

5.1 PRE-TEST

Course name: Precalculus Precalculus Essential Skills

Professor name: Homeschool Studies

College name: Homeschool Studies

All exercises, quizzes, and tests are delivered online.

Directions: Ready to test your smarts?

This is a sample print of an online Test.

Have a shot at this 20-question practice test!

Take it as many times as you want to. Once you're done, be sure to click the "Guide" button to review any questions you missed, a step-by-step explanation for the question, and a link to the video where that content is discussed.

Need Help? No Problem! Contact support@thinkwell.com with questions.

Question: 1

Which of the following equations is equivalent to $\sin^2 \theta + \tan^2 \theta + \cos^2 \theta = 1$?

- $1 + \cos^2 \theta + \tan^2 \theta = \csc^2 \theta$
- $1 + \sec^2 \theta + \cot^2 \theta = \csc^2 \theta$
- $1 + \csc^2 \theta + \tan^2 \theta = \sec^2 \theta$
- $\tan^2 \theta + \sin^2 \theta = \sec^2 \theta$

Question: 2

If the cotangent of θ is 2 in the first quadrant, what is the secant of θ ?

- $\frac{\sqrt{5}}{2}$
- $\sqrt{5}$
- $\frac{1}{2}$
- $\frac{5}{4}$

Question: 3

Simplify the expression:
 $\tan^2 x \cdot \csc^2 x$

- $\tan^2 x \left(\frac{1}{\sin^2 x} \right)$
- 1
- $\sec^2 x$
- $\frac{1}{\cos^2 x}$

Question: 4

Simplify the expression.

$$(\sec^2 \theta - 1)(\csc^2 \theta \cos^2 \theta)$$

- $\tan^2 \theta \cos \theta$
 $\sin \theta$
 1
 $\tan^4 \theta$

Question: 5

Simplify the expression.

$$\frac{\sin^2 \alpha - \cos^2 \alpha}{\sin^2 \alpha - \sin \alpha \cos \alpha}$$

- $\csc \alpha$
 $1 - \cot \alpha$
 $\frac{1}{\sin^2 \alpha - \sin \alpha \cos \alpha}$
 $1 + \cot \alpha$

Question: 6

Subtract and simplify this expression.

$$\frac{\sin x - 1}{\cos x} - \frac{\cos x}{\sin x - 1}$$

- $2 \tan x$
 $2 \sin x$
 $2 \tan x + \csc x$
 $\frac{2 \sin^2 x - 2 \sin x}{\cos x (\sin x - 1)}$

Question: 7

Simplify the expression.

$$(\csc x + \cot x)(\csc x - \cot x)$$

- $\csc x - \cot x$
 $\csc^2 x - \cot^2 x$
 1
 -1

Question: 8

Simplify the expression $(\csc \theta - \cos \theta)^2$.

- $\csc^2 \theta + \cos^2 \theta$
 $\csc^2 \theta - 2 \csc \theta \cdot \cos \theta + \cos^2 \theta$
 $\csc^2 \theta - 2 \cot \theta + \cos^2 \theta$
 $1 + 2 \cot^2 \theta$

Question: 9

Factor the expression

$\cot x \cdot \csc^2 x - \cot x$ and simplify.

- $\cot x(\csc^2 x - 1)$
 $\cot x(\sin^2 x)$
 $\cot^3 x$
 This expression cannot be factored.

Question: 10

Simplify the following expression by factoring
 $\tan^2 x - \sin^2 x$

- $\tan^2 x - 1$
 $\sin^2 x \tan^2 x$
 $\sin^2 x$
 $\sec^2 x$
 None of the above

Question: 11

Find all the solutions for

$$\cos x = \frac{\sqrt{2}}{2}$$

- $x = \frac{\pi}{4} + 2\pi n$ and $x = \frac{3\pi}{4} + 2\pi n$
 $x = \frac{3\pi}{4} + 2\pi n$ and $x = \frac{5\pi}{4} + 2\pi n$
 $x = \frac{\pi}{4} + 2\pi n$ and $x = \frac{7\pi}{4} + 2\pi n$
 $x = \frac{\pi}{4} + 2\pi n$ and $x = \frac{5\pi}{4} + 2\pi n$

Question: 12

What is the smallest positive solution to the equation?

$$\tan x = \sqrt{3}$$

- $\frac{\pi}{6}$

- $\frac{\pi}{3}$
- $-\frac{2\pi}{3}$
- There is no solution to the equation.

Question: 13

Find all solutions in the interval $[0, 2\pi)$ of the equation $2 \cos \theta \sin \theta + \cos \theta = 0$.

- $\theta = \frac{\pi}{2}$ and $\frac{7\pi}{6}$
- $\theta = \frac{\pi}{2}$ and $\frac{3\pi}{2}$
- $\theta = \frac{\pi}{2}, \frac{7\pi}{6}, \frac{3\pi}{2}$ and $\frac{11\pi}{6}$
- $\theta = \frac{\pi}{6}, \frac{\pi}{2}, \frac{5\pi}{6}$ and $\frac{3\pi}{2}$

Question: 14

Solve the equation $\sin x \tan x = \sin x$ on the interval $[0, 2\pi)$.

- $x = 0$, or $x = \pi$
- $x = \frac{\pi}{4}$, or $x = \frac{5\pi}{4}$
- $x = 0, x = \frac{\pi}{4}, x = \pi$, or $x = \frac{5\pi}{4}$
- $x = \frac{3\pi}{4}$ or $x = \frac{7\pi}{4}$

Question: 15

Find all solutions in the interval $[0, 2\pi)$ of the equation $\sin 2\theta = -\frac{\sqrt{3}}{2}$.

- $\theta = \frac{4\pi}{3}$ and $\frac{5\pi}{3}$
- $\theta = \frac{2\pi}{3}$ and $\frac{5\pi}{6}$
- $\theta = \frac{2\pi}{3}$ and $\frac{5\pi}{3}$

$\theta = \frac{2\pi}{3}, \frac{5\pi}{6}, \frac{5\pi}{3}, \text{ and } \frac{11\pi}{6}$

Question: 16

Find all solutions to the equation

$$2 \cos\left(\frac{x}{2}\right) - \sqrt{3} = 0 \text{ on } [0, 2\pi].$$

- $x = \frac{\pi}{6}$
- $x = \frac{\pi}{12}$
- $x = \frac{\pi}{3}, \text{ or } x = \frac{11\pi}{3}$
- $x = \frac{\pi}{3}$

Question: 17

Solve the equation $\sin^2 x + \sin x - 1 = 0$ on $[0, 2\pi]$, rounding your answers to three decimal places.

- $x = 0.618$ or $x = -1.618$
- $x = 0.666$
- $x = 0.666$ or $x = 2.475$
- The equation has no solution.

Question: 18

A weight suspended from a spring is vibrating vertically according to the equation

$$f(t) = 10 \sin\left(\frac{3}{4}\pi(t-3)\right)$$

where $f(t)$ is the directed distance (in cm) of the weight from its central position at t seconds. Find the smallest positive value of t for which the weight will be at its central position.

- 3
- $\frac{13}{3}$
- $\frac{1}{3}$
- $\frac{3}{4}$

Question: 19

A child is playing with a yo-yo. The yo-yo's position relative to the child's hand is given by $S(t) = \cos(2\pi t) - 1$, where t is the time in seconds. How long does it take for the yo-yo to return to the child's hand?

- 2π seconds
- 2 seconds
- t
- 1 second

- None of the above

Question: 20

What is the smallest positive solution to the equation $\sin x = -1$.

- $\frac{3\pi}{2}$
- $\frac{3\pi}{4}$
- $\frac{\pi}{2}$
- The equation has no solution.

Sample Assessment