

Trigonometric Functions

Chapter Test Review

Select the best answer.

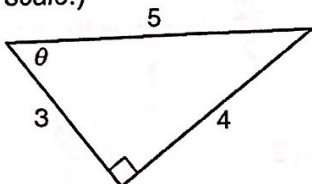
1. The sides of right $\triangle ABC$ have lengths 10 ft, 24 ft, and 26 ft. Which could be the cosine of angle B ?

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

2. A carpenter is making a ramp for a ski jump. The ramp is made from a 25 ft board tilted at a 30° angle from the ground. Approximately how far off the ground is the end of the ramp?

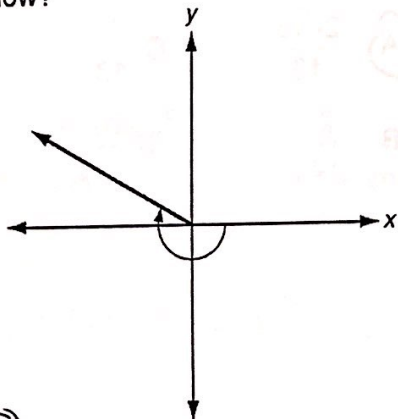
A 11.6 ft
 B 12.5 ft

3. Which is the value of $\cot \theta$? (Picture is not to scale.)



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

4. Which is the angle of rotation shown below?



A -210°
 B -150°

5. Which two angles are both coterminal with $\theta = 90^\circ$?

A 270° and -90° C 0° and 180°
 B 270° and 450° D 450° and -270°

6. When viewed from the side, a nail is located at 90° on a tire. The tire turns counterclockwise through 8.5 complete rotations. What is the new position of the nail in the tire?

A 0° C 180°
 B 90° D 270°

7. What is the reference angle for $\theta = 165^\circ$?

A 15°
 B 65°

8. A circular baggage return has a diameter of 40 ft. A piece of luggage makes 3 revolutions in 12 minutes. Approximately how far does one piece of luggage travel in 1 minute?

A 10 ft C 62 ft
 B 31 ft D 93 ft

9. Which angle measure is closest to 8 radians?

A 100° C 150°
 B 120° D 360°

10. The sine of θ is $\frac{1}{2}$ and the cosine

of θ is $-\frac{\sqrt{3}}{2}$. Which is the cotangent of θ ?

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

11. The point $(3, -4)$ is on the terminal side of θ in standard position. Which is the sine of θ ?

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

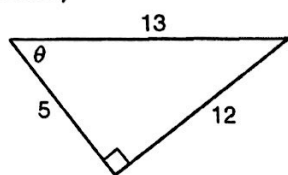
12. The sides of right $\triangle ABC$ have lengths 12 ft, 16 ft, and 20 ft. Which could be the cosine of angle C?

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

13. A camper creates a make-shift tent by leaning a branch against a tree and draping a tarp over it. The roof is constructed from a 15 ft branch that makes a 15° angle with the ground. Approximately how tall is the tent at its highest point?

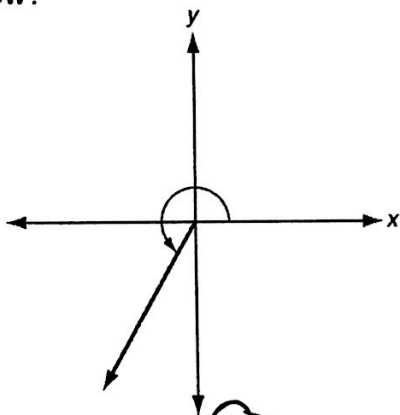
F 3.89 ft H 14.49 ft
 G 4.02 ft J 15.56 ft

14. What is the value of $\csc \theta$? (Picture is not to scale.)



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

15. What is the angle of rotation shown below?



F -30° H 240°
 G -120° J 330°

16. Which two angles are both coterminal with $\theta = 50^\circ$?

A 230° and -130° C -130° and -310°
 B 230° and 410° D 410° and -310°

17. What is the reference angle for $\theta = 210^\circ$?

A 30° C 120°
 B 60° D 150°

18. A Ferris wheel has a diameter of 100 ft. The passengers ride in cars that make 5 revolutions in 7.5 minutes. Approximately how far does a car on the Ferris wheel travel in 1 minute?

F 209 ft H 471 ft
 G 418 ft J 942 ft

19. Which angle measure is closest to 4.7 radians?

D A 90° C 180°
 B 135° D 270°

20. The tangent of θ is -1 and the cosine of θ is $-\frac{\sqrt{2}}{2}$. Which is the cosecant of θ ?

F $-\sqrt{2}$ H $\frac{\sqrt{2}}{2}$
 G $-\frac{\sqrt{2}}{2}$ J $\sqrt{2}$

21. The point $(-4, 6)$ is on the terminal side of θ in standard position. Which is the cosine of θ ?

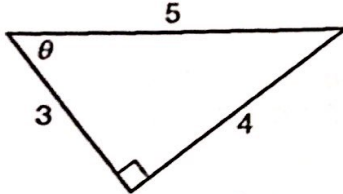
A $-\frac{2\sqrt{13}}{13}$ C $\frac{2}{13}$
 B $-\frac{2}{13}$ D $\frac{2\sqrt{13}}{13}$

Open Ended

22. A truck drives 11.5 feet up an incline to a loading dock. The incline makes a 10° angle with the parking lot. Find the approximate vertical height of the incline. Round your answer to the nearest foot.

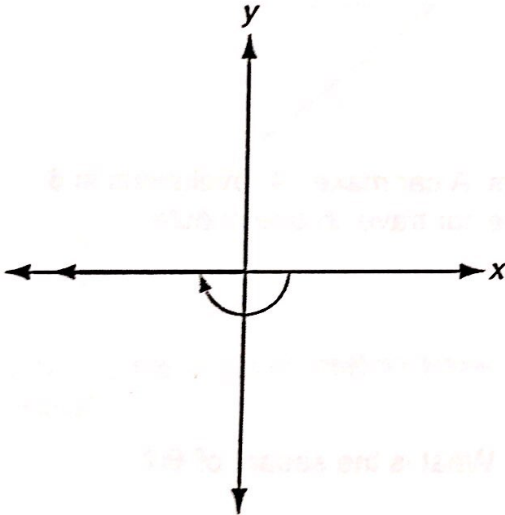
2 ft

23. What is the value of $\sec \theta$? (Picture is not to scale.)



$5/3$

24. What is the angle of rotation shown below?



-180°

25. What are the smallest positive and the largest negative angles that are coterminal with $\theta = 90^\circ$?

$450^\circ + -270^\circ$

26. The indicator on a circular volume knob is located at 100° . Becky hears a song that she liked and turns the knob clockwise through 2.5 rotations. What is the new position of the indicator on the volume knob?

-80° or 280°

27. What is the reference angle for $\theta = 200^\circ$?

20°

28. A circular plate has a diameter of 10 inches. An ant walking along the edge makes 2 revolutions in 4 minutes. Approximately how many inches does the ant travel in one minute? Round your answer to the nearest tenth of an inch.

15.7 in

29. Convert $\frac{\pi}{4}$ radians to the nearest degree.

45°

30. The tangent of θ is 1 and the cosine of θ is $-\frac{\sqrt{2}}{2}$. What is the cosecant of θ ?

$-\sqrt{2}$

31. The point $(-6, 8)$ is on the terminal side of θ in standard position. What is the cosine of θ ?

$-3/5$

32. A business is adding a wheelchair ramp to its front entrance. The ramp will be 12.5 feet long and makes a 5° angle with the sidewalk. Find the approximate vertical distance from the sidewalk to the front entrance. Round your answer to the nearest tenth of a foot.

1.1 ft

33. What are the smallest positive and the largest negative angles that are coterminal with $\theta = 65^\circ$?

425° and -295°

34. The indicator on a circular volume knob is located at 170° . Venuta likes a song that comes on the radio and turns the knob clockwise through 4.75 rotations. What is the new position of the indicator on the volume knob?

skip

35. What is the reference angle for $\theta = 235^\circ$?

55°

36. A circular race track has a diameter of 1200 meters. A car makes 4 revolutions in 6 minutes. Approximately how many meters does the car travel in one minute? Round your answer to the nearest meter.

2514 m

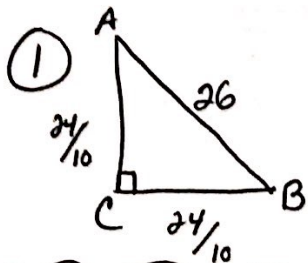
37. The tangent of θ is $\sqrt{3}$ and the sine of θ is $-\frac{\sqrt{3}}{2}$. What is the secant of θ ?

$-\frac{2}{3}$

38. The point $(-12, 16)$ is on the terminal side of θ in standard position. What is the cosine of θ ?

$-\frac{3}{5}$

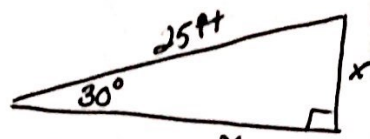
Ch. 10 Review Key



$$\cos B = \frac{24}{26} = \frac{12}{13}$$

$$\cos B = \frac{10}{26} = \frac{5}{13}$$

(2)



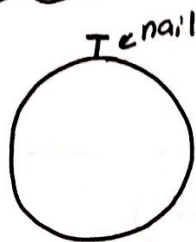
$$\sin 30 = \frac{x}{25}$$

$$\frac{1}{2} = \frac{x}{25}$$

$$x = 12.5 \text{ ft}$$

(3) $\tan \theta = \frac{4}{3}$
 $\cot \theta = \frac{3}{4}$

(6)



(5) $\theta = 90^\circ$
 $90^\circ + 360^\circ = 450^\circ$
 $90^\circ - 360^\circ = -270^\circ$

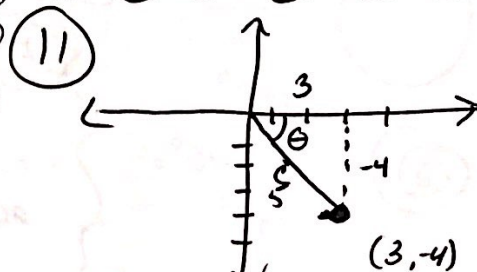


(8) $r = \frac{40}{2} = 20 \text{ ft}$
 $\theta = \frac{(3 \text{ revolutions})(2\pi)}{(12 \text{ min})} \approx 1.57 \text{ rad.}$

$s = \theta \cdot r$
 $s = (1.57)(20) = 31.4$

(9) $(8) \left(\frac{180}{\pi} \right) \approx 459^\circ$

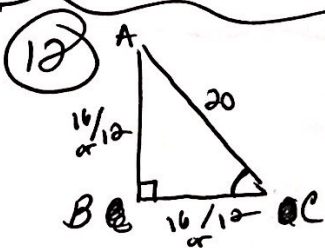
(10) $\sin \theta = \frac{1}{2} = y$
 $\cos \theta = \frac{-\sqrt{3}}{2} = x$
 $\cot \theta = \frac{x}{y} = \frac{-\sqrt{3}}{\frac{1}{2}} = \frac{-\sqrt{3}}{\frac{1}{2}} \cdot \frac{2}{1} = -\sqrt{3}$



$$(3)^2 + (-4)^2 = c^2$$

$$c = 5$$

$$\sin \theta = \frac{-4}{5}$$



$$\cos C = \frac{16}{20} = \frac{4}{5}$$

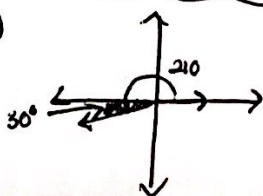
$$\cos C = \frac{12}{20} = \frac{3}{5}$$

(13) Right triangle with hypotenuse 15, angle 15 degrees, and side x.
 $\sin 15^\circ = \frac{x}{15}$
 $x = 3.89 \text{ ft}$

(14) $\sin \theta = \frac{12}{13}$
 $\csc \theta = \frac{13}{12}$

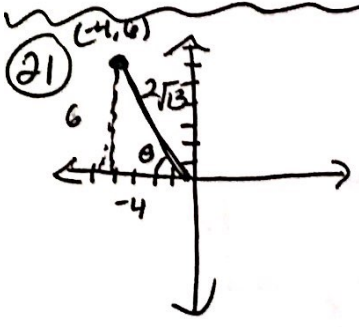
(16) $\theta = 50^\circ$
 $50^\circ + 360^\circ = 410^\circ$
 $50^\circ - 360^\circ = -310^\circ$

(17)



(18) $r = \frac{100}{2} = 50 \text{ ft}$
 $\theta = \frac{(5 \text{ rev})(2\pi)}{(7.5)} = 4.18$
 $s = r \cdot \theta \Rightarrow s = (50)(4.18) = 209 \text{ ft}$

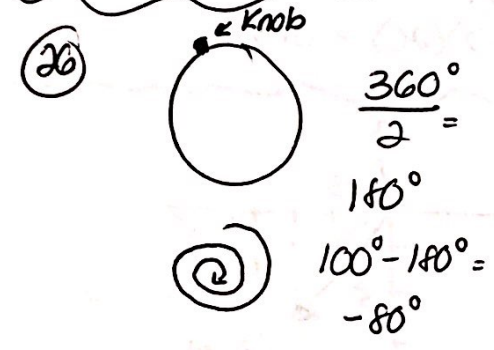
19) $(4.7) \left(\frac{180}{\pi}\right) \approx 270^\circ$



$(-4)^2 + (6)^2 = c^2$
 $52 = c^2$
 $c = \sqrt{52} = 2\sqrt{13}$

$\cos \theta = \frac{-4}{2\sqrt{13}} = \frac{-2}{\sqrt{13}} = \frac{-2\sqrt{13}}{13}$

23) $\cos \theta = \frac{3}{5}$
 $\sec \theta = \frac{5}{3}$

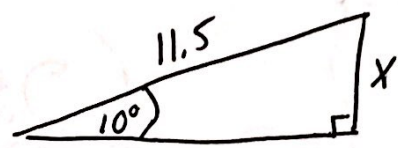


28) $r = \frac{10}{2} = 5 \text{ in}$
 $\theta = \frac{(2)(2\pi)}{4} = \pi \approx 3.14$
 $s = r \cdot \theta \Rightarrow s = (5)(3.14) \approx 15.7$

20) $\tan \theta = -1 = \frac{y}{x}$
 $\cos \theta = \frac{-\sqrt{2}}{2} = x$
 $\csc \theta = \frac{1}{\sin \theta}$

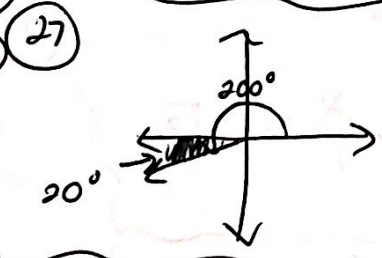
~~20) =~~
 $\tan \theta = \frac{\sin \theta = y}{\cos \theta = x} =$
 $\left(\frac{-\sqrt{2}}{2}\right)_{-1} = \frac{\sin \theta}{\left(\frac{-\sqrt{2}}{2}\right)}$
 $\frac{\sqrt{2}}{2} = \sin \theta$
 $\csc \theta = \frac{2}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = \sqrt{2}$

22)



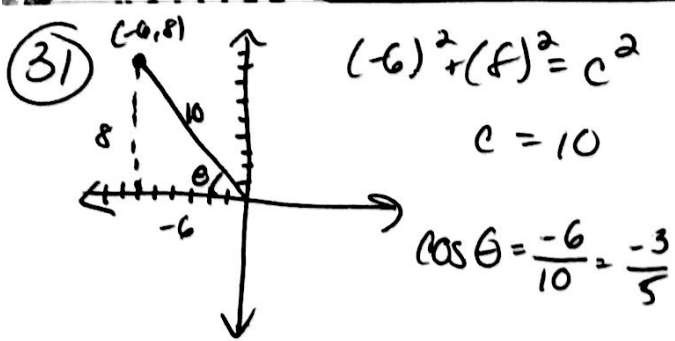
$\sin 10^\circ = \frac{x}{11.5}$
 $x = 1.99 \approx 2 \text{ ft}$

25) $\theta = 90^\circ$
 $90^\circ + 360^\circ = 450^\circ$
 $90^\circ - 360^\circ = -270^\circ$

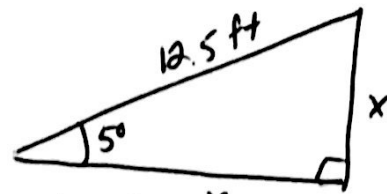


29) $\left(\frac{\pi}{4}\right) \left(\frac{180}{\pi}\right) = 45^\circ$

30) $\tan \theta = 1 = \frac{y}{x}$ $1 = \frac{\sin \theta = y}{\cos \theta = x}$ $\csc \theta = \frac{1}{\sin \theta}$
 $\cos \theta = \frac{-\sqrt{2}}{2} = x$ $\left(\frac{-\sqrt{2}}{2}\right)_{-1} = \frac{\sin \theta}{\left(\frac{-\sqrt{2}}{2}\right)}$ $\csc \theta = \frac{2}{-\sqrt{2}} = \frac{2\sqrt{2}}{-2} = -\sqrt{2}$
 $\csc \theta = \frac{1}{\sin \theta}$ $-\frac{\sqrt{2}}{2} = \sin \theta$



32)



$$\sin 5^\circ = \frac{x}{12.5}$$

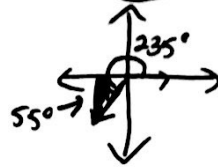
$$x = 1.09 \approx 1.1 \text{ ft}$$

33) $\theta = 65^\circ$

$$65^\circ + 360^\circ = 425^\circ$$

$$65^\circ - 360^\circ = -295^\circ$$

34)



36) $r = \frac{1200}{2} = 600 \text{ m}$

$$\theta = \frac{(4)(2\pi)}{6} = 4.19$$

$$s = \theta \cdot r \Rightarrow s = (600)(4.19) \approx 2514 \text{ m}$$

37)

$$\tan \theta = \sqrt{3} = \frac{y}{x}$$

$$\sin \theta = \frac{-\sqrt{3}}{2} = \frac{y}{r}$$

$$\sec \theta = \frac{1}{\cos \theta}$$

$$\sqrt{3} = \frac{(-\frac{\sqrt{3}}{2})}{\cos \theta}$$

$$(\cos \theta) \cdot (\sqrt{3}) = \frac{(-\frac{\sqrt{3}}{2})}{\cos \theta} (\cos \theta)$$

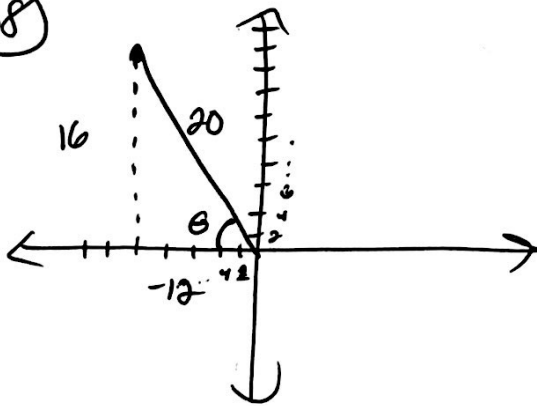
$$\frac{(\sqrt{3})(\cos \theta)}{\sqrt{3}} = \frac{-\frac{\sqrt{3}}{2}}{\sqrt{3}}$$

$$\cos \theta = \frac{-\sqrt{3}}{2} \cdot \frac{\sqrt{3}}{1} = -\frac{3}{2}$$

$$\cos \theta = -\frac{3}{2}$$

$$\sec \theta = -\frac{2}{3}$$

38)



$$(-12)^2 + (16)^2 = c^2$$

$$144 + 256 = 400$$

$$c = 20$$

$$\cos \theta = \frac{-12}{20} = -\frac{3}{5}$$