

Trigonometric Functions Test Review

For each of the following, state in which quadrant the terminal ray of the angle lies. Then, find the reference angle.

1. $\frac{7\pi}{5}$

3. $\frac{9\pi}{10}$

2. $-\frac{4\pi}{3}$

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

Evaluate each of the following

5. $\sin\left(\frac{\pi}{6}\right)$

9. $\tan(0)$

13. $\cot\left(-\frac{7\pi}{4}\right)$

6. $\tan(\pi)$

10. $\sin\left(\frac{2\pi}{3}\right)$

14. $\cos\left(-\frac{5\pi}{6}\right)$

7. $\csc\left(\frac{4\pi}{3}\right)$

11. $\csc(-2\pi)$

15. $\sec\left(\frac{\pi}{2}\right)$

8. $\sec\left(\frac{5\pi}{4}\right)$

12. $\cos\left(\frac{11\pi}{4}\right)$

16. $\cot\left(\frac{5\pi}{3}\right)$

Match each numbered angle with the corresponding letter of the angle graphed in standard position.

17. $\frac{4\pi}{3}$

18. $\frac{11\pi}{3}$

19. $-\frac{6\pi}{7}$

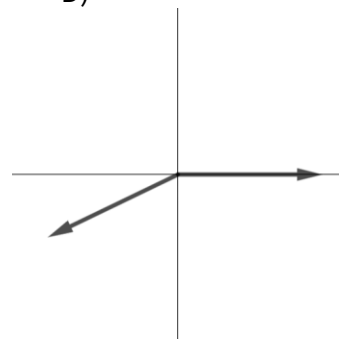
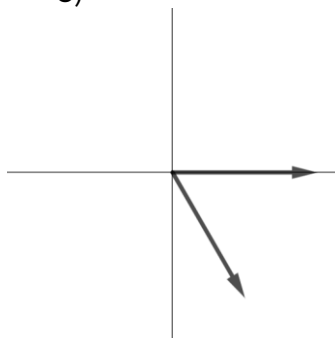
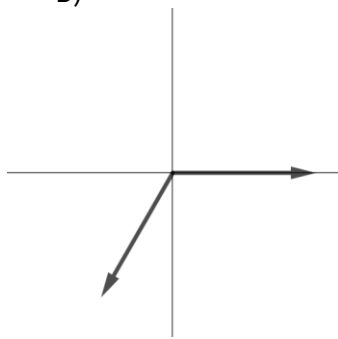
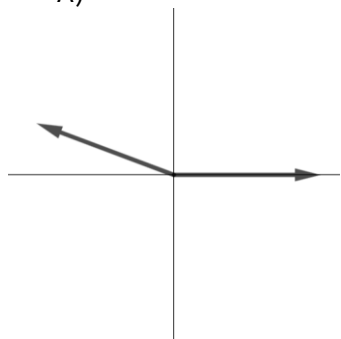
20. -3.5

A)

B)

C)

D)



21. When graphed in standard position, the terminal ray of angle α passes through the point $(-3,1)$.

a. Find $\cos \alpha$

b. Find $\csc \alpha$

c. Find $\tan \alpha$

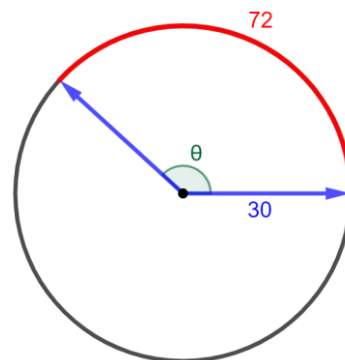
22. Given $\sin \theta = 0.6$ and $\cos \theta = -0.8$

a. In which quadrant does the terminal ray of θ lie?

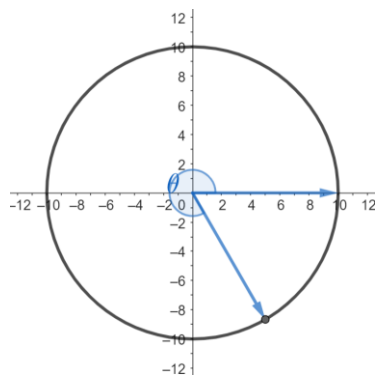
b. Find $\sec \theta$.

c. If θ is graphed in standard position, what is the slope of its terminal ray?

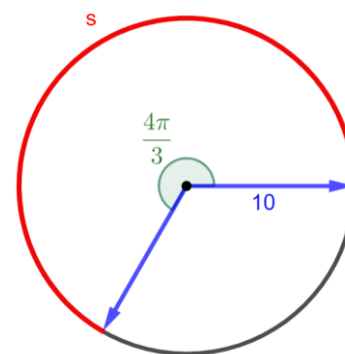
23. In a circle of radius 30, the central angle θ subtends a minor arc of length 72. Find θ .



24. Consider a circle of radius 10 centered about the origin. When graphed in standard form, the terminal ray of the angle $\frac{5\pi}{3}$ intersects this circle at what coordinates?



25. Find the length of the major arc subtended by a central angle of $\frac{4\pi}{3}$ in a circle of radius 10.



Use the following four trigonometric ratios to answer #26-29

$$\sin\left(\frac{\pi}{12}\right) = \frac{\sqrt{6} - \sqrt{2}}{4}$$

$$\cos\left(\frac{\pi}{12}\right) = \frac{\sqrt{6} + \sqrt{2}}{4}$$

$$\sin\left(\frac{5\pi}{12}\right) = \frac{\sqrt{6} + \sqrt{2}}{4}$$

$$\cos\left(\frac{5\pi}{12}\right) = \frac{\sqrt{6} - \sqrt{2}}{4}$$

26. Find $\cot\left(\frac{5\pi}{12}\right)$

27. Consider a circle of radius 36 centered about the origin. When graphed in standard form, the terminal ray of the angle $\frac{5\pi}{12}$ intersects this circle at what coordinates?

28. Evaluate $\sin\left(-\frac{7\pi}{12}\right)$

29. Evaluate $\sec\left(-\frac{\pi}{12}\right)$

30. Solve over $0 \leq \theta < 2\pi$

$$\tan^2 \theta = \tan \theta$$

31. Solve over $0 \leq \theta < 2\pi$

$$3 - \csc \theta = 2 \sin \theta$$

32. Which one of the following correctly completes the statement: Coterminal angles...

- (A) Differ by an integer multiple of π
- (B) Differ by an integer number of revolutions
- (C) Add to an even multiple of π
- (D) Are supplementary

33. Three of the following angles are coterminal. One is not. Select the option that is not coterminal with the others.

- (A) $\frac{5\pi}{6}$
- (B) $\frac{23\pi}{6}$
- (C) $-\frac{7\pi}{6}$
- (D) $-\frac{19\pi}{6}$

34. Let $f(x) = 2 + 5 \sec x$. Find all input values in the interval $0 \leq x < 2\pi$ that yield an output value of -8 .

- (A) $x = \frac{\pi}{6}$ and $x = \frac{5\pi}{6}$
- (B) $x = \frac{5\pi}{6}$ and $x = \frac{7\pi}{6}$
- (C) $x = \frac{2\pi}{3}$ and $x = \frac{4\pi}{3}$
- (D) $x = \frac{4\pi}{3}$ and $x = \frac{5\pi}{3}$

35. Solve over the interval $0 \leq \theta < 2\pi$

$$\csc^2 \theta = 2 \csc \theta$$

- (A) $\theta = \frac{\pi}{6}$ and $\theta = \frac{5\pi}{6}$
- (B) $\theta = \frac{5\pi}{6}$ and $\theta = \frac{7\pi}{6}$
- (C) $\theta = \frac{2\pi}{3}$ and $\theta = \frac{4\pi}{3}$
- (D) $\theta = \frac{4\pi}{3}$ and $\theta = \frac{5\pi}{3}$

36. Find an expression for all solutions to the following trigonometric equation.

$$4 \sin \theta = 3 \csc \theta$$

- (A) $\theta = \frac{\pi}{3}k$, where k is any integer
- (B) $\theta = \frac{\pi}{3} + \pi k$ or $\theta = \frac{2\pi}{3} + \pi k$, where k is any integer
- (C) $\theta = \frac{2\pi}{3} + 2\pi k$ or $\theta = \frac{4\pi}{3} + 2\pi k$, where k is any integer
- (D) $\theta = \frac{\pi}{6} + 2\pi k$ or $\theta = \frac{5\pi}{6} + 2\pi k$, where k is any integer

37. Find an expression for all solutions to the following trigonometric equation.

$$\sin^2 \theta - \sin \theta = \cos^2 \theta$$

- (A) $\theta = \frac{\pi}{2} + \frac{\pi}{6}n$, where $n \in \mathbb{Z}$
- (B) $\theta = \frac{\pi}{2} + \frac{2\pi}{3}n$, where $n \in \mathbb{Z}$
- (C) $\theta = \frac{7\pi}{6} + 2\pi n$ or $\theta = \frac{11\pi}{6} + 2\pi n$, where $n \in \mathbb{Z}$
- (D) $\theta = \frac{\pi}{2} + \pi n$ or $\theta = \frac{7\pi}{6} + \pi n$ or $\theta = \frac{11\pi}{6} + \pi n$, where $n \in \mathbb{Z}$

38. Which one of the following is not a solution to the following trigonometric equation

$$2 \cos^2 \theta + \cos \theta = 1$$

- (A) $\theta = \pi$
- (B) $\theta = \frac{\pi}{3}$
- (C) $\theta = \frac{2\pi}{3}$
- (D) $\theta = \frac{5\pi}{3}$

39. Where defined, which trigonometric function is equivalent to $\frac{\cot \theta \sec^2 \theta (1 - \sin^2 \theta)}{\csc \theta}$?

- (A) $\sin \theta$
- (B) $\cos \theta$
- (C) $\tan \theta$
- (D) $\csc \theta$

40. Where defined, which trigonometric function is equivalent to $\frac{1 - \csc^2 \theta}{1 - \sin^2 \theta}$?

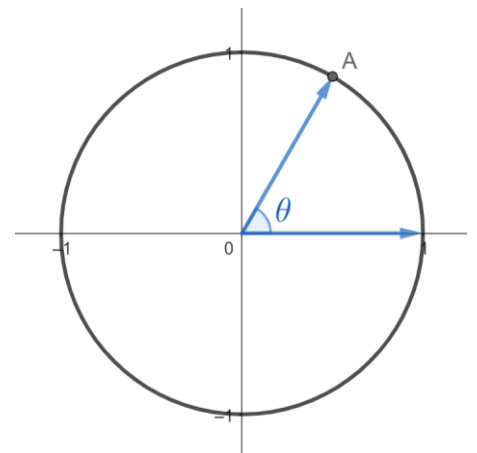
- (A) $-\csc^2 \theta$
- (B) $\sec^2 \theta$
- (C) $-\sin^2 \theta$
- (D) $\cos^2 \theta$

41. Three of the following expressions are equivalent where defined. One is not. Which one of the following is not equivalent to the others?

- (A) $\sin \theta \tan \theta + \cos \theta$
- (B) $\csc^2 \theta \cot \theta$
- (C) $\sec \theta$
- (D) $\frac{\cos \theta}{1 - \sin^2 \theta}$

42. The angle θ is graphed in standard form. It intersects the unit circle at the point A . Which one of the following is false?

- (A) The arc subtended by θ has length θ
- (B) $\cos(\theta)$ is equal to the ratio of the horizontal displacement of A from the y -axis to the distance between the origin and A .
- (C) $\tan(\theta)$ is equal to the slope of the line connecting the origin to the point A .
- (D) $\sec(\theta)$ is equal to the ratio of the vertical displacement of A from the x -axis to the distance between the origin and A .



43. Which one of the following expresses all values of θ for which $\tan \theta$ is undefined?

- (A) $\frac{\pi}{4} + \frac{\pi}{2}k$, where $k \in \mathbb{Z}$
- (B) $\frac{\pi}{2} + \pi k$, where $k \in \mathbb{Z}$
- (C) $\frac{\pi}{2} + 2\pi k$, where $k \in \mathbb{Z}$
- (D) $\pi + 2\pi k$, where $k \in \mathbb{Z}$

44. When graphed in standard position, the terminal ray of angle β passes through the point $(\frac{5}{2}, 6)$. Find $\sec \beta$.

- (A) $\frac{13}{5}$
- (B) $\frac{13}{12}$
- (C) $\frac{10}{13}$
- (D) $\frac{6}{13}$

45. Find all solutions in the interval $-\pi \leq \theta < \pi$

$$\sec \theta = -\frac{2\sqrt{3}}{3}$$

- (A) $\theta = -\frac{5\pi}{6}$ or $\theta = \frac{5\pi}{6}$
- (B) $\theta = -\frac{5\pi}{6}$ or $\theta = -\frac{\pi}{6}$
- (C) $\theta = -\frac{2\pi}{3}$ or $\theta = -\frac{\pi}{3}$
- (D) $\theta = -\frac{2\pi}{3}$ or $\theta = \frac{2\pi}{3}$

46. If $\sin \theta = \frac{1}{2}$ and $\cos \theta < 0$, then which one of the following represents all possible values of θ ?

- (A) $\theta = \frac{\pi}{6} + \frac{2\pi}{3}n$, where $n \in \mathbb{Z}$
- (B) $\theta = \frac{\pi}{6} + 2\pi n$ or $\theta = \frac{5\pi}{6} + 2\pi n$, where $n \in \mathbb{Z}$
- (C) $\theta = \frac{5\pi}{6} + 2\pi n$, where $n \in \mathbb{Z}$
- (D) $\theta = \frac{5\pi}{6} + \pi n$, where $n \in \mathbb{Z}$

Before the solving equations quiz (the most recent quiz), there was an optional set of problems on Canvas called "Extra Trig Equation Solving Practice". If you are feeling like you'd like more practice solving equations before the test but have not yet done those problems, this is just a reminder that those problems exist.

Trigonometric Functions Test Review Answers

1. Quadrant III Reference Angle: $\frac{2\pi}{5}$
2. Quadrant II Reference Angle: $\frac{\pi}{3}$
3. Quadrant II Reference Angle: $\frac{\pi}{10}$
4. Quadrant II Reference Angle: $\frac{\pi}{4}$
5. $\frac{1}{2}$
6. 0
7. $-\frac{2}{\sqrt{3}} = -\frac{2\sqrt{3}}{3}$
8. $-\sqrt{2}$
9. 0
10. $\frac{\sqrt{3}}{2}$
11. Undefined
12. $-\frac{1}{\sqrt{2}} = -\frac{\sqrt{2}}{2}$
13. 1
14. $-\frac{\sqrt{3}}{2}$
15. Undefined
16. $-\frac{1}{\sqrt{3}} = -\frac{\sqrt{3}}{3}$
17. B
18. C
19. D
20. A
21.
 - a. $-\frac{3}{\sqrt{10}}$
 - b. $\sqrt{10}$
 - c. $-\frac{1}{3}$
22.
 - a. Quadrant II
 - b. $-\frac{5}{4}$
 - c. $-\frac{3}{4}$
23. $\theta = \frac{12}{5} = 2.4$
24. $(5, -5\sqrt{3})$
25. $\frac{40\pi}{3}$
26. $\cot\left(\frac{5\pi}{12}\right) = \frac{\sqrt{6}-\sqrt{2}}{\sqrt{6}+\sqrt{2}} = 2 - \sqrt{3}$
27. $(9\sqrt{6} - 9\sqrt{2}, 9\sqrt{6} + 9\sqrt{2})$
28. $\sin\left(-\frac{7\pi}{12}\right) = -\frac{\sqrt{6}+\sqrt{2}}{4} = \frac{-\sqrt{6}-\sqrt{2}}{4}$
29. $\sqrt{6} - \sqrt{2}$
30. $\theta = 0, \theta = \frac{\pi}{4}, \theta = \pi, \text{ or } \theta = \frac{5\pi}{4}$
31. $\theta = \frac{\pi}{6}, \theta = \frac{\pi}{2}, \text{ or } \theta = \frac{5\pi}{6}$
32. B
33. B
34. C
35. A
36. B
37. B
38. C
39. B
40. A
41. B
42. D
43. B
44. A
45. A
46. C