

1. Identify the value of $\sin^{-1}(.5)$ (in degrees)
2. $\theta = 325^\circ$, find θ_{ref}
3. $\theta = -185^\circ$, find θ_{ref}
4. $\theta = -142^\circ$, $\theta_{\text{ref}} = ?$
5. Convert 710° into radians
6. Convert 135° into radians
7. Convert $\frac{-3\pi}{8}$ into degrees
8. Convert $\frac{2\pi}{9}$ into degrees
9. $\sin \theta = -\frac{2}{3}$ and θ terminates in Quadrant III, $\tan \theta = ?$
10. $\sec \theta = \frac{5}{2}$ and θ terminates in Quadrant IV, find $\csc \theta$
11. $\cos \theta = \frac{1}{3}$ and θ terminates in Quadrant I, find $\cot \theta$
12. If the terminal side of θ passes through $(4, -3)$, find $\tan \theta$.
13. If $\tan \theta = \frac{5}{7}$ in Quadrant III, find $\csc \theta$
14. Which functions are positive in Quadrant I?
15. Which trigonometric functions are positive in Quadrant II?
16. Which trigonometric functions are positive in Quadrant IV?
17. $y = \csc x$ is positive in Quadrants?

Find:

- | | |
|--|---|
| 18. $\tan \frac{\pi}{3}$ | 24. $\sec \frac{-5\pi}{6}$ |
| 19. $\sin \left(\frac{5\pi}{6} \right)$ | 25. $\cos \left(-\frac{\pi}{3} \right)$ |
| 20. $\cos \left(\frac{2\pi}{3} \right)$ | 26. $\cos^2 \left(-\frac{\pi}{3} \right) + \sin^2 \left(-\frac{\pi}{3} \right)$ |
| 21. $\csc \frac{7\pi}{6}$ | 27. $4\cos \left(\frac{3\pi}{4} \right) \sin \left(\frac{3\pi}{4} \right)$ |
| 22. $\sec \frac{3\pi}{4}$ | 28. $\cos^2 \left(-\frac{\pi}{3} \right) - \sin^2 \left(\frac{\pi}{6} \right)$ |
| 23. $\cos \frac{-\pi}{6}$ | 29. $\sec^2 \left(\frac{\pi}{3} \right) - \csc^2 \left(\frac{\pi}{4} \right)$ |

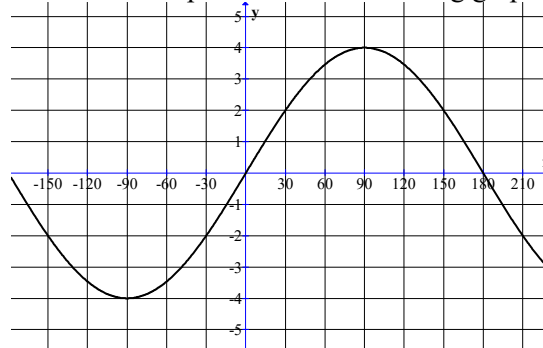
30. Graph $y = 2 + 3\cos \frac{1}{2}(\theta - 20^\circ)$

31. Graph $y = 1 + \tan \theta$

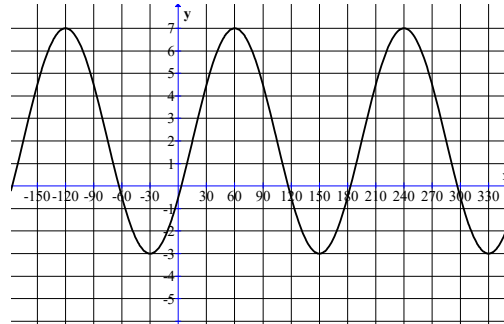
32. Graph $y = -1 + 2\cos 3(\theta - 50^\circ)$

33. Graph $y = 2 + 3\sin 2(\theta - 30^\circ)$

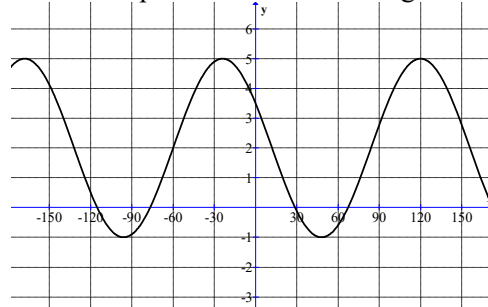
34. What is the amplitude of the following graph



35. What is the horizontal shift if the graph is a sine curve? A cosine curve?



36. Give the equation of the following curve.



37. Identify the period of $y = -2 + 3\cos \frac{1}{4}(\theta - 20^\circ)$

38. What transformation were performed on $y = -2 + 3\cos \left(3x + \frac{\pi}{2} \right)$

39. Identify the equation of a sinusoid whose period is 180° , whose vertical shift is 3, whose amplitude is 6, and whose horizontal shift for \sin is 100° .

40. Identify the equation of a sinusoid whose period is 120° , whose vertical shift is 2, whose amplitude is 1, and whose horizontal shift for \sin is 55° .

41. Identify the range of $y = 2 + 3\cos\frac{1}{2}x$

42. Identify the period of $y = 3\sec 5(\theta - 30^\circ)$

43. Identify the vertical shift of $y = 2 + 3\cos 4x$

44. Identify the horizontal shift of

$$y = 9 + 7\sin\frac{1}{4}(\theta - 100^\circ)$$

45. Simplify $\frac{\sin^2 x + \cos^2 x}{\tan x}$

46. Show that $\csc x - \sin x = \cot x \cos x$

47. Prove $\frac{\csc^2 x - 1}{\cos x} = \cot x \csc x$

48. Simplify $\cos x + \sin x \tan x$

49. Simplify $(1 - \cos x)(\csc x + \cot x)$

50. Simplify $\frac{\cos x \cot x + \sin x}{2 \cos x}$

51. Simplify $\cos x \sin x \tan x$

52. Identify the solution set over the given domain:

$$2\cos^2 x - 3\cos x + 1 = 0, [-2\pi, 2\pi]$$

53. Identify the solution set over the given domain:

$$2\csc x - 4 = 0 \text{ for } [0, 2\pi]$$

54. Identify the solution set over the given domain:

$$4\cos^2 x - 1 = 0 \text{ for } [0, 360^\circ]$$

55. Identify the solution set over the given domain:

$$2\sin^2 x + \sin x - 1 = 0 \text{ for } [-\pi, \pi]$$

Find:

56. $\arctan\sqrt{3}$

60. $\sin\left(\arccos\left(-\frac{8}{17}\right)\right)$

57. $\arcsin\left(\frac{-\sqrt{3}}{2}\right)$

61. $\arccos\frac{\sqrt{3}}{2}$

58. $\arccos\left(\frac{-1}{2}\right)$

62. $\operatorname{arcsec}(-2)$

59. $\csc^{-1}\left(\csc\frac{7\pi}{6}\right)$

63. $\arcsin\left(\cos\left(-\frac{\pi}{3}\right)\right)$

Find Domain and Range for the following

64. $f(x) = \frac{\pi}{2} + 3\sin^{-1} 2(x+1)$

65. $f(x) = \pi + 4\arcsin 3(x-2)$

66. $f(x) = 2 + \frac{3}{\pi}\cos^{-1}\frac{1}{3}(x+2)$

67. $f(x) = 3 + \frac{2}{\pi}\arccos\frac{1}{2}(x-5)$

68. $f(x) = \frac{2\pi}{3} + 2\arctan 10(x-1)$

Calculator is allowed

69. A ship is observed from the top of a lighthouse at an angle of depression of 26° . If the lighthouse is 140 m high, how far is the ship from the base of the lighthouse?

70. An observer at the top of the lighthouse 80 ft. above the surface of the water measures an angle of depression of $0^\circ 42'$ to a distant ship. How many miles is the ship from the base of the lighthouse?

71. Given $\triangle ABC$ with $\angle A = 25^\circ$, $b = 10$, and $c = 12$. Find a .

72. Given $\triangle ABC$ with $\angle A = 33^\circ$, $b = 7$, and $c = 15$. Find area.

73. Given $\triangle ABC$ with $\angle A = 40^\circ$, $b = 8$, and $c = 10$. Find perimeter.

74. Given $\triangle ABC$ with $\angle A = 35^\circ$, $\angle B = 70^\circ$, $a = 7$. Find b .

75. Given $\triangle ABC$ with $a = 10$, $b = 15$, and $c = 20$. Find $\angle B$.

76. Compute $\sin^{-1}(0.654)$ (in radians)

77. Compute $\sin^{-1}(-0.6)$ (in radians)

78. Compute $\cos^{-1}(0.1576)$ (in degrees)

79. Find the general solution to the equation $\sin x = 0.7$ (in radians)

80. A ranger in an observation tower can sight the north end of a lake 15 km away and the south end of the same lake 19 km away. The angle between these two lines of sight is 104° . How long is the lake?

81. Two planes leave an airport at the same time, one flying due west at 500 km/h and the other flying due southeast at 300 km/h. What is the distance between the planes two hours later?

82. A triangular-shaped lot of land has sides of length 130m, 150m and 80m. What are the measures of the angles?

83. Two streets meet at an angle of 52° . If a triangular lot has frontages of 60m and 65m on the two streets, what is the perimeter of the lot?

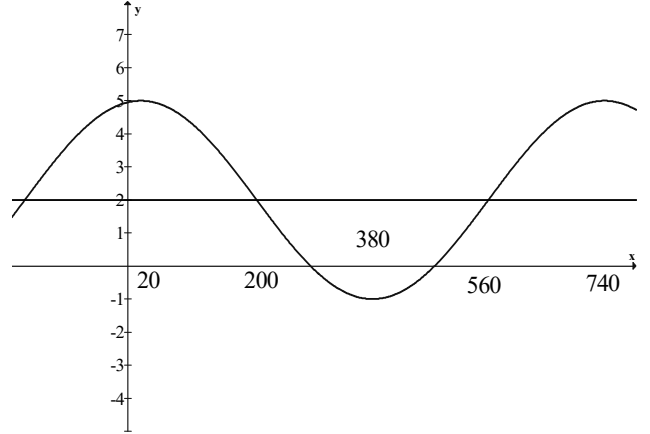
84. The carnival ferris wheel is 20 feet in diameter and turns at 4 rpm. The bottom of the ferris wheel is 3 feet above the ground. Assume that the height h of a passenger above the ground varies sinusoidally with time t (in seconds).

- Find an equation that describes the functional relationship between h and t .
- Use the model to predict the height of the passenger above the ground for $t = 3$
- When will the passenger be 7 feet from the ground the first time?

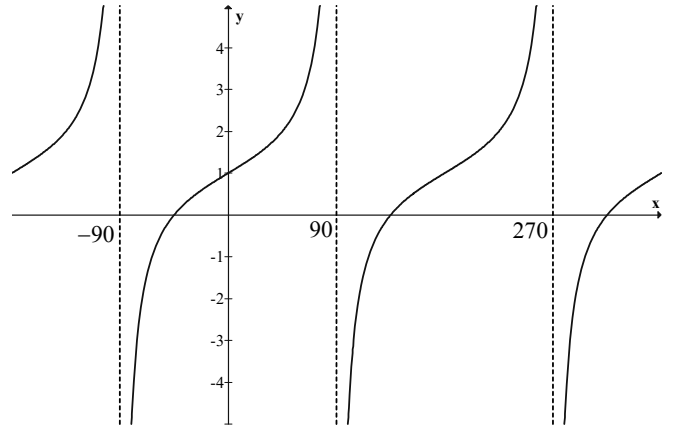
Answers

1. 30°
2. 35°
3. 5°
4. 38°
5. $\frac{71\pi}{18}$
6. $\frac{3\pi}{4}$
7. -67.5°
8. 40°
9. $\frac{2\sqrt{5}}{5}$
10. $-\frac{5\sqrt{21}}{21}$
11. $\frac{\sqrt{2}}{4}$
12. $-\frac{3}{4}$
13. $-\frac{\sqrt{74}}{5}$
14. All
15. *sin, csc*
16. *cos, sec*
17. I, II
18. $\sqrt{3}$
19. $\frac{1}{2}$
20. $-\frac{1}{2}$
21. -2
22. $-\sqrt{2}$
23. $\frac{\sqrt{3}}{2}$
24. $-\frac{2\sqrt{3}}{3}$
25. $\frac{1}{2}$
26. 1
27. -2
28. 0
29. 2

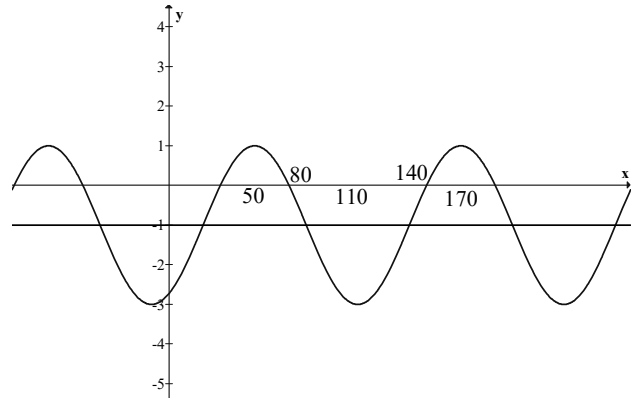
30.



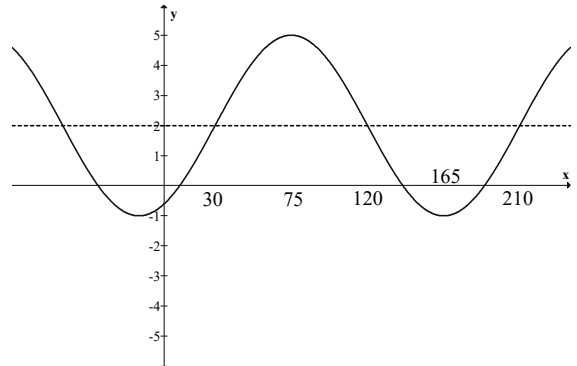
31.



32.



33.



34. 4

35. 15° for \sin ; 60° for \cos

36. $y = 2 + 3 \cos\left(\frac{12}{5}(\theta + 30^\circ)\right)$ or

$$y = 2 - 3 \sin\left(\frac{12}{5}(\theta - 15^\circ)\right)$$

37. 1440°

38. $y = -2 + 3 \cos\left(3\left(x + \frac{\pi}{6}\right)\right)$

A: 3; B: 120° C: -2 D: $\frac{\pi}{6}$

39. $y = 3 + 6 \sin(2(x - 100^\circ))$

40. $y = 2 + \sin(3(x - 55^\circ))$

41. $[-1, 5]$

42. 72°

43. up 2

44. 100° right

45. $\cot x$

46. $\cos x \cot x$

47. $\csc x \cot x$

48. $\sec x$

49. $\sin x$

50. $\csc 2x$

51. $\sin^2 x$

52. $\left\{-2\pi, -\frac{5\pi}{3}, -\frac{\pi}{3}, 0, \frac{\pi}{3}, \frac{5\pi}{3}, 2\pi\right\}$

53. $\left\{\frac{\pi}{6}, \frac{5\pi}{6}\right\}$

54. $\{60, 120, 240, 300\}$

55. $\left\{-\frac{\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}\right\}$

56. 60 or $\frac{\pi}{3}$

57. -60 or $-\frac{\pi}{3}$

58. 120 or $\frac{2\pi}{3}$

59. $-\frac{\pi}{6}$

60. $\frac{15}{17}$

61. 30 or $\frac{\pi}{6}$

62. 120 or $\frac{2\pi}{3}$

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

64. D: $\left[-\frac{3}{2}, -\frac{1}{2}\right]$; R: $[-\pi, 2\pi]$

65. D: $[-\pi, 3\pi]$; R: $\left[\frac{5}{3}, \frac{7}{3}\right]$

66. D: $[-5, 1]$; R: $[2, 5]$

67. D: $[3, 7]$; R: $[3, 5]$

68. D: $(-\infty, \infty)$ R: $\left[-\frac{\pi}{3}, \frac{5\pi}{3}\right]$

69. 287.04 m

70. $\frac{6547.76 \text{ ft}}{5280} = 1.24 \text{ miles}$

71. 5.146

72. 28.594

73. 24.437

74. 11.468

75. 46.567°

76. 0.7129

77. -0.6435

78. 80.9324

79. $0.7754 + 2\pi n$ and $2.3662 + 2\pi n$

80. 26.9 km

81. 1490 km

82. $32.2^\circ, 87.8^\circ, 60.0^\circ$

83. 54.980

84. a. $h = 13 + 10 \cos \frac{2\pi}{15} t$

b. 22.998

c. 5.286 seconds