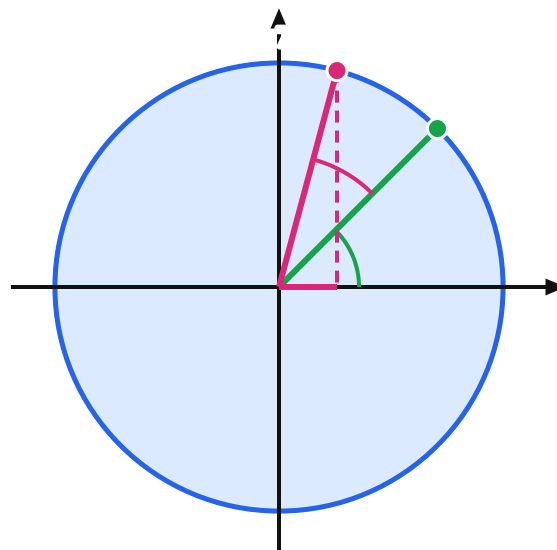
Question 4

If $\sin\theta = \frac{3}{5}$, what is $\cos 2\theta$?

- A. $\frac{24}{25}$
- B. $-\frac{1}{5}$
- C. $\frac{9}{25}$
- D. $\frac{7}{25}$

Question 5

The figure shows rays at 45 and 75 degrees. Which is the exact value of $\sin 75^\circ$?



75 degrees is 45 plus 30.

- A. $\frac{\sqrt{6}-\sqrt{2}}{4}$
- B. $\frac{\sqrt{2}+1}{2}$

- C. $\frac{\sqrt{2}}{4}$
 D. $\frac{\sqrt{6}+\sqrt{2}}{4}$

Question 6

If $\tan A = \frac{1}{2}$ and $\tan B = \frac{1}{3}$, what is $\tan(A+B)$?

- A. 1
 B. $\frac{5}{6}$
 C. $\frac{5}{7}$
 D. $\frac{1}{6}$

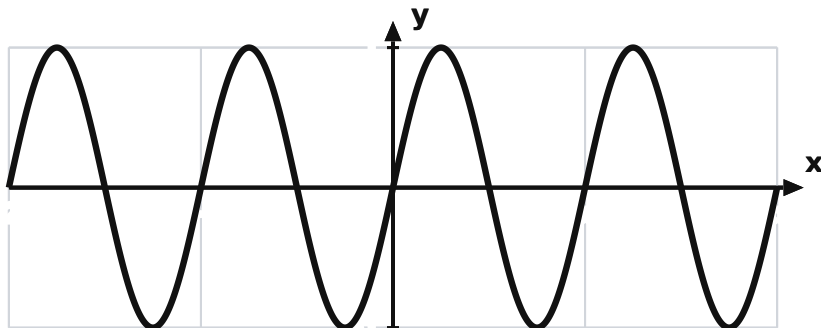
Question 7

Which expression is equal to $\frac{\sin \theta}{1 - \cos 2\theta}$?

- A. $\sin \theta$
 B. $\csc \theta$
 C. $\sec \theta$
 D. $\tan \theta$

Question 8

The graph shows $y = 2\sin x \cos x$. Which function has the same graph?



A sine wave with period π .

- A. $y = \sin 2x$
 B. $y = 2\sin x$
 C. $y = \cos 2x$
 D. $y = \sin \frac{x}{2}$

Question 9

Angle θ is in Quadrant III and $\cos \theta = -\frac{4}{5}$. What is $\tan \theta$?

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

D. $\frac{3}{4}$

Question 10

Which expression is equal to $\sin(A - B)$?

- A. $\sin A \cos B - \cos A \sin B$
- B. $\sin A \cos B + \cos A \sin B$
- C. $\cos A \cos B - \sin A \sin B$
- D. $\sin A - \sin B$

Answer key

1. **B** - Since $y^2 = 1 - \frac{25}{169} = \frac{144}{169}$ and Quadrant II has positive y , $\sin\theta = \frac{12}{13}$. Computing $1 - \frac{5}{13}$ instead of squaring is a common slip.
2. **C** - $\sin\theta \cdot \frac{\cos\theta}{\sin\theta} = \cos\theta$. Mixing up cotangent with $\frac{\sin\theta}{\cos\theta}$ leads to the wrong answers.
3. **C** - Divide $\sin^2\theta + \cos^2\theta = 1$ by $\cos^2\theta$. The other equations fail, for example at $\theta = 45^\circ$.
4. **D** - $\cos 2\theta = 1 - 2\sin^2\theta = 1 - \frac{18}{25} = \frac{7}{25}$. The value $\frac{24}{25}$ is $\sin 2\theta$, and $-\frac{1}{5}$ comes from doubling the sine before squaring.
5. **D** - $\sin(45^\circ + 30^\circ) = \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{3}}{2} + \frac{\sqrt{2}}{2} \cdot \frac{1}{2}$. Adding $\sin 45^\circ + \sin 30^\circ$ is the usual mistake.
6. **A** - $\frac{\frac{1}{2} + \frac{1}{3}}{1 - \frac{1}{6}} = \frac{5/6}{5/6} = 1$. The value $\frac{5}{6}$ comes from forgetting the denominator.
7. **B** - $1 - \cos 2\theta = \sin^2\theta$, so the fraction is $\frac{\sin\theta}{\sin^2\theta} = \frac{1}{\sin\theta}$.
8. **A** - The double-angle formula gives $2\sin x \cos x = \sin 2x$, which has amplitude 1 and period π .
9. **D** - $\sin\theta = -\frac{3}{5}$ in Quadrant III, so $\tan\theta = \frac{-3/5}{-4/5} = \frac{3}{4}$. A negative sign slip gives the first wrong answer.
10. **A** - The difference formula for sine keeps the pattern sine-cosine minus cosine-sine. Distributing sine over the subtraction is not allowed.

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:

- Standards F-TF.C.8 and F-TF.C.9: prove and use the Pythagorean identity, and the addition formulas for sine, cosine and tangent.
- Pythagorean identities: $\sin^2\theta + \cos^2\theta = 1$, $1 + \tan^2\theta = \sec^2\theta$ and $1 + \cot^2\theta = \csc^2\theta$.
- Sum formulas: $\sin(A+B) = \sin A \cos B + \cos A \sin B$ and $\cos(A+B) = \cos A \cos B - \sin A \sin B$.
- Double angle: $\sin 2\theta = 2\sin\theta \cos\theta$ and $\cos 2\theta = \cos^2\theta - \sin^2\theta$.
- To verify an identity, work on one side only, rewrite in sine and cosine, and simplify until it matches the other side.

How to use this precalculus trig identities quiz

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

