

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use the fundamental identities to find the value of the trigonometric function.

1) Find $\sin \theta$ if $\cos \theta = \frac{2}{3}$ and θ is in quadrant IV. 1) _____

2) Find $\tan \theta$ if $\sin \theta = \frac{3}{4}$ and θ is in quadrant II. 2) _____

3) Find $\sin \theta$ if $\sec \theta = -\frac{8}{5}$ and $\tan \theta < 0$. 3) _____

4) Find $\csc \theta$ if $\cot \theta = -\sqrt{35}$ and θ is in quadrant II. 4) _____

5) Find $\sin \theta$ if $\tan \theta = -\frac{5}{12}$ and $\cos \theta > 0$. 5) _____

Complete the sentence so the result is an identity. Let x be any real number.

6) $___ + \sin^2 x = 1$ 6) _____

7) $\sin x = (___)(\cos x)$ 7) _____

Write the first trigonometric function in terms of the second trigonometric function.

8) $\cot x$; $\csc x$ 8) _____

Write the expression in terms of sine and cosine, and simplify so that no quotients appear in the final expression.

9) $\tan x(\cot x - \cos x)$ 9) _____

10) $\frac{\sin^2 x - 1}{\cos(-x)}$ 10) _____

Use a graphing calculator to make a conjecture as to whether each equation is an identity.

11) $\sin \frac{x}{2} \cos \frac{x}{2} = \frac{\sin x}{2}$ 11) _____

Perform the indicated operations and simplify the result.

12) $\frac{\sin \theta}{1 + \sin \theta} - \frac{\sin \theta}{1 - \sin \theta}$ 12) _____

13) $\frac{\sec \theta \sin \theta}{\tan \theta} - 1$ 13) _____

Factor the trigonometric expression and simplify.

14) $\sec^4 x - 2 \sec^2 x \tan^2 x + \tan^4 x$ 14) _____

Use the fundamental identities to simplify the expression.

15) $\cos \theta - \cos \theta \sin^2 \theta$ 15) _____

16) $\tan^2 \theta \csc^2 \theta$ 16) _____

Simplify the expression.

17) $\cot \theta \sec \theta \sin \theta$ 17) _____

18) $\frac{\cos^2 x}{\sin^2 x} + \cos x \sec x$ 18) _____

Verify that each equation is an identity.

19) $\csc^2 t - \cos t \sec t = \cot^2 t$ 19) _____

20) $\frac{1 - \sec \theta}{\tan \theta} + \frac{\tan \theta}{1 - \sec \theta} = -2 \csc \theta$ 20) _____

21) $\sec^4 x - \tan^4 x = \sec^2 x + \tan^2 x$ 21) _____

Graph the expression on each side of the equals symbol to determine whether the equation might be an identity.

22) $\frac{\sin \theta + 1}{\cos \theta + \cot \theta} = \tan \theta$ 22) _____

Use Identities to find the exact value.

23) $\cos -75^\circ$ 23) _____

24) $\cos \left(\frac{\pi}{12} \right)$ 24) _____

Write in terms of the cofunction of a complementary angle.

25) $\cos \frac{\pi}{16}$ 25) _____

26) $\cot \frac{13\pi}{14}$ 26) _____

Use identities to fill in the blank with the appropriate trigonometric function name.

27) $\sin 59^\circ = \frac{1}{\frac{\quad}{31^\circ}}$ 27) _____

Use the cofunction identities to find an angle θ that makes the statement true.

28) $\tan (2\theta - 140^\circ) = \cot (\theta + 5^\circ)$ 28) _____

Use identities to write each expression as a function of θ .

29) $\cos (\theta - \pi)$ 29) _____

Find the exact value of the expression using the provided information.

30) Find $\cos(s + t)$ given that $\cos s = \frac{1}{3}$, with s in quadrant I, and $\sin t = -\frac{1}{2}$, with t in quadrant IV. 30) _____

31) Find $\cos(s - t)$ given that $\cos s = -\frac{12}{13}$, with s in quadrant II, and $\sin t = \frac{8}{17}$, with t in quadrant II. 31) _____

Verify that the equation is an identity.

32) $\sec\left(\frac{\pi}{2} + x\right) = -\csc x$ 32) _____

Find the exact value by using a sum or difference identity.

33) $\sin 15^\circ$ 33) _____

34) $\tan 75^\circ$ 34) _____

35) $\tan 105^\circ$ 35) _____

36) $\sin \frac{7\pi}{12}$ 36) _____

Use trigonometric identities to find the exact value.

37) $\sin 25^\circ \cos 35^\circ + \cos 25^\circ \sin 35^\circ$ 37) _____

38) $\frac{\tan 10^\circ + \tan 20^\circ}{1 - \tan 10^\circ \tan 20^\circ}$ 38) _____

Use a sum or difference identity to find the exact value.

39) $\sin\left(-\frac{5\pi}{12}\right)$ 39) _____

40) $\tan \frac{11\pi}{12}$ 40) _____

Using a sum or difference identity, write the following as an expression involving functions of x .

41) $\sin\left(\frac{\pi}{4} - x\right)$ 41) _____

42) $\tan\left(x - \frac{\pi}{3}\right)$ 42) _____

Find the exact value of the expression using the provided information.

43) Find $\tan(s + t)$ given that $\sin s = \frac{1}{4}$, with s in quadrant II, and $\sin t = -\frac{1}{2}$, with t in quadrant IV. 43) _____

44) Find $\sin(s + t)$ given that $\cos s = -\frac{1}{6}$, with s in quadrant III, and $\cos t = -\frac{3}{5}$, with t in quadrant III. 44) _____

Verify that the equation is an identity.

45) $\tan\left(\frac{\pi}{2} + x\right) = -\cot x$ 45) _____

46) $\sin\left(\frac{3\pi}{2} - \theta\right) = -\cos \theta$ 46) _____

Use an identity to write the expression as a single trigonometric function or as a single number.

47) $2 \cos^2 22.5^\circ - 1$ 47) _____

48) $\sin 22.5^\circ \cos 22.5^\circ$ 48) _____

49) $\frac{2 \tan 15^\circ}{1 - \tan^2 15^\circ}$ 49) _____

50) $4 \sin 2x \cos 2x$ 50) _____

Use identities to find the indicated value for each angle measure.

51) $\sin \theta = \frac{21}{29}$, $\cos \theta > 0$ Find $\cos(2\theta)$. 51) _____

52) $\cos \theta = \frac{12}{13}$, $\sin \theta < 0$ Find $\sin(2\theta)$. 52) _____

Verify that each equation is an identity.

53) $\cot(2\theta) = \frac{\csc^2 \theta - 2}{2 \cot \theta}$ 53) _____

Find the exact value by using a half-angle identity.

54) $\sin 22.5^\circ$ 54) _____

55) $\cos 75^\circ$ 55) _____

56) $\tan 165^\circ$ 56) _____

Use an identity to write the expression as a single trigonometric function or as a single number.

57) $\sqrt{\frac{1 - \cos 46^\circ}{2}}$ 57) _____

58) $\sqrt{\frac{1 + \cos 6^\circ}{2}}$ 58) _____

59) $\frac{\sin 34^\circ}{1 + \cos 34^\circ}$ 59) _____

Establish the identity.

60) $\left(\cos \frac{x}{2} - \sin \frac{x}{2}\right)^2 = 1 - \sin x$ 60) _____

Find the exact value of the real number y.

61) $y = \sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$ 61) _____

62) $y = \csc^{-1}(1)$ 62) _____

Give the degree measure of θ .

63) $\theta = \cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$ 63) _____

64) $\theta = \cot^{-1}\left(\frac{\sqrt{3}}{3}\right)$ 64) _____

Use a calculator to give the value to the nearest degree.

65) $\theta = \sin^{-1}(.2079)$ 65) _____

66) $\theta = \cos^{-1}(-.3907)$ 66) _____

Use a calculator to give the real number value.

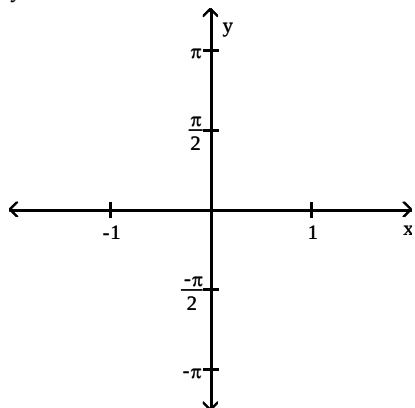
67) $y = \tan^{-1}(.5774)$ 67) _____

68) $y = \operatorname{arcsec}(2.8842912)$ 68) _____

Graph the inverse circular function.

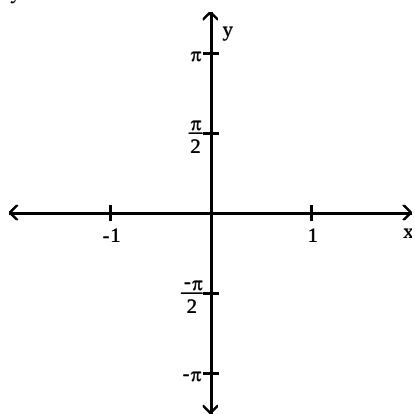
69) $y = \cos^{-1} x$

69) _____



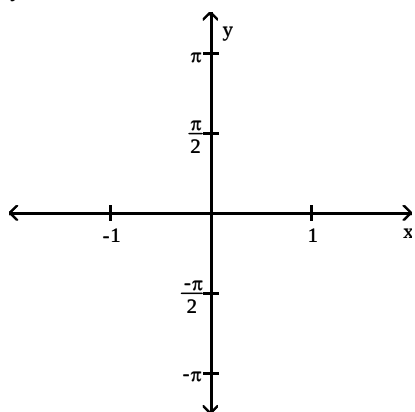
70) $y = \sin^{-1} x$

70) _____



71) $y = \tan^{-1} x$

71) _____



Evaluate the expression.

72) $\csc \left(\sin^{-1} \frac{3}{5} \right)$

72) _____

73) $\cos \left(2 \arcsin \frac{1}{4} \right)$

73) _____

$$74) \cos \left(\arcsin \frac{3}{5} + \arccos \frac{\sqrt{3}}{2} \right) \quad 74) \underline{\hspace{2cm}}$$

Use a calculator to find the value. Give answers as real numbers.

$$75) \sin (\arctan 2) \quad 75) \underline{\hspace{2cm}}$$

$$76) \cos (\cos^{-1}(-.9372)) \quad 76) \underline{\hspace{2cm}}$$

Write the following as an algebraic expression in u , $u > 0$.

$$77) \cos(\arcsin u) \quad 77) \underline{\hspace{2cm}}$$

$$78) \tan \left(\operatorname{arcsec} \frac{\sqrt{u^2 + 4}}{u} \right) \quad 78) \underline{\hspace{2cm}}$$

Solve the equation for the interval $[0, 2\pi)$.

$$79) 2 \sin^2 x = \sin x \quad 79) \underline{\hspace{2cm}}$$

$$80) \cos x = \sin x \quad 80) \underline{\hspace{2cm}}$$

$$81) \tan x + \sec x = 1 \quad 81) \underline{\hspace{2cm}}$$

Solve the equation in the interval $[0^\circ, 360^\circ)$.

$$82) 4 \sin^2 \theta = 3 \quad 82) \underline{\hspace{2cm}}$$

$$83) \sin 2\theta = -\sin \theta \quad 83) \underline{\hspace{2cm}}$$

$$84) 2 \cos 2\theta + 7 \sin \theta = 5 \quad 84) \underline{\hspace{2cm}}$$

Determine the solution set of each equation in radians (for x) or degrees (for θ) to the nearest tenth as appropriate.

$$85) 4 \sin^2 x - 1 = 0 \quad 85) \underline{\hspace{2cm}}$$

$$86) 2 \sin^2 x + \sin x = 1 \quad 86) \underline{\hspace{2cm}}$$

$$87) \frac{4 \tan \theta}{5 - \tan^2 \theta} = 1 \quad 87) \underline{\hspace{2cm}}$$

Solve the equation for solutions in the interval $[0, 2\pi)$.

$$88) \sin 4x = \frac{\sqrt{3}}{2} \quad 88) \underline{\hspace{2cm}}$$

$$89) \sin x \cos x = \frac{1}{2} \quad 89) \underline{\hspace{2cm}}$$

$$90) \csc 3x = 0 \quad 90) \underline{\hspace{2cm}}$$

$$91) \sqrt{2} \cos 2x = 1$$

91) _____

Solve the equation for solutions in the interval $[0^\circ, 360^\circ)$. Round to the nearest degree.

$$92) \sin 2\theta = \cos \theta$$

92) _____

$$93) \sqrt{3} \sec 2\theta = 2$$

93) _____

$$94) \tan^2 2\theta = 5$$

94) _____

$$95) \cot \frac{\theta}{3} = 1$$

95) _____

Solve the equation for x.

$$96) y = 7 \sin x$$

96) _____

$$97) y = 4 \cot \frac{x}{2}$$

97) _____

$$98) y = 3 \tan 2x - 1$$

98) _____

Solve the equation for exact solutions.

$$99) 6 \cos^{-1} x = \pi$$

99) _____

$$100) \cos^{-1} x = \sin^{-1} \frac{24}{25}$$

100) _____

Solve the equation.

$$101) \arccos x + \arccos 2x = \arccos \frac{1}{2}$$

101) _____

$$102) \arcsin x + 2 \arctan x = \pi$$

102) _____

Answer Key

Testname: TRIG CH. 5-6 REVIEW

1) $-\frac{\sqrt{5}}{3}$

2) $-\frac{3\sqrt{7}}{7}$

3) $\frac{\sqrt{39}}{8}$

4) 6

5) $-\frac{5}{13}$

6) $\cos^2 x$

7) $\tan x$

8) $\pm \sqrt{\csc^2 x - 1}$

9) $1 - \sin x$

10) $-\cos x$

11) Identity

12) $-2 \tan^2 \theta$

13) 0

14) 1

15) $\cos^3 \theta$

16) $\sec^2 \theta$

17) 1

18) $\csc^2 x$

19) $\csc^2 t - \cos t \sec t = \csc^2 t - \cos t \cdot \frac{1}{\cos t} = \csc^2 t - 1 = \cot^2 t$

20) $\frac{1 - \sec \theta}{\tan \theta} + \frac{\tan \theta}{1 - \sec \theta} = \frac{(1 - \sec \theta)^2 + \tan^2 \theta}{\tan \theta (1 - \sec \theta)} = \frac{1 - 2 \sec \theta + \sec^2 \theta + \tan^2 \theta}{\tan \theta (1 - \sec \theta)} = \frac{2 \sec^2 \theta - 2 \sec \theta}{\tan \theta (1 - \sec \theta)} = \frac{2 \sec \theta (\sec \theta - 1)}{\tan \theta (1 - \sec \theta)} = -\frac{2 \sec \theta}{\tan \theta} = -\frac{2}{\cos \theta} \cdot \frac{\cos \theta}{\sin \theta} = -\frac{2}{\sin \theta} = -2 \csc \theta$

21) $\sec^4 x - \tan^4 x = (\sec^2 x + \tan^2 x)(\sec^2 x - \tan^2 x) = (\sec^2 x + \tan^2 x)(1) = \sec^2 x + \tan^2 x.$

22) Identity

23) $\frac{\sqrt{6} - \sqrt{2}}{4}$

24) $\frac{\sqrt{6} + \sqrt{2}}{4}$

25) $\sin \frac{7\pi}{16}$

26) $\tan \frac{-3\pi}{7}$

27) $\sec$

28) $\theta = 75^\circ$

29) $-\cos \theta$

30) $\frac{\sqrt{3} + 2\sqrt{2}}{6}$

Answer Key

Testname: TRIG CH. 5-6 REVIEW

$$31) \frac{220}{221}$$

$$32) \sec\left(\frac{\pi}{2} + x\right) = \frac{1}{\cos(\pi/2) \cos x - \sin(\pi/2) \sin x} = \frac{1}{0 \cdot \cos x - 1 \cdot \sin x} = -\csc x.$$

$$33) \frac{\sqrt{6} - \sqrt{2}}{4}$$

$$34) \sqrt{3} + 2$$

$$35) -2 - \sqrt{3}$$

$$36) \frac{\sqrt{2} + \sqrt{6}}{4}$$

$$37) \frac{\sqrt{3}}{2}$$

$$38) \frac{\sqrt{3}}{3}$$

$$39) \frac{-\sqrt{6} - \sqrt{2}}{4}$$

$$40) -2 + \sqrt{3}$$

$$41) \frac{\sqrt{2}}{2} \cos x - \frac{\sqrt{2}}{2} \sin x$$

$$42) \frac{\tan x - \sqrt{3}}{1 + \sqrt{3} \tan x}$$

$$43) \frac{4\sqrt{3} + \sqrt{15}}{-11}$$

$$44) \frac{3\sqrt{35} + 4}{30}$$

$$45) \tan\left(\frac{\pi}{2} + x\right) = \frac{\sin((\pi/2) + x)}{\cos((\pi/2) + x)} = \frac{\sin(\pi/2) \cos x + \sin x \cos(\pi/2)}{\cos(\pi/2) \cos x - \sin(\pi/2) \sin x} = \frac{1 \cdot \cos x + \sin x \cdot 0}{0 \cdot \cos x - 1 \cdot \sin x} = -\cot x.$$

$$46) \sin\left(\frac{3\pi}{2} - \theta\right) = \sin \frac{3\pi}{2} \cos \theta - \cos \frac{3\pi}{2} \sin \theta = (-1) \cdot \cos \theta - 0 \cdot \sin \theta = -\cos \theta$$

$$47) \frac{\sqrt{2}}{2}$$

$$48) \frac{\sqrt{2}}{4}$$

$$49) \frac{\sqrt{3}}{3}$$

$$50) 2 \sin 4x$$

$$51) -\frac{41}{841}$$

$$52) -\frac{120}{169}$$

Answer Key

Testname: TRIG CH. 5-6 REVIEW

$$53) \cot(2\theta) = \frac{\cos(2\theta)}{\sin(2\theta)} = \frac{1 - 2 \sin^2 \theta}{2 \sin \theta \cos \theta} = \frac{\frac{1}{\sin^2 \theta} - 2}{\frac{2 \cos \theta}{\sin \theta}} = \frac{\csc^2 \theta - 2}{2 \cot \theta}$$

$$54) \frac{1}{2} \sqrt{2 - \sqrt{2}}$$

$$55) \frac{1}{2} \sqrt{2 - \sqrt{3}}$$

$$56) -2 + \sqrt{3}$$

$$57) \sin 23^\circ$$

$$58) \cos 3^\circ$$

$$59) \tan 17^\circ$$

$$60) \left(\cos \frac{x}{2} - \sin \frac{x}{2} \right)^2 = \left(\sqrt{\frac{1 + \cos x}{2}} - \sqrt{\frac{1 - \cos x}{2}} \right)^2 = \frac{1 + \cos x}{2} - 2 \sqrt{\frac{1 + \cos x}{2}} \sqrt{\frac{1 - \cos x}{2}} + \frac{1 - \cos x}{2} = 1 - 2 \sqrt{\frac{1 - \cos^2 x}{4}} = 1 - 2 \sqrt{\frac{\sin^2 x}{4}} = 1 - 2 \left(\frac{\sin x}{2} \right) = 1 - \sin x$$

$$61) \frac{\pi}{3}$$

$$62) \frac{\pi}{2}$$

$$63) 30^\circ$$

$$64) 60^\circ$$

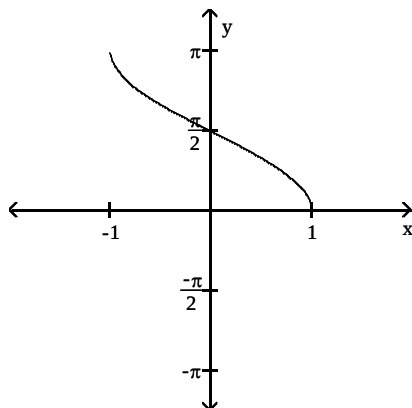
$$65) 12^\circ$$

$$66) 113^\circ$$

$$67) .52363607$$

$$68) 1.2167397$$

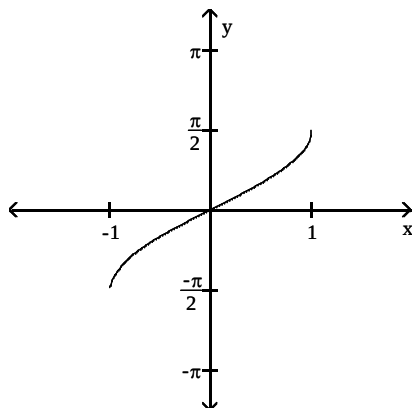
$$69)$$



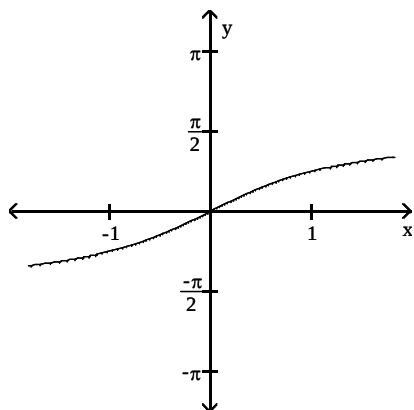
Answer Key

Testname: TRIG CH. 5-6 REVIEW

70)



71)



72) $\frac{5}{3}$

73) $\frac{7}{8}$

74) $\frac{4\sqrt{3}-3}{10}$

75) .8944

76) -.9372

77) $\sqrt{1-u^2}$

78) $\frac{2}{u}$

79) $\left\{0, \pi, \frac{\pi}{6}, \frac{5\pi}{6}\right\}$

80) $\left\{\frac{\pi}{4}, \frac{5\pi}{4}\right\}$

81) $\{0\}$

82) $\{60^\circ, 120^\circ, 240^\circ, 300^\circ\}$

83) $\{0^\circ, 120^\circ, 180^\circ, 240^\circ\}$

84) $\{90^\circ, 48.6^\circ, 131.4^\circ\}$

85) $\left\{\frac{\pi}{6} + n\pi, \frac{5\pi}{6} + n\pi\right\}$

Answer Key

Testname: TRIG CH. 5-6 REVIEW

$$86) \left\{ \frac{\pi}{6} + 2n\pi, \frac{5\pi}{6} + 2n\pi, \frac{3\pi}{2} + 2n\pi \right\}$$

$$87) \{45^\circ + 180^\circ n, 101.3^\circ + 180^\circ n\}$$

$$88) \left\{ \frac{\pi}{12}, \frac{\pi}{6}, \frac{2\pi}{3}, \frac{7\pi}{12}, \frac{7\pi}{6}, \frac{13\pi}{12}, \frac{5\pi}{3}, \frac{19\pi}{12} \right\}$$

$$89) \left\{ \frac{\pi}{4}, \frac{5\pi}{4} \right\}$$

$$90) \emptyset$$

$$91) \left\{ \frac{\pi}{8}, \frac{9\pi}{8}, \frac{7\pi}{8}, \frac{15\pi}{8} \right\}$$

$$92) \{30^\circ, 90^\circ, 150^\circ, 270^\circ\}$$

$$93) \{15^\circ, 165^\circ, 195^\circ, 345^\circ\}$$

$$94) \{33^\circ, 57^\circ, 123^\circ, 147^\circ, 213^\circ, 237^\circ, 303^\circ, 327^\circ\}$$

$$95) \{135^\circ\}$$

$$96) x = \arcsin \frac{y}{7}$$

$$97) x = 2 \operatorname{arccot} \frac{y}{4}$$

$$98) x = \frac{1}{2} \arctan \frac{y+1}{3}$$

$$99) \left\{ \frac{\sqrt{3}}{2} \right\}$$

$$100) \left\{ \frac{7}{25} \right\}$$

$$101) x = \frac{1}{2}$$

$$102) x = 1$$