

- 1) In what quadrant is the cosecant function positive and the secant function negative?
- a. I b. II c. III d. IV e. Not Given
- 2) Find the length of an arc formed by a 30 degree angle and a radius of 84 meters.
- a. 7 meters b. 2,580 meters c. 7π meters d. $2,580\pi$ meters e. Not Given
- 3) Suppose $\sin \theta = \frac{3}{7}$ and $\cot \theta < 0$. Find the value of $\sec \theta$.
- a. $\frac{2\sqrt{5}}{7}$ b. $-\frac{2\sqrt{5}}{7}$ c. $\frac{7\sqrt{5}}{10}$ d. $-\frac{7\sqrt{5}}{10}$ e. Not Given
- 4) A sinusoid has a maximum at (2, 1) and a minimum at (8, -7). Find the amplitude of the sinusoid.
- a. 2 b. 4 c. 6 d. 8 e. Not Given
- 5) A sinusoid has a maximum at (2, 1) and a minimum at (8, -7). Find the period of the sinusoid.
- a. 3 b. 6 c. 9 d. 12 e. Not Given
- 6) Suppose $f(x) = 3 \tan\left(\frac{\pi x}{5}\right)$. Find the location of the first positive vertical asymptote of $f(x)$.
- a. $x = 0.5$ b. $x = 1.5$ c. $x = 2.5$ d. $x = 3.5$ e. Not Given
- 7) Convert the point $(-7, 7\sqrt{3})$ from rectangular coordinates into polar coordinates.
- a. $\left(7, \frac{\pi}{6}\right)$ b. $\left(14, \frac{\pi}{3}\right)$ c. $\left(14, \frac{2\pi}{3}\right)$ d. $\left(7, \frac{5\pi}{6}\right)$ e. Not Given
- 8) Give the value of $\sin\left(\frac{5\pi}{12}\right)$.
- a. $\frac{\sqrt{6} - \sqrt{2}}{2}$ b. $\frac{\sqrt{6} + \sqrt{2}}{2}$ c. $\frac{\sqrt{6} - \sqrt{2}}{4}$ d. $\frac{\sqrt{6} + \sqrt{2}}{4}$ e. Not Given
- 9) Simplify $\sin x \tan x \cos x \sec x \csc x$.
- a. $\sin x$ b. $\tan x$ c. $\cos x$ d. $\sec x$ e. $\csc x$

10) Simplify $\frac{\sin x}{1 + \sin x} + \frac{\sin x}{1 - \sin x}$.

- a. $2 \tan x \sec x$ b. $2 \cot x \sec x$ c. $2 \tan x \csc x$ d. $2 \cot x \csc x$ e. $2 \sin x$

11) Suppose ABC is a triangle where $\angle A = 34^\circ$, $\angle B = 48^\circ$, and $\angle C = 98^\circ$. Find the length of side AC, if side BC has a length of 5.

- a. 3.762 b. 4.483 c. 5.232 d. 5.867 e. 6.645

12) Find the angle between the vectors $\langle -3, 5 \rangle$ and $\langle 1, 2 \rangle$.

- a. 51.5 degrees b. 53.5 degrees c. 55.5 degrees d. 57.5 degrees e. 59.5 degrees

13) Find a unit vector pointing in the same direction as $\langle 7, -2 \rangle$.

- a. $\left\langle \frac{7}{9}, -\frac{2}{9} \right\rangle$ b. $\left\langle \frac{7}{\sqrt{53}}, -\frac{2}{\sqrt{53}} \right\rangle$ c. $\left\langle \frac{7}{\sqrt{45}}, -\frac{2}{\sqrt{45}} \right\rangle$ d. $\left\langle \frac{7}{\sqrt{71}}, -\frac{2}{\sqrt{71}} \right\rangle$ e. Not Given

14) Simplify $\frac{(\sec x + \tan x)(\sec x - \tan x)}{\tan x}$.

- a. $\cos x$ b. $\sin x$ c. $\csc x$ d. $\sec x$ e. Not Given

15) Convert $\left(-2, \frac{\pi}{2}\right)$ from polar coordinates into rectangular coordinates.

- a. $(-2, 0)$ b. $(2, 0)$ c. $(0, 2)$ d. $(0, -2)$ e. Not Given

16) Convert 3 radians into degrees.

- a. 180 degrees b. $\frac{540}{\pi}$ degrees c. 540 degrees d. $\frac{1080}{\pi}$ degrees e. 1080 degrees

17) Find the area of a triangle with side lengths 4, 6 and 8.

- a. $\sqrt{95}$ b. $\sqrt{105}$ c. $\sqrt{115}$ d. $5\sqrt{3}$ e. $3\sqrt{15}$

18) Which of the following is equivalent to $-\frac{\sqrt{3}}{2} - \frac{1}{2}i$?

- a. $e^{\frac{2\pi}{3}i}$ b. $e^{\frac{5\pi}{6}i}$ c. $e^{\frac{7\pi}{6}i}$ d. $e^{\frac{4\pi}{3}i}$ e. $e^{\frac{3\pi}{2}i}$

19) Which of the following angles has the same trigonometric values as 1000 degrees?

- a. 20 degrees b. 80 degrees c. 140 degrees d. 280 degrees e. 420 degrees

20) Which of the following is equivalent to $\sin(\arccos(x))$?

- a. $\sqrt{1-x^2}$ b. $\sqrt{x^2-1}$ c. $\frac{1}{\sqrt{1-x^2}}$ d. $\frac{1}{\sqrt{x^2-1}}$ e. $\frac{x}{x^2+1}$

21) Find the distance between the polar points $(2, 100^\circ)$ and $(4, 220^\circ)$.

- a. 5.09 b. 5.19 c. 5.29 e. 5.39 d. 5.49

22) The center of a Ferris Wheel is 15 feet above the ground and the radius of the wheel is 11 feet. If the motion of the wheel is modeled by the equation, $y = A\sin(Bx) + C$, and the wheel makes one revolution every 42 seconds, find the value of B.

- a. $\frac{\pi}{42}$ b. $\frac{\pi}{21}$ c. 4 d. 15 e. 26

23) Find $\cot^{-1}(-1)$.

- a. $-\frac{\pi}{4}$ b. $\frac{\pi}{4}$ c. $\frac{3\pi}{4}$ d. $\frac{5\pi}{4}$ e. $\frac{3\pi}{2}$

24) If $\sec(A) = -3$, and $\sin(A) < 0$, find the value of angle A.

- a. 109 degrees b. 161 degrees c. 251 degrees d. 289 degrees e. 341 degrees

25) Find the smallest positive angle that satisfies the equation: $2\sin^2\theta + \sin\theta - 3 = 0$

- a. $\frac{\pi}{2}$ b. $\frac{\pi}{3}$ c. $\frac{\pi}{4}$ d. $\frac{\pi}{6}$ e. not given

26) Suppose angle A is in the first quadrant and that $\sec A \tan A = \frac{1}{9}$. Calculate $\sin A$.

a. $\frac{-4 + \sqrt{17}}{2}$

b. $\frac{-4 - \sqrt{17}}{2}$

c. $\frac{-9 + \sqrt{85}}{2}$

d. $\frac{-9 - \sqrt{85}}{2}$

e. not given

27) A wheel with a radius of 14 inches spins at a rate of 32 miles per hour. How fast does the wheel spin in revolutions per minute?

a. 32 RPM

b. 42 RPM

c. 202 RPM

d. 266 RPM

e. 316 RPM

28) Which of the following is a solution to the equation $\cot^2 x + \csc x - 1 = 0$?

a. $\frac{\pi}{6}$

b. $\frac{5\pi}{6}$

c. $\frac{3\pi}{2}$

d. $\frac{5\pi}{3}$

e. $\frac{11\pi}{6}$

29) Simplify $\frac{\sin(2x)}{2\sin(x)}$.

a. $\cos x$

b. $\sin x$

c. $\csc x$

d. $\sec x$

e. Not Given

30) How many removable discontinuities does the graph $f(x) = \frac{\sin x \cos x - \sin^2 x}{\sin x \cos x + \sin^2 x}$ have?

a. None

b. One

c. Two

d. Four

e. Infinite