

Chapter 4 Review Worksheet

Use a vertical shift to graph the function.

$$1) y = -4 \sin \left(2x + \frac{\pi}{2} \right) - 2$$

In the problem, t is a real number and $P = (x, y)$ is the point on the unit circle that corresponds to t . Find the exact value of the indicated trigonometric function of t .

$$2) \left(\frac{5}{6}, -\frac{\sqrt{11}}{6} \right) \quad \text{Find } \csc t.$$

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

$$3) \tan \theta = -\frac{8}{9}, \quad \theta \text{ in quadrant II. Find } \cos \theta.$$

$$4) \tan \frac{4\pi}{3} = \frac{\sin \frac{4\pi}{3}}{\cos \frac{4\pi}{3}}$$

Determine the phase shift of the function.

$$5) y = -2 \sin \left(\frac{1}{4}x - \frac{\pi}{4} \right)$$

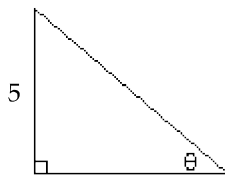
Determine the amplitude or period as requested.

$$6) \text{ Period of } y = -4 \cos \frac{1}{3}x$$

Determine the horizontal shift of the function.

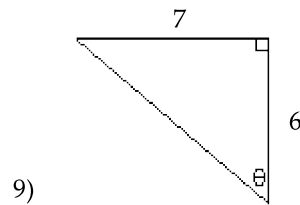
$$7) y = 5 \sin \left(4x - \frac{\pi}{2} \right)$$

Find the values of all six of the indicated trigonometric function of the angle θ in the figure. Give an exact answer with a rational denominator.

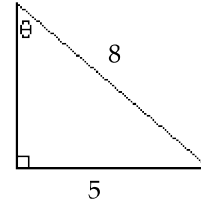


8)

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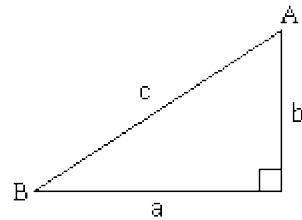
9)



10)

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Solve the right triangle using the information given. Round answers to two decimal places, if necessary.



$$11) a = 8, B = 30^\circ; \text{ Find } b, c, \text{ and } A.$$

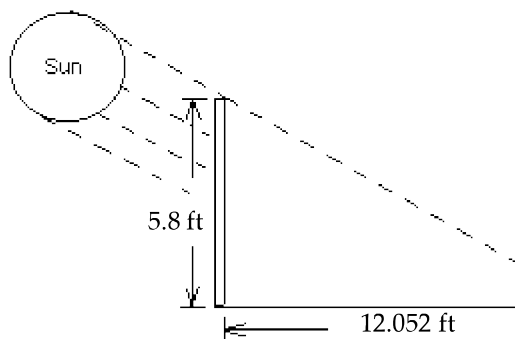
$$12) a = 4, b = 7; \text{ Find } c, A, \text{ and } B.$$

$$13) b = 5, c = 8; \text{ Find } a, B, \text{ and } A.$$

Solve the problem.

$$14) \text{ A tree casts a shadow of 26 meters when the angle of elevation of the sun is } 24^\circ. \text{ Find the height of the tree to the nearest meter.}$$

- 15) A 5.8-ft fence is 12.052 ft away from a plant in the direction of the sun. It is observed that the shadow of the fence extends exactly to the bottom of the plant. (See drawing) Find θ , the angle of elevation of the sun at that time. Round the measure of the angle to the nearest tenth of a degree.



- 16) A radio transmission tower is 150 feet tall. How long should a guy wire be if it is to be attached 5 feet from the top and is to make an angle of 20° with the ground? Give your answer to the nearest tenth of a foot.
- 17) A straight trail with a uniform inclination of 11° leads from a lodge at an elevation of 600 feet to a mountain lake at an elevation of 9000 feet. What is the length of the trail (to the nearest foot)?
- 18) A building 210 feet tall casts a 60 foot long shadow. If a person looks down from the top of the building, what is the measure of the angle between the end of the shadow and the vertical side of the building (to the nearest degree)? (Assume the person's eyes are level with the top of the building.)

If s denotes the length of the arc of a circle of radius r subtended by a central angle θ , find the missing quantity. Round to one decimal place, if necessary.

19) $r = 12.17$ centimeters, $\theta = 1.8$ radians, $s = ?$

Solve the problem.

- 20) For a circle of radius 4 feet, find the arc length s subtended by a central angle of 60° . Round to the nearest hundredth.

- 21) A photographer points a camera at a window in a nearby building forming an angle of 42° with the camera platform. If the camera is 52 m from the building, how high above the platform is the window, to the nearest hundredth of a meter?

- 22) A twenty-five foot ladder just reaches the top of a house and forms an angle of 41.5° with the wall of the house. How tall is the house? Round your answer to the nearest 0.1 foot.

- 23) From the edge of a 1000-foot cliff, the angles of depression to two cars in the valley below are 21° and 28° . How far apart are the cars? Round your answers to the nearest 0.1 ft.

- 24) For what numbers x , $0 \leq x \leq 2\pi$, does $\sin x = 0$?

- 25) For what numbers x , $0 \leq x \leq 2\pi$, does $\sin x = 1$?

- 26) For what numbers x , $0 \leq x \leq 2\pi$, does $\sin x = -1$?

- 27) What is the y -intercept of $y = \sin x$?

- 28) For what numbers x , $0 \leq x \leq 2\pi$, does $\cos x = 0$?

- 29) For what numbers x , $0 \leq x \leq 2\pi$, does $\cos x = 1$?

- 30) For what numbers x , $-2\pi \leq x \leq 2\pi$, does the graph of $y = \tan x$ have vertical asymptotes.?

Determine the amplitude, period, and any shifts.

31) $y = 3 \sin\left(\frac{1}{2}x\right)$

32) $y = \frac{7}{6} \sin\left(-\frac{6\pi}{5}x\right)$

33) $y = \frac{5}{8} \cos\left(-\frac{8\pi}{3}x\right)$

34) $y = 5 \cos\left(\frac{1}{4}x\right)$

35) $y = 4 \sin(3x)$

Find (i) the amplitude, (ii) the period, and (iii) the horizontal shift.

$$36) y = -\frac{1}{2} \sin(4x + 3\pi)$$

$$37) y = -\frac{1}{2} \cos(2x - 2\pi)$$

Find the amplitude, period, and any shifts.

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

$$39) y = -4 \sin\left(3x + \frac{\pi}{2}\right)$$

$$40) y = -2 \cos(4x - \pi)$$

$$41) y = -3 \sin(4x + \pi)$$

$$42) y = -2 \cos(3\pi x - 3)$$

$$43) y = 5 \sin(2\pi x + 3)$$

Find the amplitude, period, and any shifts.

$$44) y = 5 \sin\left(8x + \frac{\pi}{2}\right)$$

$$45) y = 5 \cos\left(3x + \frac{\pi}{2}\right)$$

$$46) y = -5 \sin\left(\frac{1}{2}x - \frac{\pi}{2}\right)$$

$$47) y = -2 \cos\left(\frac{1}{3}x + \frac{\pi}{3}\right)$$

$$48) y = -4 \sin(6\pi x + 4)$$

$$49) y = -4 \cos(3\pi x + 4)$$

$$50) y = -4 \sin\left(x - \frac{\pi}{4}\right)$$

$$51) y = -4 \cos\left(x + \frac{\pi}{4}\right)$$

$$52) y = 5 \sin\left(2x - \frac{\pi}{2}\right)$$

$$53) y = -5 \cos(8x + \pi)$$

$$54) y = 4 \sin\left(\frac{1}{4}x - \frac{\pi}{4}\right)$$

$$55) y = 5 \cos\left(\frac{1}{2}x + \frac{\pi}{2}\right)$$

$$56) y = 3 \cos(4\pi x + 5)$$

$$57) y = 2 \sin\left(-2x - \frac{\pi}{3}\right)$$

Graph the function.

$$58) y = -\frac{3}{4} \sin\left(x - \frac{\pi}{4}\right)$$

$$59) y = -3 \sin(4\pi x + 2)$$

$$60) y = 3 \sin\left(x + \frac{\pi}{4}\right)$$

Use a vertical shift to graph the function.

$$61) y = -4 \cos\frac{1}{2}x - 2$$

Graph the function.

$$62) y = \frac{2}{3} \sin\left(x + \frac{\pi}{3}\right)$$

Determine vertical and horizontal shifts, and amplitude, then graph the function.

$$63) y = -3 \sin(3x)$$

$$64) y = \sin(\pi x)$$

$$65) y = -3 \sin\left(\frac{1}{2}x\right)$$

$$66) y = 3 \cos x$$

$$67) y = \cos\left(\frac{\pi}{2}x\right)$$

$$68) y = -3 \cos(3x)$$

$$69) y = 4 \cos(4\pi x)$$

$$70) y = -\frac{1}{2} \cos\left(\frac{\pi}{2}x\right)$$

$$71) y = \frac{1}{2} \tan x$$

$$72) y = 3 \tan(2x)$$

$$73) y = 3 \tan\left(\frac{1}{4}x\right)$$

$$74) y = 4 \sin(\pi x)$$

$$75) y = 2 \cos(\pi x)$$

$$76) y = 2 + \sin x$$

$$77) y = \sin x - 2$$

$$78) y = -4 \sin\left(\frac{1}{2}x\right) + 2$$

$$79) y = -2 \cos\left(\frac{1}{2}x\right) + 2$$

$$80) y = 3 \sin(4\pi x + 3)$$

$$81) y = 5 \sin(4x - \pi)$$

$$82) y = 5 \sin(-4x - \pi)$$

$$83) y = 2 \cos\left(4x + \frac{\pi}{2}\right)$$

$$84) y = -2 \sin\left(5x + \frac{\pi}{2}\right)$$

$$85) y = 2 \sin(\pi x + 4)$$

$$86) y = 5 \cos\left(-3x + \frac{\pi}{2}\right)$$

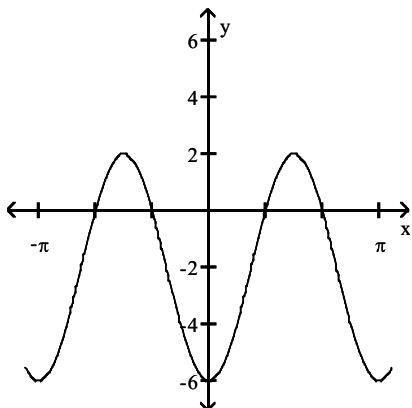
$$87) y = -4 \cos(\pi x + 5)$$

$$88) y = -4 \tan\left(x + \frac{\pi}{4}\right)$$

Answer Key

Testname: EXAM #5 REVIEW WORKSHEET

1)



2) $-\frac{6\sqrt{11}}{11}$

3) $-\frac{9\sqrt{145}}{145}$

4) 0

5) π units to the right

6) 6π

7) $\frac{\pi}{8}$ units to the right

8) $\sin \theta = \frac{5\sqrt{34}}{34}$

9) $\tan \theta = \frac{7}{6}$

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

11) $b = 4.62$

$c = 9.24$

$A = 60^\circ$

12) $c = 8.06$

$A = 29.74^\circ$

$B = 60.26^\circ$

13) $a = 6.24$

$B = 38.68^\circ$

$A = 51.32^\circ$

14) 12 m

15) $\theta = 25.7^\circ$

16) 424.0 ft

17) 44,023 ft

18) 16°

19) 21.9 cm

20) 4.19 ft

21) 46.82 m

22) 18.7 ft

23) 724.4 ft

24) $0, \pi, 2\pi$

Answer Key

Testname: EXAM #5 REVIEW WORKSHEET

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

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

27) 1

28) $\frac{\pi}{2}, \frac{3\pi}{2}$

29) $0, 2\pi$

30) $-\frac{3\pi}{2}, -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{2}$

31) 3

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

33) $\frac{5}{8}$

34) 5

35) 4

36) (i) $\frac{1}{2}$ (ii) $\frac{\pi}{2}$ (iii) $-\frac{3\pi}{4}$

37) (i) $\frac{1}{2}$ (ii) π (iii) π

38) 3

39) 4

40) 2

41) 3

42) 2

43) 5

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

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

46) 4π

47) 6π

48) $\frac{1}{3}$

49) $\frac{2}{3}$

50) $\frac{\pi}{4}$ units to the right

51) $\frac{\pi}{4}$ units to the left

52) $\frac{\pi}{4}$ units to the right

53) $\frac{\pi}{8}$ units to the left

54) π units to the right

55) π units to the left