Review for Exam 3

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find a positive angle and a negative angle that are coterminal to the given angle.

1) 34° 1) _____

A) 394°; –326° B) 124°; –56° C) 394°; –146° D) 214°; –146°

2) –45° 2) _____

A) 135°; –225° B) 135°; –135° C) 315°; –405° D) 315°; –225°

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

A) $\frac{4\pi}{3}; -\frac{2\pi}{3}$ B) $\frac{7\pi}{3}; -\frac{\pi}{3}$

C) $\frac{7\pi}{3}; -\frac{5\pi}{3}$ D) $\frac{\pi}{3} + 360°; \frac{\pi}{3} - 360°$

Convert the angle from degree measure to radian measure. Round to the nearest hundredth of a radian when appropriate.

4) 36° 4) _____

A) $\frac{\pi}{5}$ B) $\frac{\pi}{7}$ C) $\frac{\pi}{4}$ D) $\frac{\pi}{6}$

5) –45° 5) _____

A) $-\frac{\pi}{6}$ B) $-\frac{\pi}{3}$ C) $-\frac{\pi}{5}$ D) $-\frac{\pi}{4}$

6) 630° 6) _____

A) 7π B) $-\frac{7\pi}{4}$ C) $-\frac{7\pi}{2}$ D) $\frac{7\pi}{2}$

Convert the angle from radian measure to degree measure. Round to the nearest hundredth of a degree when appropriate.

7) $\frac{7\pi}{4}$ 7) _____

A) 315° B) 154.29° C) 630° D) $102.86\pi°$

8) $-\frac{\pi}{5}$ 8) _____

A) –36° B) $-36\pi°$ C) $-\frac{\pi}{5}°$ D) –0.63°

9) $\frac{11\pi}{12}$ 9) _____

A) $196.36\pi°$ B) 165° C) 330° D) 163.64°

Solve the problem.

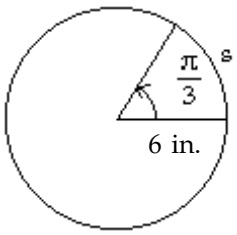
10) Find the complementary angle to $\theta = 44.4°$. 10) _____

A) 45.6° B) 134.4° C) 404.4° D) 135.6°

11) Find the supplementary angle to $\theta = 7°$. 11) _____

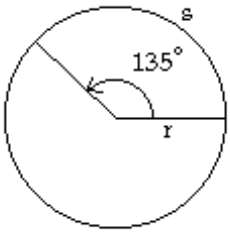
A) 187° B) 83° C) 173° D) 367°

12) Use the formula $s = r\theta$ to determine the value of s in the figure. Round to two decimal places. 12) _____



A) 0.17 in. B) 12.57 in. C) 6.28 in. D) 343.77 in.

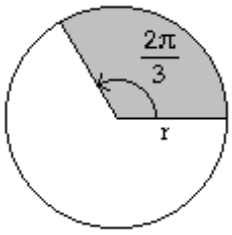
13) Use the formula $s = r\theta$ to determine the value of s in the figure. Round to two decimal places, if necessary. 13) _____



r = 9 in.

A) 3.82 in. B) 2.36 in. C) 21.21 in. D) 1215 in.

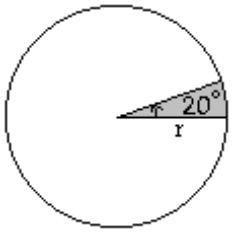
14) Find the area of the shaded sector. Round to one decimal place. 14) _____



r = 15 m

A) 235.6 m^2 B) 15.7 m^2 C) 32.9 m^2 D) 471.2 m^2

15) Find the area of the shaded sector. Round to one decimal place. 15) _____



r = 23 ft

A) 184.7 ft^2 B) 92.3 ft^2 C) 0.7 ft^2 D) 4.0 ft^2

Use the given trigonometric function value of θ to find the requested trigonometric function value of the acute angle θ. Rationalize the denominator where necessary.

16) $\sin\theta = \frac{5}{13}$ Find $\tan\theta$. 16) _____

A) $\frac{13}{5}$ B) $\frac{13}{12}$ C) $\frac{12}{5}$ D) $\frac{5}{12}$

17) $\cot\theta = \frac{\sqrt{3}}{3}$ Find $\sin\theta$. 17) _____

A) $\frac{1}{2}$ B) $\frac{\sqrt{3}}{2}$ C) 2 D) $\sqrt{3}$

Rewrite the expression in terms of sin θ and cos θ.

18) $\tan\theta(\cot\theta - \cos\theta)$ 18) _____

A) $1 - \sin\theta$ B) $-\sec^2\theta$ C) 0 D) 1

19) $\frac{\tan\theta}{\sec\theta}$ 19) _____

A) $\cos^3\theta$ B) $\sin\theta$ C) $\tan^2\theta$ D) $\sec^2\theta$

20) $\cos\theta\tan\theta$ 20) _____

A) $\cot\theta$ B) $\sin\theta$ C) $\cos\theta$ D) 1

Use the fundamental identities to simplify the expression.

21) $\sin^2\theta + \tan^2\theta + \cos^2\theta$ 21) _____

A) $\sin\theta$ B) $\cos^3\theta$ C) $\tan^2\theta$ D) $\sec^2\theta$

22) $\frac{\cos^2\theta}{\sin^2\theta} + \csc\theta\sin\theta$ 22) _____

A) 1 B) $\csc^2\theta$ C) $\sec^2\theta$ D) $\tan^2\theta$

Rewrite the expression in terms of sin θ and cos θ.

23) $\frac{\sin\theta\cos\theta}{\tan\theta}$ 23) _____

A) $\cos^2\theta$ B) $\sin^2\theta$ C) $\sin\theta$ D) $\cos\theta$

Use a calculator to find the approximate value of the expression. Round the answer to two decimal places.

24) $\sin 61°$ 24) _____

A) −0.97 B) −1.05 C) 0.87 D) 0.95

25) $\cos 62°$ 25) _____

A) 0.53 B) 0.67 C) 0.47 D) 0.61

26) $\tan 72°$ 26) _____

A) −0.35 B) −0.26 C) 3.08 D) 3.17

27) $\cos \frac{5\pi}{12}$ 27) _____

A) 1.09 B) 0.17 C) 1.00 D) 0.26

Solve the problem.

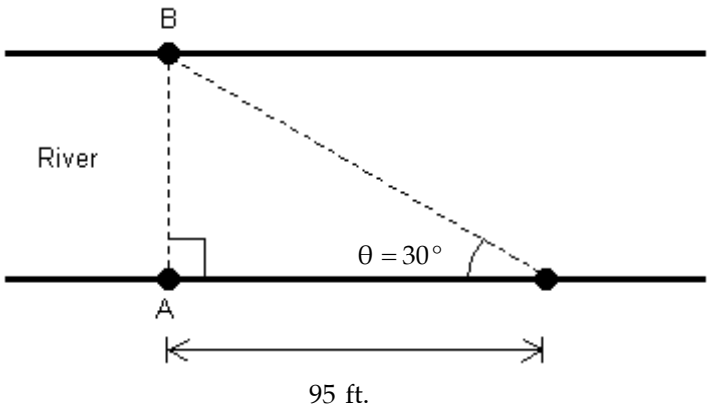
28) Find the height of a pine tree that casts a 48-foot shadow on the ground assuming that the angle of elevation from the point on the ground at the tip of the shadow to the sun is $63°$. Round your answer to the nearest foot. 28) _____

A) 22 ft B) 94 ft C) 24 ft D) 43 ft

29) A kite is currently flying at an altitude of 20 meters above the ground. If the angle of elevation from the ground to the kite is $35°$, find the length of the kite string to the nearest meter. 29) _____

A) 11 m B) 24 m C) 29 m D) 35 m

30) A conservation officer needs to know the width of a river in order to set instruments correctly for a study of pollutants in the river. From point A, the conservation officer walks 95 feet downstream and sights point B on the opposite bank to determine that $\theta = 30°$ (see figure). How wide is the river? 30) _____



A) 55 ft B) 47 ft C) 110 ft D) 165 ft

A point on the terminal side of angle θ is given. Find the exact value of the indicated trigonometric function.

31) (6, 8) Find $\sin \theta$. 31) _____

A) $\frac{4}{5}$ B) $\frac{4}{3}$ C) $\frac{3}{4}$ D) $\frac{3}{5}$

32) (15, 20) Find $\cos \theta$. 32) _____

A) $\frac{3}{5}$ B) $\frac{4}{3}$ C) $\frac{3}{4}$ D) $\frac{4}{5}$

33) (−5, 12) Find $\sin \theta$. 33) _____

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

34) $(-3, -4)$ Find $\sec\theta$. 34) _____

A) $-\frac{5}{3}$ B) $\frac{5}{4}$ C) $\frac{4}{3}$ D) $-\frac{3}{5}$

35) $(7, -3)$ Find $\tan\theta$. 35) _____

A) $\frac{7}{8}$ B) $-\frac{3}{7}$ C) $-\frac{7}{3}$ D) $-\frac{3}{8}$

Name the quadrant in which the angle θ lies.

36) $\tan\theta > 0$, $\sin\theta < 0$ 36) _____

A) I B) II C) III D) IV

37) $\sin\theta > 0$, $\cos\theta < 0$ 37) _____

A) I B) II C) III D) IV

38) $\cot\theta < 0$, $\cos\theta > 0$ 38) _____

A) I B) II C) III D) IV

39) $\sin\theta > 0$, $\cos\theta > 0$ 39) _____

A) I B) II C) III D) IV

Find the reference angle of the given angle.

40) $131°$ 40) _____

A) $59°$ B) $41°$ C) $49°$ D) $51°$

41) $428°$ 41) _____

A) $22°$ B) $158°$ C) $68°$ D) $112°$

42) $-44°$ 42) _____

A) $134°$ B) $44°$ C) $46°$ D) $136°$

Use the reference angle to find the exact value of the expression. Do not use a calculator.

43) $\sin 405°$ 43) _____

A) $-\frac{\sqrt{2}}{2}$ B) $-\frac{1}{2}$ C) $\frac{\sqrt{2}}{2}$ D) $\frac{1}{2}$

44) $\sin\frac{5\pi}{3}$ 44) _____

A) $-\frac{\sqrt{3}}{2}$ B) $-\frac{1}{2}$ C) -1 D) $\frac{\sqrt{3}}{2}$

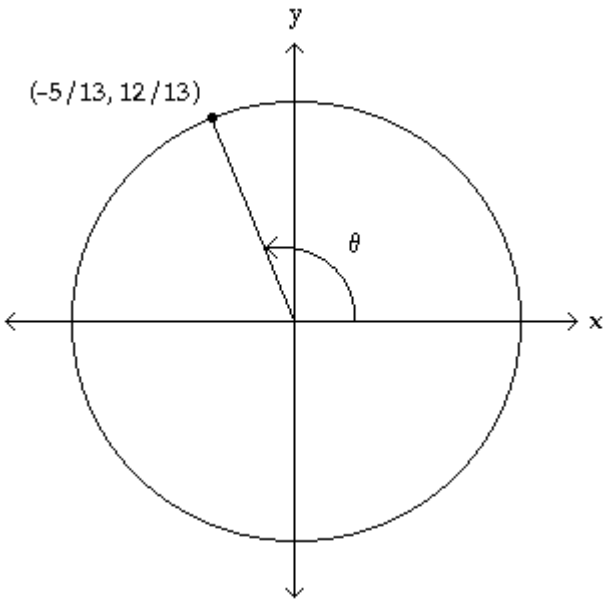
Find the exact value of the indicated trigonometric function of θ.

45) $\sec\theta = \frac{3}{2}$, θ in quadrant IV Find $\tan\theta$. 45) _____

A) $-\frac{\sqrt{5}}{2}$ B) $-\frac{\sqrt{5}}{3}$ C) $-\frac{3}{2}$ D) $-\sqrt{5}$

The figure shows angle θ in standard position with its terminal side intersecting the unit circle. Evaluate sin θ and cos θ.

46) 46) _____



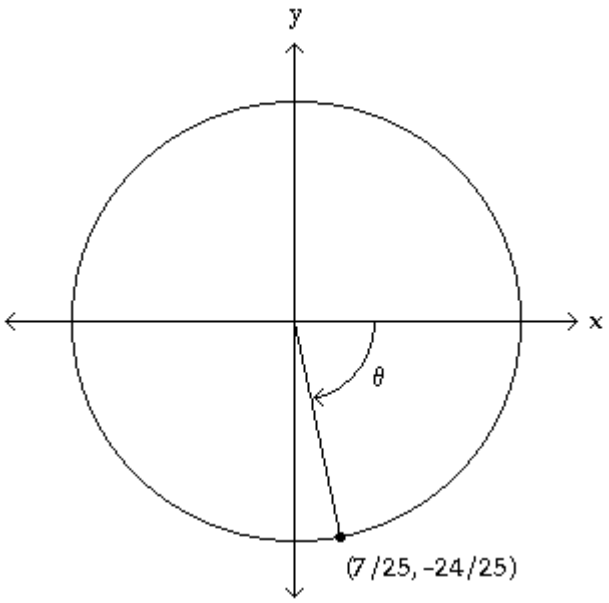
A) $\sin\theta = \frac{12}{13}, \cos\theta = -\frac{5}{13}$

B) $\sin\theta = -\frac{5}{13}, \cos\theta = \frac{12}{13}$

C) $\sin\theta = \frac{13}{12}, \cos\theta = -\frac{13}{5}$

D) $\sin\theta = -\frac{12}{5}, \cos\theta = -\frac{5}{12}$

47) 47) _____



A) $\sin\theta = \frac{7}{25}, \cos\theta = -\frac{24}{25}$

B) $\sin\theta = -\frac{24}{25}, \cos\theta = \frac{7}{25}$

C) $\sin\theta = -\frac{25}{24}, \cos\theta = \frac{25}{7}$

D) $\sin\theta = -\frac{24}{7}, \cos\theta = -\frac{7}{24}$

Find the exact value. If the value of the function is not defined, write undefined.

48) $\sin(-180°)$ 48) _____

A) Undefined B) 1 C) –1 D) 0

49) $\csc 270°$ 49) _____

A) 2 B) 0 C) –1 D) Undefined

50) $\sin 270°$ 50) _____

A) –1 B) $\frac{1}{2}$ C) 0 D) Undefined

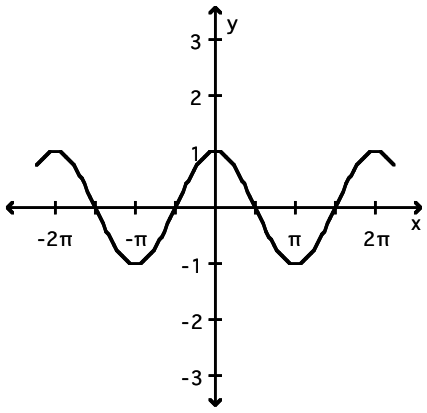
51) $\cos(-90°)$ 51) _____

A) Undefined B) $\frac{\sqrt{3}}{2}$ C) –1 D) 0

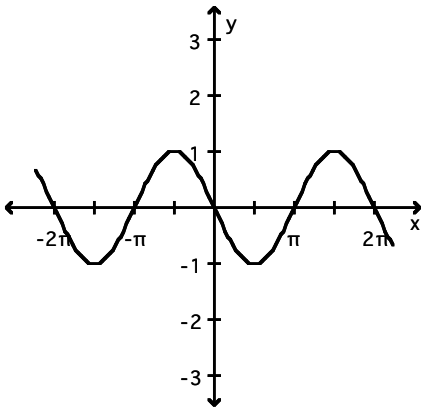
Match the given function to its graph.

52) 1) $y = \sin x$ 2) $y = \cos x$ 3) $y = -\sin x$ 4) $y = -\cos x$ 52) _____

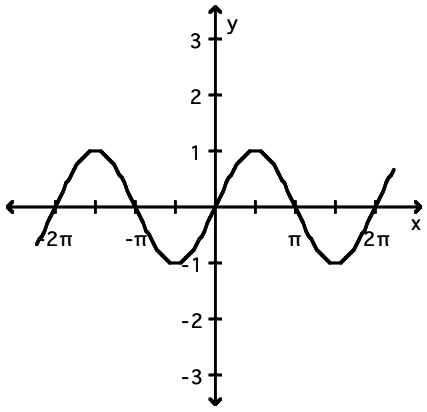
A



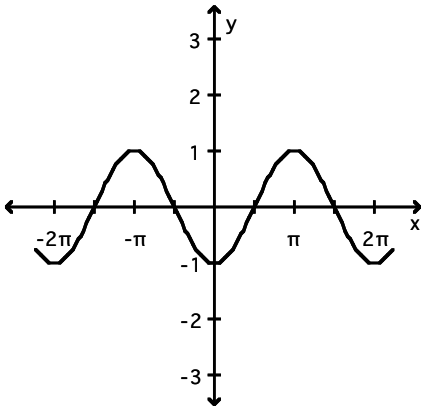
B



C



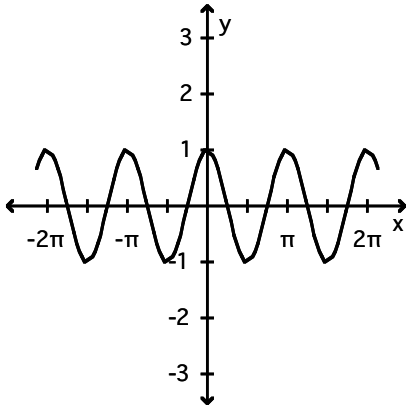
D



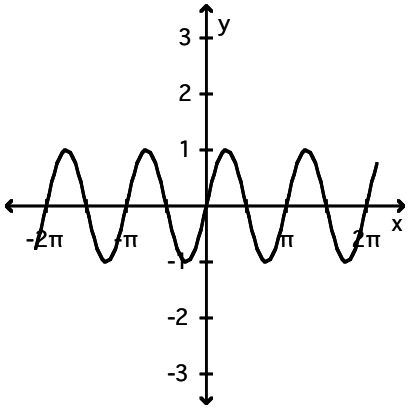
A) 1A, 2B, 3C, 4D
B) 1A, 2D, 3C, 4B
C) 1B, 2D, 3C, 4A
D) 1C, 2A, 3B, 4D

53) 1) $y = \sin 2x$ 2) $y = 2 \cos x$ 53) _____
3) $y = 2 \sin x$ 4) $y = \cos 2x$

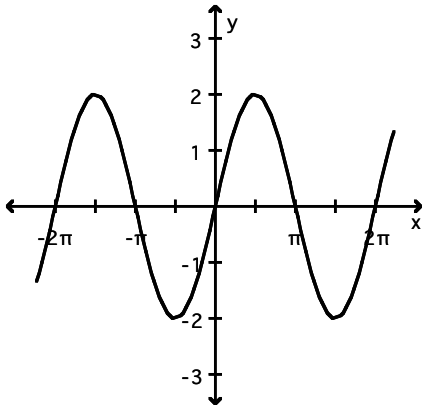
A



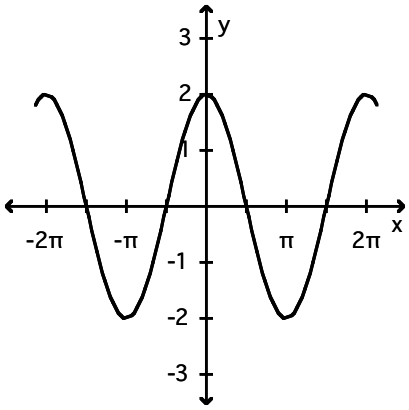
B



C



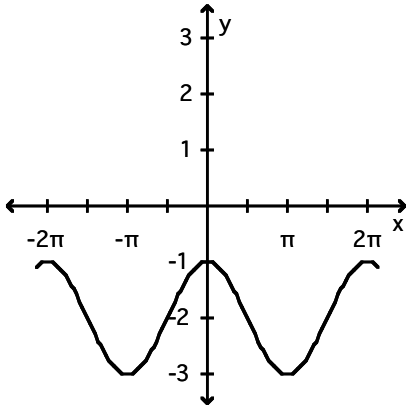
D



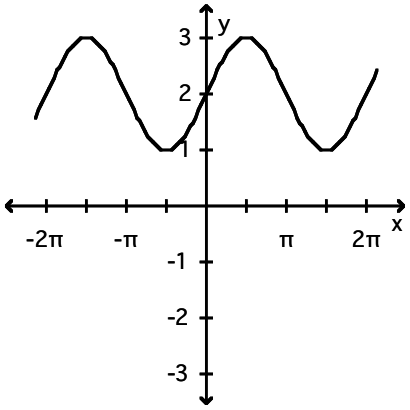
A) 1A, 2B, 3C, 4D
B) 1A, 2D, 3C, 4B
C) 1B, 2D, 3C, 4A
D) 1A, 2C, 3D, 4B

54) 1) $y = 2 + \sin x$ 2) $y = 2 + \cos x$ 54) _____
3) $y = -2 + \sin x$ 4) $y = -2 + \cos x$

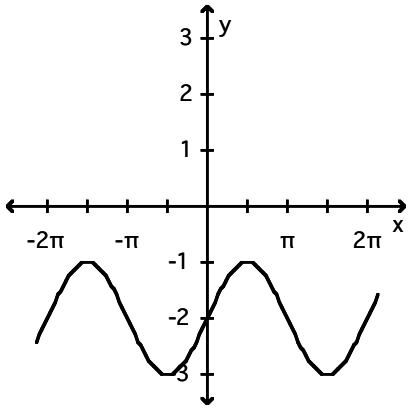
A



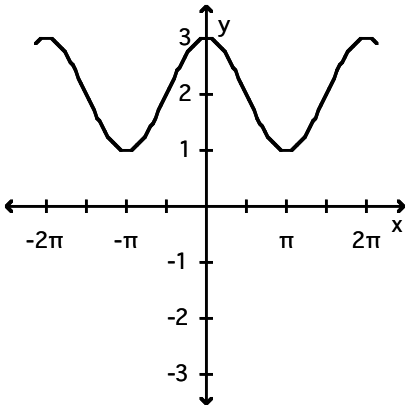
B



C



D

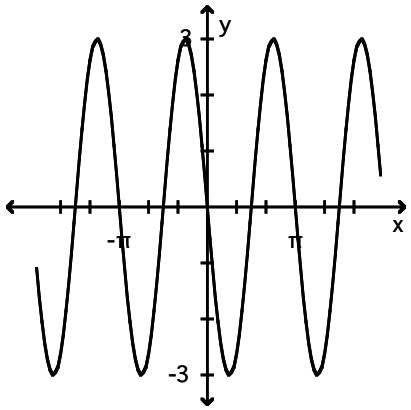


A) 1A, 2C, 3D, 4B
B) 1B, 2D, 3C, 4A
C) 1A, 2B, 3C, 4D
D) 1A, 2D, 3C, 4B

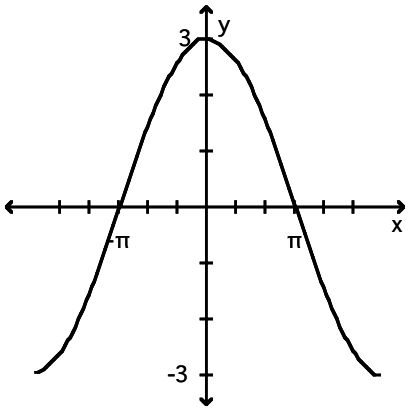
55) 1) $y = -3 \sin(2x)$ 2) $y = -3 \sin(\frac{1}{2}x)$ 55) _____

3) $y = 3 \cos(2x)$ 4) $y = 3 \cos(\frac{1}{2}x)$

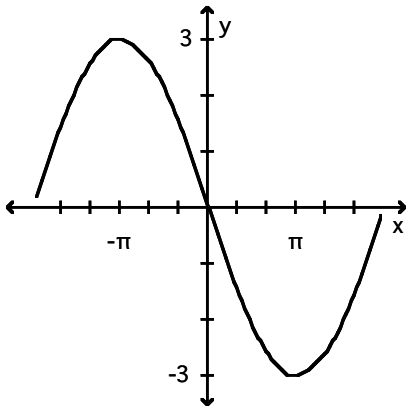
A



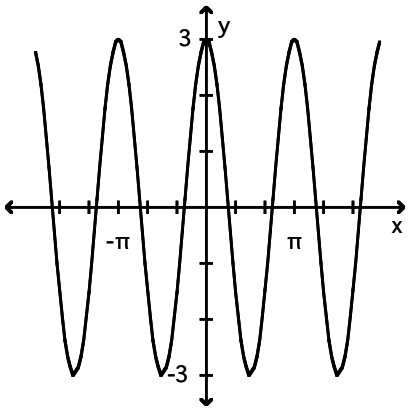
B



C



D

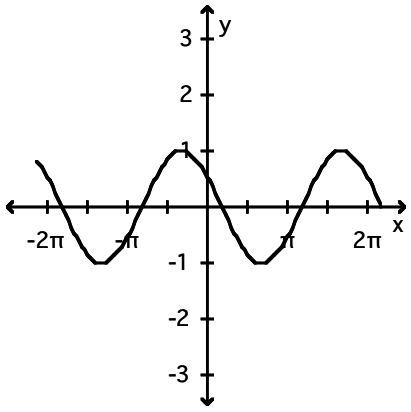


A) 1D, 2B, 3A, 4C
B) 1C, 2A, 3B, 4D
C) 1C, 2A, 3D, 4B
D) 1A, 2C, 3D, 4B

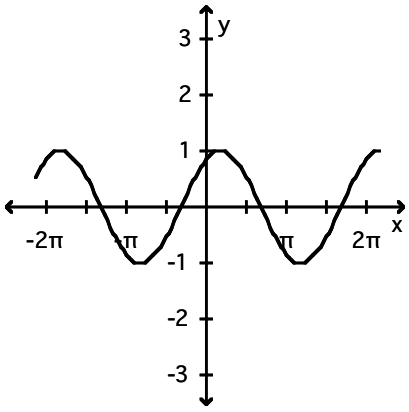
56) 1) $y = \sin\left(x - \frac{\pi}{3}\right)$ 2) $y = \cos\left(x + \frac{\pi}{3}\right)$ 56) _____

3) $y = \sin\left(x + \frac{\pi}{3}\right)$ 4) $y = \cos\left(x - \frac{\pi}{3}\right)$

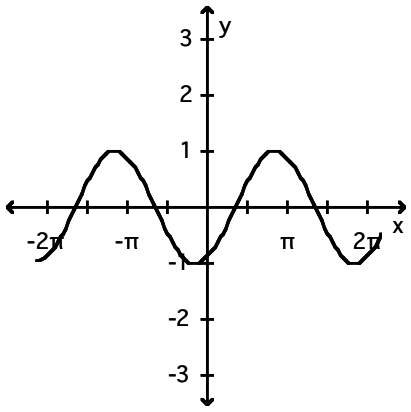
A



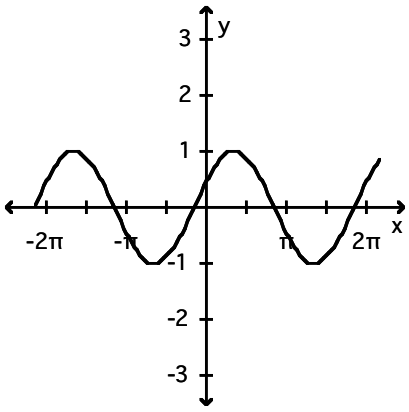
B



C



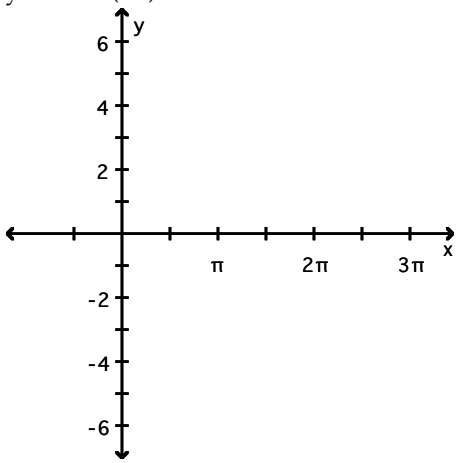
D



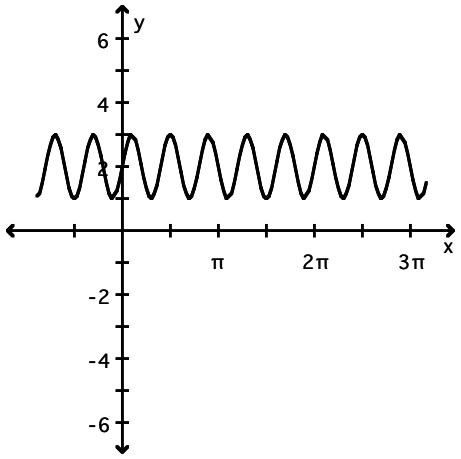
A) 1A, 2D, 3C, 4B
B) 1C, 2A, 3B, 4D
C) 1A, 2B, 3C, 4D
D) 1B, 2D, 3C, 4A

Graph the sinusoidal function.

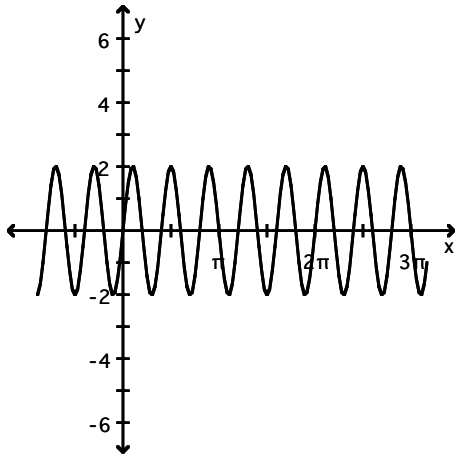
57) $y = 2 \sin(5x)$ 57) _____



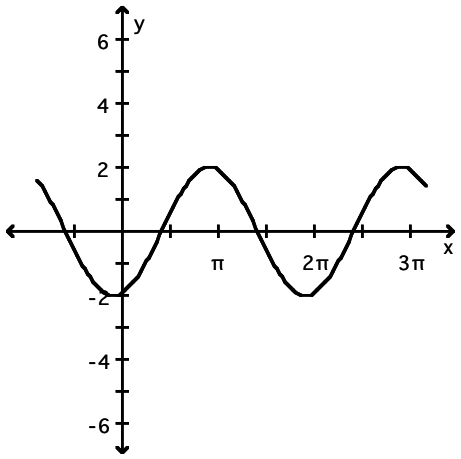
A)



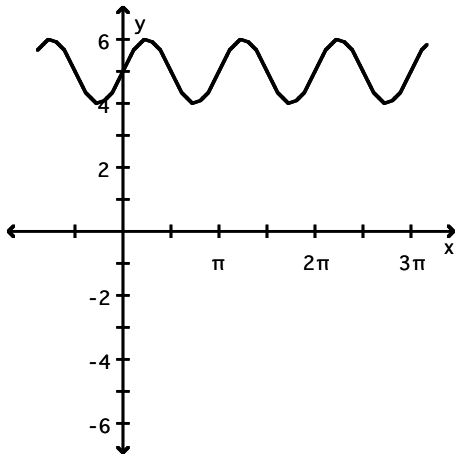
B)



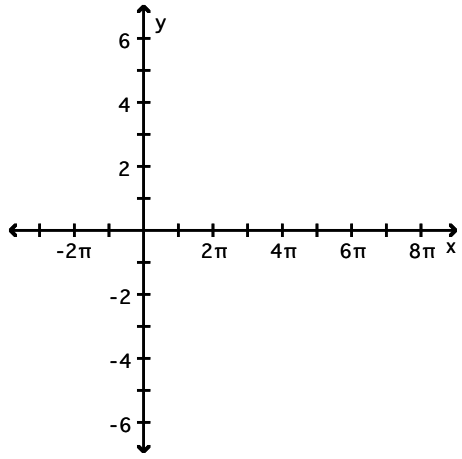
C)



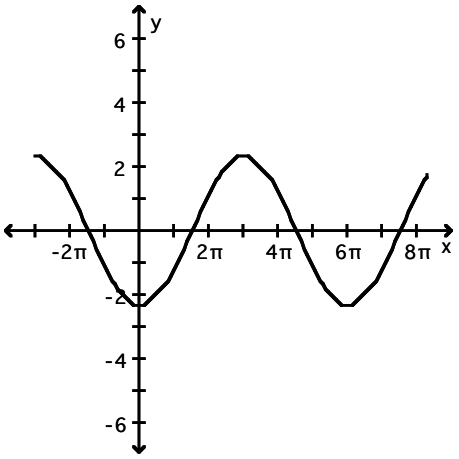
D)



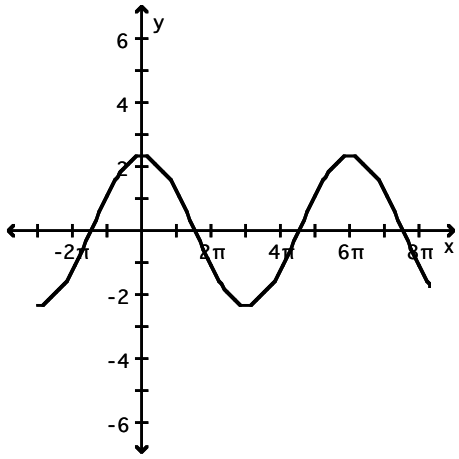
58) $y = \frac{7}{3}\cos\left(-\frac{1}{3}x\right)$ 58) _____



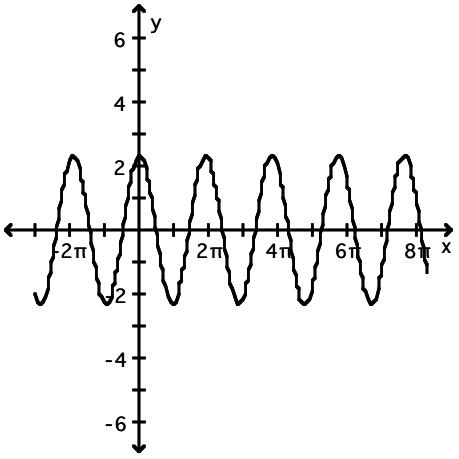
A)



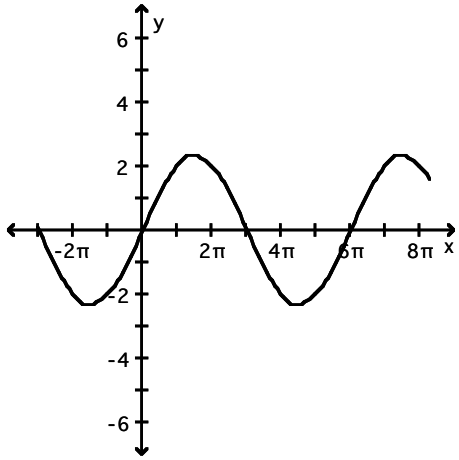
B)



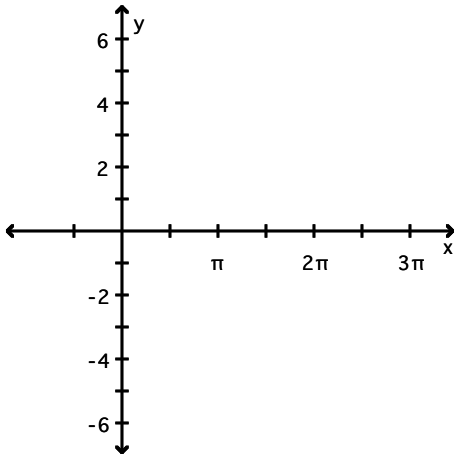
C)



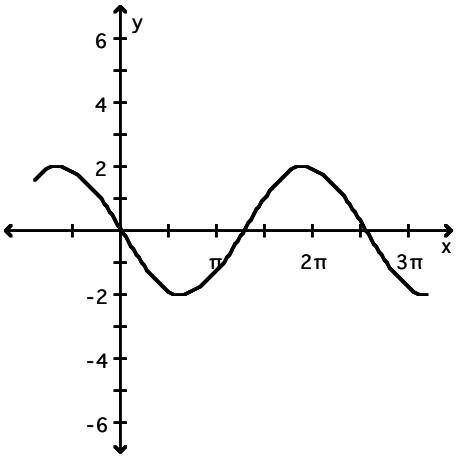
D)



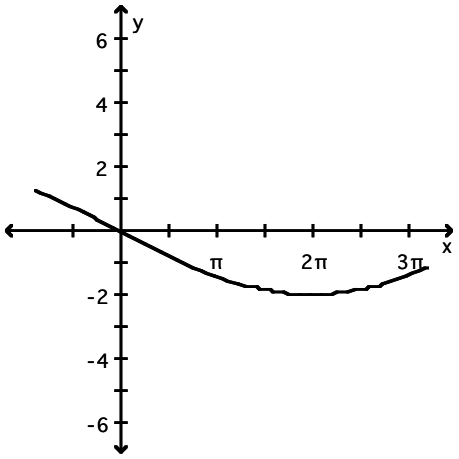
59) $y = -2 \sin(\frac{1}{4}x)$ 59) _____



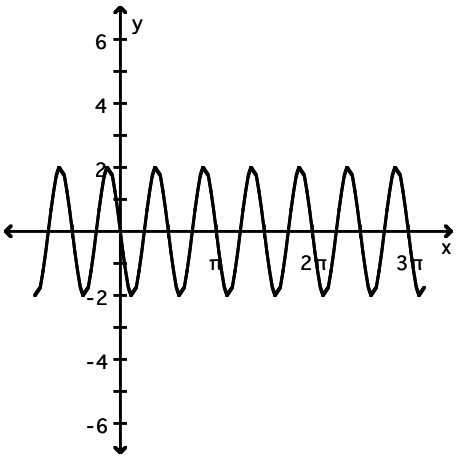
A)


y
6
4
2
-2
-4
-6
π
2π
3π
x

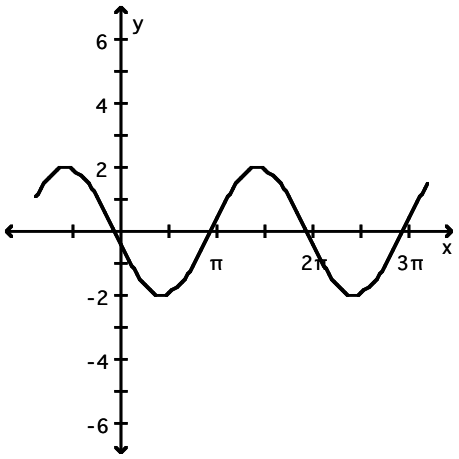
B)


y
6
4
2
-2
-4
-6
π
2π
3π
x

C)


y
6
4
2
-2
-4
-6
π
2π
3π
x

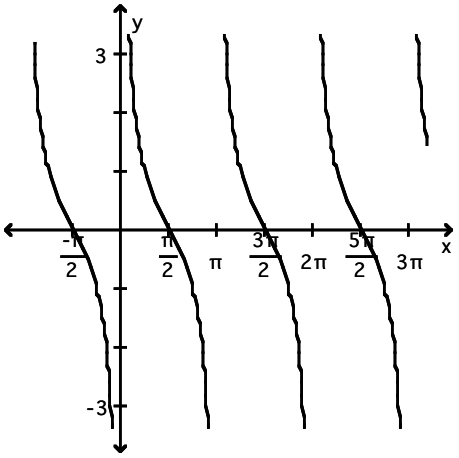
D)


y
6
4
2
-2
-4
-6
π
2π
3π
x

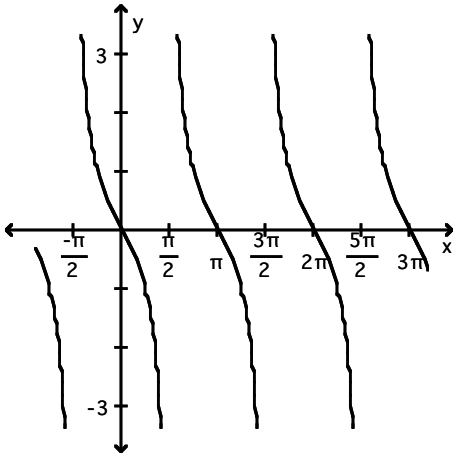
Match the function to its graph.

60) $y = \tan x$ 60) _____

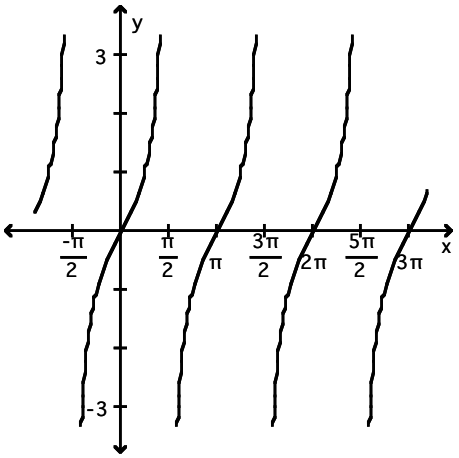
A)



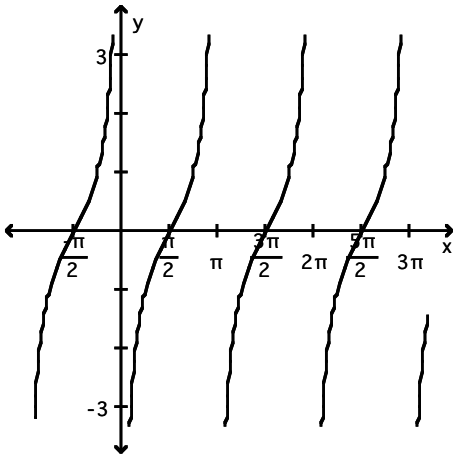
B)



C)

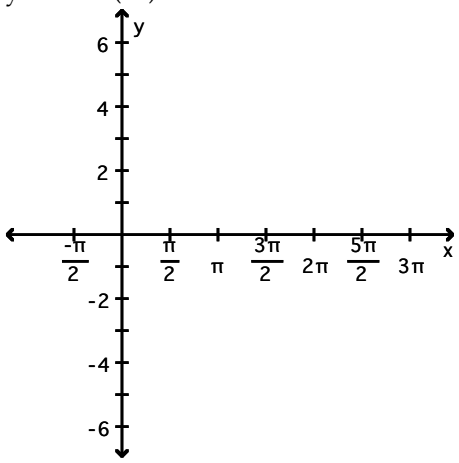


D)

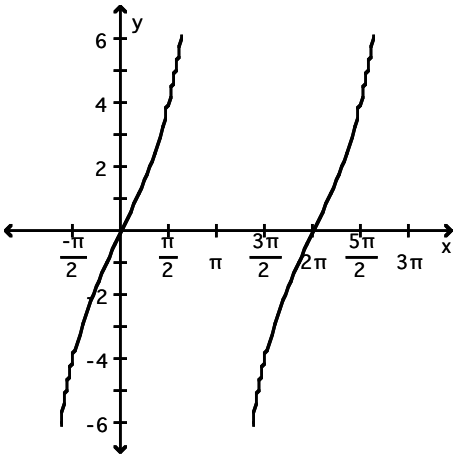


Graph the function.

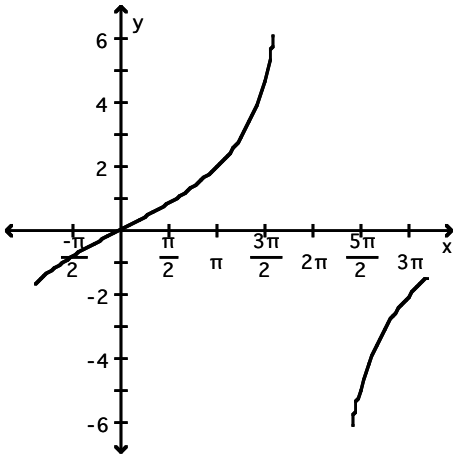
61) $y = 4 \tan (2x)$ 61) _____



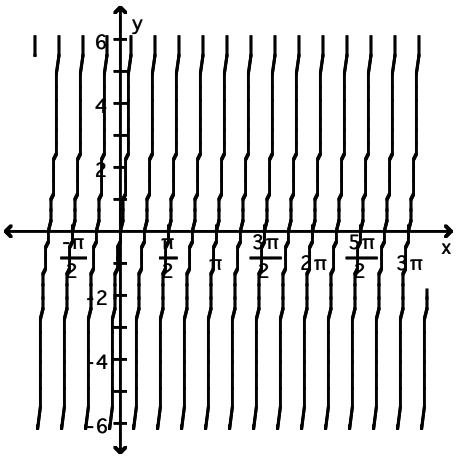
A)



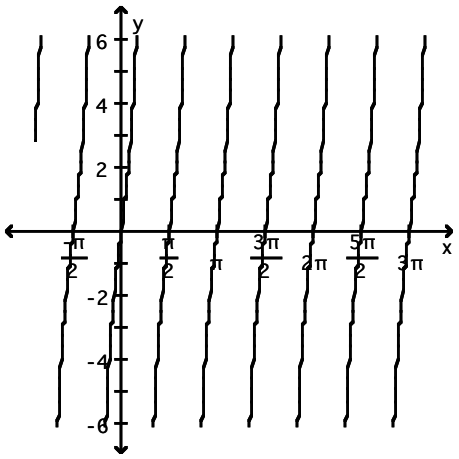
B)



C)



D)



Find the exact value of the expression.

62) $\sin^{-1}\frac{\sqrt{2}}{2}$ 62) _____

A) $\frac{2\pi}{3}$ B) $\frac{\pi}{3}$ C) $\frac{3\pi}{4}$ D) $\frac{\pi}{4}$

63) $\cos^{-1}\frac{\sqrt{3}}{2}$ 63) _____

A) $\frac{\pi}{6}$ B) $\frac{\pi}{4}$ C) $\frac{7\pi}{4}$ D) $\frac{11\pi}{6}$

64) $\sin^{-1}(-0.5)$ 64) _____

A) $\frac{\pi}{6}$ B) $\frac{\pi}{3}$ C) $\frac{7\pi}{3}$ D) $-\frac{\pi}{6}$

65) $\tan^{-1}(1)$ 65) _____

A) $\frac{5\pi}{4}$ B) $\frac{7\pi}{4}$ C) $\frac{\pi}{4}$ D) $\frac{3\pi}{4}$

Use a calculator to find the value of the expression rounded to two decimal places.

66) $\cos^{-1}(-0.2)$ 66) _____

A) 1.77 B) 101.54 C) −0.20 D) −11.54

67) $\tan^{-1}(2.5)$ 67) _____

A) 1.19 B) 0.38 C) 68.20 D) 21.80

68) $\sin^{-1}\left(-\frac{2}{3}\right)$ 68) _____

A) −41.81 B) 131.81 C) 2.30 D) −0.73

69) $\cos^{-1}\left(-\frac{\sqrt{2}}{5}\right)$ 69) _____

A) 106.43 B) −0.29 C) 1.86 D) −16.43

Find the exact value of the expression, if possible. Do not use a calculator.

70) $\cos^{-1}\left[\cos\left(-\frac{\pi}{4}\right)\right]$ 70) _____

A) $-\frac{\pi}{4}$ B) $\frac{\pi}{4}$ C) $\frac{5\pi}{4}$ D) $\frac{3\pi}{4}$

Use a sketch to find the exact value of the expression.

71) $\cos\left(\sin^{-1}\frac{4}{5}\right)$ 71) _____

A) $-\frac{3}{5}$ B) $\frac{1}{5}$ C) $\frac{3}{5}$ D) $-\frac{4}{5}$

72) $\cot\left(\sin^{-1}\frac{\sqrt{2}}{2}\right)$ 72) _____

A) $\frac{\sqrt{2}}{2}$ B) 2 C) 1 D) $\sqrt{2}$

73) $\cos\left(\sin^{-1}\frac{3}{5}\right)$ 73) _____

A) $-\frac{3}{5}$ B) $-\frac{4}{5}$ C) $\frac{1}{5}$ D) $\frac{4}{5}$

Find the exact value of the composition.

74) $\arccos[\sin(\pi/6)]$ 74) _____

A) $\frac{1}{2}$ B) $\frac{\pi}{3}$ C) $\frac{\pi}{6}$ D) $\frac{\sqrt{3}}{2}$

Complete the identity.

75) $\tan x \cdot \cot x = ?$ 75) _____

A) $\sin x$ B) 0 C) 1 D) –1

76) $\csc^2 x \sec x = ?$ 76) _____

A) $\sec x - \csc x \cot x$ B) $\sec x + \csc x$

C) $\csc x \cot x - \sec x$ D) $\sec x + \csc x \cot x$

77) $\sin^2 x + \sin^2 x \cot^2 x = ?$ 77) _____

A) $\sin^2 x + 1$ B) $\cot^2 x - 1$ C) 1 D) $\cot^2 x + 1$

78) $\sin^2 x + \tan^2 x + \cos^2 x = ?$ 78) _____

A) $\sec^2 x$ B) $\tan^2 x$ C) $\sin x$ D) $\cot^3 x$

79) $\dfrac{\csc x \cot x}{\sec x} = ?$ 79) _____

A) 1 B) $\csc^2 x$ C) $\cot^2 x$ D) $\sec^2 x$

80) $\dfrac{1 - \sin x}{\cos x} = ?$ 80) _____

A) $\sec x - \tan x$ B) $\sec x + \tan x$

C) $-\sec x - \tan x$ D) $\sec x - \tan x + 1$

81) The expression $\dfrac{1 + \tan^2 x}{\tan^2 x}$ is to be the left hand side of an equation that is an identity. Which one of the following four expressions can be used as the right hand side of the equation to complete the identity? 81) _____

A) $\sec^2 x$ B) $\csc^2 x$ C) $\tan^2 x$ D) $-\cos^2 x$

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

82) $\dfrac{\sin x}{\tan x} =$ ___ 82) _____

A) $\sec x$ B) $\csc x$ C) $\cot x$ D) $\cos x$

Which answer choice is equivalent to the given expression?

83) $\cos x \tan x \csc x$ 83) _____

A) $\cot x$ B) 1 C) $\sin x$ D) 2

84) $\sec v - \tan v \sin v$ 84) _____

A) $1 - \csc v$ B) $\cot v$ C) $\cos v$ D) $\csc v$

Find the exact value of the expression.

85) $\cos(60° + 45°)$ 85) _____

A) $\frac{\sqrt{6} - \sqrt{2}}{4}$ B) $\frac{\sqrt{2} + 2\sqrt{3}}{4}$ C) $\frac{2\sqrt{2} + \sqrt{6}}{4}$ D) $\frac{\sqrt{2} - \sqrt{6}}{4}$

86) $\cos(45° - 30°)$ 86) _____

A) $\frac{\sqrt{2} + \sqrt{6}}{4}$ B) $\frac{\sqrt{2} + \sqrt{6}}{2}$ C) $\frac{\sqrt{6} - \sqrt{2}}{4}$ D) $\frac{\sqrt{6} - \sqrt{2}}{2}$

87) $\cos\left(\frac{\pi}{3} + \frac{\pi}{4}\right)$ 87) _____

A) $\frac{\sqrt{2} + 2\sqrt{3}}{4}$ B) $\frac{2\sqrt{2} + \sqrt{6}}{4}$ C) $\frac{\sqrt{6} - \sqrt{2}}{4}$ D) $\frac{\sqrt{2} - \sqrt{6}}{4}$

88) $\sin 75°$ 88) _____

A) $\frac{\sqrt{6} - \sqrt{2}}{4}$ B) $\frac{\sqrt{2} + \sqrt{6}}{4}$ C) $\frac{\sqrt{2} + 2\sqrt{3}}{4}$ D) $\frac{2\sqrt{2} + \sqrt{6}}{4}$

Use the given information to find the exact value.

89) $\cos A = \frac{1}{3}, \ 0 < A < \frac{\pi}{2}; \quad \sin B = -\frac{1}{2}, \ \frac{3\pi}{2} < B < 2\pi$ Find $\cos(A + B)$. 89) _____

A) $\frac{\sqrt{3} - 2\sqrt{2}}{6}$ B) $\frac{2\sqrt{6} + 1}{6}$ C) $\frac{\sqrt{3} + 2\sqrt{2}}{6}$ D) $\frac{2\sqrt{6} - 1}{6}$

90) $\cos A = \frac{1}{3}, \ 0 < A < \frac{\pi}{2}; \quad \sin B = -\frac{1}{2}, \ \frac{3\pi}{2} < B < 2\pi$ Find $\sin(A - B)$. 90) _____

A) $\frac{2\sqrt{6} + 1}{6}$ B) $\frac{\sqrt{3} - 2\sqrt{2}}{6}$ C) $\frac{2\sqrt{6} - 1}{6}$ D) $\frac{\sqrt{3} + 2\sqrt{2}}{6}$

Use the appropriate sum or difference identity to write the given expression as a function of x alone.

91) $\tan(x - \pi)$ 91) _____

A) $\tan x$ B) $\frac{1 + \sqrt{3}\tan x}{\sqrt{3} - \tan x}$ C) $-\tan x$ D) $\frac{\tan x - \sqrt{3}}{1 + \sqrt{3}\tan x}$

92) $\sin(x - \pi)$ 92) _____

A) $\cos x$ B) $-\sin x$ C) $-\cos x$ D) $\sin x$

93) $\sin\left(\frac{\pi}{2} - x\right)$ 93) _____

A) $\sin x$ B) $\cos x$ C) $-\sin x$ D) $-\cos x$

Use the information given about the angle θ, to find the exact value of the indicated trigonometric function.

94) $\cos\theta = -\frac{5}{13}$, θ in quadrant II Find $\sin 2\theta$. 94) _____

A) $\frac{120}{169}$ B) $-\frac{119}{169}$ C) $-\frac{120}{169}$ D) $\frac{119}{169}$

95) $\sin\theta = -\frac{4}{5}$, θ in quadrant IV Find $\sin 2\theta$. 95) _____

A) $\frac{7}{25}$ B) $-\frac{24}{25}$ C) $-\frac{7}{25}$ D) $\frac{24}{25}$

96) $\sin\theta = -\frac{4}{5}$, θ in quadrant IV Find $\cos 2\theta$. 96) _____

A) $-\frac{24}{25}$ B) $-\frac{7}{25}$ C) $\frac{7}{25}$ D) $\frac{24}{25}$

Answer the question.

97) Find $\cos\theta$ given that $\cos 2\theta = \frac{4}{7}$ and $0 \le \theta < \frac{\pi}{2}$. 97) _____

A) $\frac{14}{154}$ B) 14 C) $\frac{\sqrt{154}}{13}$ D) $\frac{\sqrt{154}}{14}$

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

98) $\sin 22.5°$ 98) _____

A) $\frac{1}{2}\sqrt{2-\sqrt{2}}$ B) $\frac{1}{2}\sqrt{2+\sqrt{2}}$ C) $-\frac{1}{2}\sqrt{2+\sqrt{2}}$ D) $-\frac{1}{2}\sqrt{2-\sqrt{2}}$

99) $\cos 22.5°$ 99) _____

A) $-\frac{1}{2}\sqrt{2+\sqrt{2}}$ B) $-\frac{1}{2}\sqrt{2-\sqrt{2}}$ C) $\frac{1}{2}\sqrt{2-\sqrt{2}}$ D) $\frac{1}{2}\sqrt{2+\sqrt{2}}$

Answer the question.

100) Find $\cos\theta$ given that $\sin\left(\frac{\theta}{2}\right) = \frac{3}{7}$ and $0 \le \theta < \frac{\pi}{2}$. 100) _____

A) $\frac{31}{29}$ B) $\frac{29}{49}$ C) $\frac{3}{49}$ D) $\frac{31}{49}$

1) A
2) C
3) C
4) A
5) D
6) D
7) A
8) A
9) B
10) A
11) C
12) C
13) C
14) A
15) B
16) D
17) B
18) A
19) B
20) B
21) D
22) B
23) A
24) C
25) C
26) C
27) D
28) B
29) D
30) A
31) A
32) A
33) B
34) A
35) B
36) C
37) B
38) D
39) A
40) C
41) C
42) B
43) C
44) A
45) A
46) A
47) B
48) D
49) C

50) A
51) D
52) D
53) C
54) B
55) D
56) B
57) B
58) B
59) B
60) C
61) D
62) D
63) A
64) D
65) C
66) A
67) A
68) D
69) C
70) B
71) C
72) C
73) D
74) B
75) C
76) D
77) C
78) A
79) C
80) A
81) B
82) D
83) B
84) C
85) D
86) A
87) D
88) B
89) C
90) A
91) A
92) B
93) B
94) C
95) B
96) B
97) D
98) A

99) D
100) D