

Name _____

Find the exact value of the expression.

1) $\tan\left[\cos^{-1}\left(-\frac{1}{2}\right)\right]$ 1) _____

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

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

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

3) $\cos^{-1}\left(\cos\frac{7\pi}{6}\right)$ 3) _____

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

4) $\cos^{-1}\left(\sin\frac{7\pi}{6}\right)$ 4) _____

- A) $\frac{\pi}{3}$ B) $\frac{4\pi}{5}$ C) $\frac{2\pi}{3}$ D) $\frac{\pi}{6}$

5) $\cos\left(\tan^{-1}\frac{4}{3} - \sin^{-1}\frac{3}{5}\right)$ 5) _____

- A) $\frac{2\sqrt{3}}{5}$ B) $\frac{2\sqrt{6}}{5}$ C) $\frac{24}{25}$ D) 1

6) $\sin\left(\sin^{-1}\frac{2}{3} + \cos^{-1}\frac{1}{3}\right)$ 6) _____

A) $\frac{2\sqrt{3} + 2\sqrt{10}}{9}$ B) $\frac{2 + 2\sqrt{10}}{9}$ C) $\frac{2\sqrt{3}}{5}$ D) $\frac{2\sqrt{6}}{5}$

7) $\cos\left(\sin^{-1}\frac{1}{3} - \tan^{-1}\frac{1}{2}\right)$ 7) _____

A) $\frac{4\sqrt{10} + \sqrt{5}}{15}$ B) $\frac{2\sqrt{6}}{5}$ C) $\frac{2\sqrt{3} + 4}{3\sqrt{5}}$ D) $\frac{2\sqrt{3} + 1}{5}$

8) $\cos\left(\tan^{-1}\frac{5}{12} - \cos^{-1}\frac{4}{5}\right)$ 8) _____

A) $\frac{7}{13}$ B) $\frac{13}{24}$ C) $\frac{52}{65}$ D) $\frac{63}{65}$

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

9) $(1 + \cot \theta)(1 - \cot \theta) - \csc^2 \theta$ 9) _____

A) $2 \cot^2 \theta$ B) $-2 \cot^2 \theta$ C) 0 D) 2

10) $\tan x(\cot x - \cos x)$ 10) _____

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

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

11) $\cos(x + y) = \cos x + \cos y$ 11) _____

A) Not an Identity B) Identity

Perform the indicated operations and simplify the result.

12) $\csc \theta(\sin \theta + \cos \theta)$ 12) _____

A) $\sec \theta \csc \theta$ B) $1 + \cot \theta$ C) $\sin \theta \tan \theta$ D) $-2 \tan^2 \theta$

13) $\frac{\sin \theta}{\cos \theta} + \frac{\cos \theta}{\sin \theta}$ 13) _____

A) $\sec \theta \csc \theta$

B) $1 + \cot \theta$

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

D) $\sin \theta \tan \theta$

14) $\frac{(\sin \theta + \cos \theta)^2}{1 + 2 \sin \theta \cos \theta}$ 14) _____

A) 1

B) 0

C) $1 - \sin \theta$

D) $-\sec^2 \theta$

Use Identities to find the exact value.

15) $\cos -75^\circ$ 15) _____

A) $-\sqrt{6} - \sqrt{2}$

B) $\sqrt{2} - \sqrt{6}$

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

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

16) $\cos \left(\frac{\pi}{12} \right)$ 16) _____

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

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

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

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

17) $\cos 36^\circ \cos 24^\circ - \sin 36^\circ \sin 24^\circ$ 17) _____

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

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

C) $\frac{1}{2}$

D) 1

18) $\cos \frac{7\pi}{12} \cos \frac{5\pi}{12} + \sin \frac{7\pi}{12} \sin \frac{5\pi}{12}$ 18) _____

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

B) $\frac{1}{2}$

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

D) -1

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

19) Find $\cos(s + t)$ given that $\cos s = \frac{1}{3}$, with s in quadrant I, and $\sin t = \frac{1}{4}$, with t in quadrant II. 19) _____

A) $\frac{\sqrt{15} - 2\sqrt{2}}{6}$

B) $\frac{\sqrt{15} - 2\sqrt{2}}{12}$

C) $-\frac{\sqrt{15} + 2\sqrt{2}}{6}$

D) $-\frac{\sqrt{15} + 2\sqrt{2}}{12}$

20) 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. 20) _____

A) $-\frac{220}{221}$

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

C) $-\frac{140}{221}$

D) $\frac{140}{221}$

Tell whether the statement is true or false.

21) $\cos 58^\circ = \cos 66^\circ \cos 8^\circ - \sin 66^\circ \sin 8^\circ$ 21) _____

A) True

B) False

22) $\cos -64^\circ = \cos 23^\circ \cos 87^\circ + \sin 23^\circ \sin 87^\circ$ 22) _____

A) True

B) False

23) $\cos \frac{17\pi}{72} = \cos \frac{\pi}{9} \cos \frac{\pi}{8} - \sin \frac{\pi}{9} \sin \frac{\pi}{8}$ 23) _____

A) True

B) False

24) $\cos \frac{\pi}{72} = \cos \frac{\pi}{9} \cos \frac{\pi}{8} - \sin \frac{\pi}{9} \sin \frac{\pi}{8}$ 24) _____

A) True

B) False

Use trigonometric identities to find the exact value.

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

A) $\frac{5}{12}$

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

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

D) $\frac{1}{2}$

26) $\sin 100^\circ \cos 40^\circ - \cos 100^\circ \sin 40^\circ$ 26) _____

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

B) $\frac{1}{2}$

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

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

$$27) \frac{\tan 75^\circ + \tan 75^\circ}{1 - \tan 75^\circ \tan 75^\circ}$$

27) _____

A) $-\sqrt{3}$

B) $-\frac{1}{2}$

C) $-\frac{\sqrt{3}}{3}$

D) -2

$$28) \frac{\tan 75^\circ - \tan (-45)^\circ}{1 + \tan 75^\circ \tan (-45)^\circ}$$

28) _____

A) $-\frac{1}{2}$

B) $-\sqrt{3}$

C) -2

D) $-\frac{\sqrt{3}}{3}$

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

$$29) \sin \frac{7\pi}{12}$$

29) _____

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

B) $\frac{1}{2}$

C) $\frac{\sqrt{3} + 1}{2}$

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

$$30) \tan \frac{11\pi}{12}$$

30) _____

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

B) $2 - \sqrt{3}$

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

D) $2 + \sqrt{3}$

$$31) \sin \frac{7\pi}{24} \cos \frac{\pi}{8} - \cos \frac{7\pi}{24} \sin \frac{\pi}{8}$$

31) _____

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

B) $\frac{1}{2}$

C) 1

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

$$32) \frac{\tan \frac{7\pi}{24} - \tan \frac{\pi}{8}}{1 + \tan \frac{7\pi}{24} \tan \frac{\pi}{8}}$$

32) _____

A) $\sqrt{3}$

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

C) $\frac{1}{2}$

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

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

33) $2 \cos^2 22.5^\circ - 1$

33) _____

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

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

C) $\sqrt{3}$

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

34) $\sin 22.5^\circ \cos 22.5^\circ$

34) _____

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

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

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

D) $\sqrt{3}$

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

35) _____

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

B) $\sqrt{3}$

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

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

36) $\cos^2 4x - \sin^2 4x$

36) _____

A) $\cos 4x$

B) $\cos 8x$

C) $2 \sin 4x$

D) $\frac{1}{2} \sin 16x$

37) $4 \sin 2x \cos 2x$

37) _____

A) $\cos 8x$

B) $2 \sin 4x$

C) $\frac{1}{2} \sin 16x$

D) $\cos 4x$

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

38) $\sin \theta = \frac{21}{29}$, $\cos \theta > 0$

Find $\cos(2\theta)$.

38) _____

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

B) $\frac{840}{841}$

C) $-\frac{43}{841}$

D) $\frac{41}{841}$

39) $\cos \theta = \frac{12}{13}$, $\sin \theta < 0$

Find $\sin(2\theta)$.

39) _____

A) $-\frac{119}{169}$

B) $\frac{119}{169}$

C) $\frac{120}{169}$

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

40) $\tan \theta = \frac{7}{24}$, $\sin \theta < 0$ Find $\cos(2\theta)$. 40) _____

A) $-\frac{336}{625}$

B) $-\frac{527}{625}$

C) $\frac{336}{625}$

D) $\frac{527}{625}$

41) $\cos 2\theta = \frac{4}{5}$ and θ terminates in quadrant I Find $\sin \theta$. 41) _____

A) $\sin \theta = \frac{\sqrt{10}}{10}$

B) $\sin \theta = \sqrt{10}$

C) $\sin \theta = -\frac{\sqrt{10}}{10}$

D) $\sin \theta = 0$

Write the product as a sum or difference of trigonometric functions.

42) $\cos 44^\circ \sin 15^\circ$ 42) _____

A) $\frac{1}{2}(\cos 59^\circ + \cos 29^\circ)$

B) $\frac{1}{2}(\sin 59^\circ + \sin 29^\circ)$

C) $\frac{1}{2}(\sin 59^\circ - \sin 29^\circ)$

D) $\frac{1}{2}(\cos 59^\circ - \cos 29^\circ)$

43) $2 \cos 6x \cos 3x$ 43) _____

A) $\sin 9x + \sin 3x$

B) $\cos 9x + \cos 3x$

C) $\frac{1}{2}(\cos 9x + \cos 3x)$

D) $\cos 3x - \cos 9x$

44) $8 \sin 46^\circ \cos 103^\circ$ 44) _____

A) $8[\cos 149^\circ + \cos (-57^\circ)]$

B) $4[\sin 149^\circ - \sin (-57^\circ)]$

C) $4[\sin 149^\circ + \sin (-57^\circ)]$

D) $4[\cos 149^\circ + \cos (-57^\circ)]$

Rewrite the following as a product of trigonometric functions.

45) $\sin 10^\circ - \sin 21^\circ$ 45) _____

A) $2 \sin (-5.5^\circ) \cos 15.5^\circ$

B) $2 \cos (-5.5^\circ) \sin 15.5^\circ$

C) $2 \cos (-5.5^\circ) \cos 15.5^\circ$

D) $2 \sin (-5.5^\circ) \sin 15.5^\circ$

46) $\cos 14^\circ - \cos 39^\circ$

46) _____

A) $-2 \cos 26.5^\circ \sin (-12.5^\circ)$

B) $-2 \cos 26.5^\circ \cos (-12.5^\circ)$

C) $-2 \sin 26.5^\circ \cos (-12.5^\circ)$

D) $-2 \sin 26.5^\circ \sin (-12.5^\circ)$

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

47) $\sin 75^\circ$

47) _____

A) $\frac{1}{2} \sqrt{2 + \sqrt{3}}$

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

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

D) $-\frac{1}{2} \sqrt{2 + \sqrt{3}}$

48) $\sin \frac{5\pi}{12}$

48) _____

A) $\frac{1}{2} \sqrt{2 + \sqrt{3}}$

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

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

D) $-\frac{1}{2} \sqrt{2 + \sqrt{3}}$

49) $\cos 165^\circ$

49) _____

A) $-\frac{1}{2} \sqrt{2 + \sqrt{3}}$

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

C) $\frac{1}{2} \sqrt{2 + \sqrt{3}}$

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

Determine all solutions of the equation in radians.

50) Find $\cos \frac{x}{2}$, given that $\cos x = \frac{1}{4}$ and x terminates in $0 < x < \frac{\pi}{2}$.

50) _____

A) $\frac{\sqrt{8 - 2\sqrt{15}}}{4}$

B) $\frac{\sqrt{10}}{4}$

C) $\frac{\sqrt{6}}{4}$

D) $\frac{\sqrt{8 + 2\sqrt{15}}}{4}$

51) Find $\cos \frac{\theta}{2}$, given that $\sin \theta = \frac{1}{4}$ and θ terminates in $0 < \theta < 90^\circ$.

51) _____

A) $\frac{\sqrt{6}}{4}$

B) $\frac{\sqrt{8 - 2\sqrt{15}}}{4}$

C) $\frac{\sqrt{8 + 2\sqrt{15}}}{4}$

D) $\frac{\sqrt{10}}{4}$

52) Find $\tan \frac{x}{2}$, given that $\tan x = -3$ and x terminates in $90^\circ < x < 180^\circ$.

52) _____

A) $\frac{\sqrt{10}+1}{-3}$

B) $\frac{\sqrt{10}-1}{-3}$

C) $\frac{\sqrt{10}+1}{3}$

D) $\frac{\sqrt{10}-1}{3}$

Find the exact value of the real number y .

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

53) _____

A) $\frac{3\pi}{4}$

B) $\frac{\pi}{4}$

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

D) $\frac{2\pi}{3}$

Give the degree measure of θ .

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

54) _____

A) -60°

B) 45°

C) 60°

D) 30°

55) $\theta = \sec^{-1}(\sqrt{2})$

55) _____

A) 135°

B) 225°

C) 45°

D) 30°

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

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

56) _____

A) 10°

B) 12°

C) 15°

D) 14°

Evaluate the expression.

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

57) _____

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

B) $\frac{4}{3}$

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

D) $\frac{3}{4}$

58) $\cos\left(\arcsin\frac{3}{5} + \arccos\frac{\sqrt{3}}{2}\right)$

58) _____

A) $\frac{-25\sqrt{3}-48}{100}$

B) $\frac{4\sqrt{3}+3}{10}$

C) $\frac{2\sqrt{3}+2}{5}$

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

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

59) $\cos^2 x + 2 \cos x + 1 = 0$

59) _____

A) $\left\{ \frac{\pi}{2}, \frac{3\pi}{2} \right\}$

B) $\left\{ \frac{\pi}{4}, \frac{7\pi}{4} \right\}$

C) $\{\pi\}$

D) $\{2\pi\}$

60) $2 \sin^2 x = \sin x$

60) _____

A) $\left\{ \frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{3}, \frac{2\pi}{3} \right\}$

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

C) $\left\{ \frac{\pi}{3}, \frac{2\pi}{3} \right\}$

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

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

61) $2 \cos^3 \theta = \cos \theta$

61) _____

A) $\{45^\circ, 90^\circ, 135^\circ, 225^\circ, 270^\circ, 315^\circ\}$

B) \emptyset

C) $\{90^\circ, 270^\circ\}$

D) $\{45^\circ, 135^\circ, 225^\circ, 315^\circ\}$

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

62) $4 \sin^2 x - 1 = 0$

62) _____

A) $\left\{ \frac{\pi}{6} + n\pi, \frac{\pi}{2} + 2n\pi \right\}$

B) $\left\{ \frac{\pi}{3} + n\pi \right\}$

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

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

63) $\cos^2 x - \cos x = 0$

63) _____

A) $\left\{ \frac{5\pi}{3} + 2n\pi \right\}$

B) $\{\pi + 2n\pi\}$

C) $\left\{ \frac{\pi}{2} + 2n\pi \right\}$

D) $\left\{ 2n\pi, \frac{\pi}{2} + n\pi \right\}$

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

64) $\sin 4x = \frac{\sqrt{3}}{2}$ 64) _____

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

B) $\left\{0, \frac{\pi}{4}, \pi\right\}$

C) $\{0\}$

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

65) $2\sqrt{3} \sin 4x = 3$ 65) _____

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

B) $\{0\}$

C) $\left\{0, \frac{\pi}{4}, \pi\right\}$

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

66) $\sin^2 2x = 1$ 66) _____

A) $\left\{\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}\right\}$

B) \emptyset

C) $\left\{0, \frac{2\pi}{3}, \pi, \frac{4\pi}{3}\right\}$

D) $\left\{\frac{\pi}{8}, \frac{9\pi}{8}\right\}$

67) $\cos 2x = \sqrt{2} - \cos 2x$ 67) _____

A) $\left\{0, \frac{2\pi}{3}, \pi, \frac{4\pi}{3}\right\}$

B) \emptyset

C) $\left\{\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}\right\}$

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

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

68) $\cos 2\theta = \frac{\sqrt{3}}{2}$ 68) _____

A) $\{105^\circ, 165^\circ, 285^\circ, 345^\circ\}$

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

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

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

69) $\sin 2\theta = -\frac{1}{2}$

69) _____

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

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

C) $\{105^\circ, 165^\circ, 285^\circ, 345^\circ\}$

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

70) $\sin 2\theta + \sin \theta = 0$

70) _____

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

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

C) $\{105^\circ, 165^\circ, 285^\circ, 345^\circ\}$

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

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

71) _____

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

B) $\{105^\circ, 165^\circ, 285^\circ, 345^\circ\}$

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

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

Answer Key

Testname: 13SPR_M50_HW3_CH3

- | | |
|-------|-------|
| 1) A | 51) C |
| 2) A | 52) C |
| 3) D | 53) C |
| 4) C | 54) C |
| 5) C | 55) C |
| 6) B | 56) B |
| 7) A | 57) C |
| 8) D | 58) D |
| 9) B | 59) C |
| 10) D | 60) D |
| 11) A | 61) A |
| 12) B | 62) C |
| 13) A | 63) D |
| 14) A | 64) D |
| 15) C | 65) A |
| 16) B | 66) A |
| 17) C | 67) D |
| 18) C | 68) C |
| 19) D | 69) C |
| 20) B | 70) B |
| 21) B | 71) C |
| 22) A | |
| 23) A | |
| 24) B | |
| 25) C | |
| 26) D | |
| 27) C | |
| 28) B | |
| 29) D | |
| 30) C | |
| 31) B | |
| 32) D | |
| 33) D | |
| 34) A | |
| 35) C | |
| 36) B | |
| 37) B | |
| 38) A | |
| 39) D | |
| 40) D | |
| 41) A | |
| 42) C | |
| 43) B | |
| 44) C | |
| 45) A | |
| 46) D | |
| 47) A | |
| 48) A | |
| 49) A | |
| 50) B | |