

Exam

Name _____

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

Solve the problem.

- 1) Radio direction finders are set up at points A and B, 8.68 mi apart on an east-west line. From A it is found that the bearing of a signal from a transmitter is $N 54.3^\circ E$, while from B it is $N 35.7^\circ W$. Find the distance of the transmitter from B, to the nearest hundredth of a mile. 1) _____
- A) 4.57 mi B) 7.05 mi C) 5.07 mi D) 7.55 mi

Answer: C

Explanation: A)
 B)
 C)
 D)

Find the reference angle for the given angle.

- 2) 129° 2) _____
- A) 51° B) 49° C) 39° D) 61°

Answer: A

Explanation: A)
 B)
 C)
 D)

- 3) -403° 3) _____
- A) 47° B) 137° C) 43° D) 133°

Answer: C

Explanation: A)
 B)
 C)
 D)

The number represents an approximate measurement. State the range represented by the measurement.

- 4) 21 ft 4) _____
- A) 20.5 ft to 21.5 ft B) 20.75 ft to 21.25 ft
C) 20.9 ft to 21.1 ft D) 20 ft to 22 ft

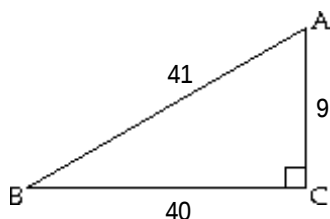
Answer: A

Explanation: A)
 B)
 C)
 D)

Evaluate the function requested. Write your answer as a fraction in lowest terms.

5)

5) _____



Find $\cos B$.

A) $\cos B = \frac{9}{40}$

B) $\cos B = \frac{40}{41}$

C) $\cos B = \frac{9}{41}$

D) $\cos B = \frac{41}{40}$

Answer: B

Explanation: A)
B)
C)
D)

Find all values of θ , if θ is in the interval $[0, 360^\circ)$ and has the given function value.

6) $\tan \theta = 1$

A) 45° and 225°

B) 135° and 225°

C) 45° and 315°

D) 225° and 315°

6) _____

Answer: A

Explanation: A)
B)
C)
D)

Solve the problem.

- 7) From the top of a vertical tower, 319 feet above the the surface of the earth, the angle of depression to a doghouse is $23^\circ 3'$. How far is it from the doghouse to the foot of the tower? Round your answer to the hundredths place when necessary.

A) 749.7 ft

B) 852.3 ft

C) 734.11 ft

D) 762.1 ft

7) _____

Answer: A

Explanation: A)
B)
C)
D)

Find the sign of the following.

8) $\sin \frac{\theta}{2}$, given that θ is in the interval $(180^\circ, 270^\circ)$.

A) positive

B) negative

8) _____

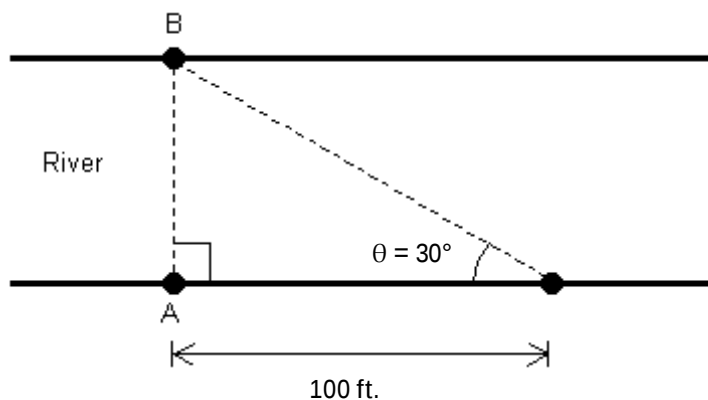
Answer: A

Explanation: A)
B)

Solve the problem.

- 9) 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 100 feet downstream and sights point B on the opposite bank to determine that $\theta = 30^\circ$ (see figure). How wide is the river (round to the nearest foot)?

9) _____



A) 115 ft

B) 173 ft

C) 50 ft

D) 58 ft

Answer: D

Explanation:

- A)
- B)
- C)
- D)

Without using a calculator, give the exact trigonometric function value with rational denominator.

10) $\cos 30^\circ$

10) _____

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

B) $\sqrt{3}$

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

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

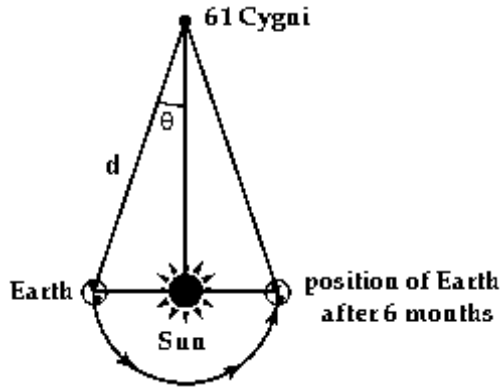
Answer: D

Explanation:

- A)
- B)
- C)
- D)

Solve the problem.

- 11) In 1838, the German mathematician and astronomer Friedrich Wilhelm Bessel was the first person to calculate the distance to a star other than the Sun. He accomplished this by first determining the parallax of the star, 61 Cygni, at 0.314 arc seconds (Parallax is the change in position of the star measured against background stars as Earth orbits the Sun. See illustration.) If the distance from Earth to the Sun is about 150,000,000 km and $\theta = 0.314 \text{ seconds} = \frac{0.314}{60} \text{ minutes} = \frac{0.314}{60 \cdot 60} \text{ degrees}$, determine the distance d from Earth to 61 Cygni using Bessel's figures. Express the answer in scientific notation.



- A) $1.97 \times 10^{14} \text{ km}$ B) $1.05 \times 10^{14} \text{ km}$ C) $2.28 \times 10^{13} \text{ km}$ D) $9.85 \times 10^{13} \text{ km}$

Answer: D

Explanation: A)
B)
C)
D)

Without using a calculator, give the exact trigonometric function value with rational denominator.

- 12) $\tan 60^\circ$

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

Answer: B

Explanation: A)
B)
C)
D)

Solve the problem.

- 13) When sitting atop a tree and looking down at his pal Joey, the angle of depression of Mack's line of sight is $51^\circ 11'$. If Joey is known to be standing 32 feet from the base of the tree, how tall is the tree (to the nearest foot)?

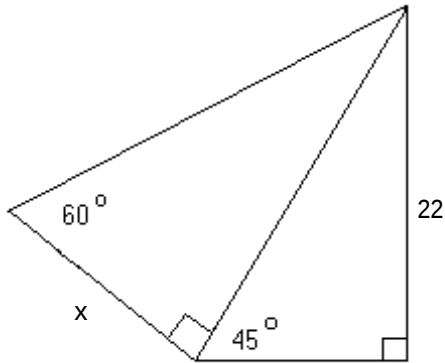
- A) 40 ft B) 46 ft C) 44 ft D) 42 ft

Answer: A

Explanation: A)
B)
C)
D)

14) Find the exact value of x in the figure.

14) _____



A) $11\sqrt{6}$

B) $\frac{22\sqrt{3}}{3}$

C) $11\sqrt{3}$

D) $\frac{22\sqrt{6}}{3}$

Answer: D

Explanation: A)
B)
C)
D)

Suppose ABC is a right triangle with sides of lengths a , b , and c and right angle at C . Find the unknown side length using the Pythagorean theorem and then find the value of the indicated trigonometric function of the given angle. Rationalize the denominator if applicable.

15) Find $\cos A$ when $a = \sqrt{7}$ and $c = 6$.

15) _____

A) $\frac{7}{6}$

B) $\frac{29}{7}$

C) $\frac{\sqrt{29}}{6}$

D) $\frac{\sqrt{7}}{6}$

Answer: C

Explanation: A)
B)
C)
D)

Find the exact value of the expression.

16) $\csc 330^\circ$

16) _____

A) -2

B) 2

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

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

Answer: A

Explanation: A)
B)
C)
D)

Use a calculator to find the function value. Give your answer rounded to seven decimal places, if necessary.

17) $\sin 304^\circ 53'$

A) -0.8103183

B) -0.8203183

C) -0.8213183

D) -0.8303183

17) _____

Answer: B

Explanation: A)

B)

C)

D)

Solve the problem.

- 18) From a boat on the lake, the angle of elevation to the top of a cliff is $13^\circ 11'$. If the base of the cliff is 1683 feet from the boat, how high is the cliff (to the nearest foot)?

18) _____

A) 394 ft

B) 407 ft

C) 397 ft

D) 404 ft

Answer: A

Explanation: A)

B)

C)

D)

- 19) A fire is sighted due west of lookout A. The bearing of the fire from lookout B, 14.1 miles due south of A, is $N 32^\circ 57' W$. How far is the fire from B (to the nearest tenth of a mile)?

19) _____

A) 18.8 mi

B) 19.8 mi

C) 16.8 mi

D) 17.8 mi

Answer: C

Explanation: A)

B)

C)

D)

Find the reference angle for the given angle.

20) 39°

A) 51°

B) 39°

C) 129°

D) 141°

20) _____

Answer: B

Explanation: A)

B)

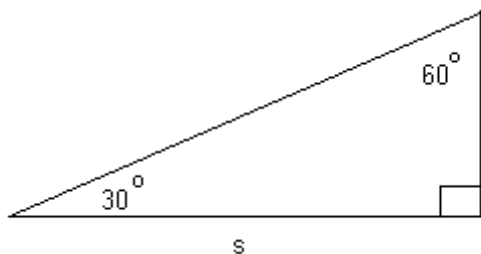
C)

D)

Solve the problem.

21) Find a formula for the area of the figure in terms of s .

21) _____



A) $\frac{\sqrt{3}}{6} s^2$

B) $\sqrt{6} s^2$

C) $\frac{\sqrt{6}}{4} s^2$

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

Answer: A

Explanation: A)
B)
C)
D)

22) A ship travels 82 km on a bearing of 24° , and then travels on a bearing of 114° for 162 km. Find the distance from the starting point to the end of the trip, to the nearest kilometer.

22) _____

A) 244 km

B) 33 km

C) 182 km

D) 75 km

Answer: C

Explanation: A)
B)
C)
D)

Find the exact value of the expression.

23) $\cos 210^\circ$

23) _____

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

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

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

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

Answer: A

Explanation: A)
B)
C)
D)

Find all values of θ , if θ is in the interval $[0, 360^\circ)$ and has the given function value.

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

24) _____

A) 60° and 300°

B) 210° and 330°

C) 150° and 210°

D) 60° and 120°

Answer: B

Explanation: A)
B)
C)
D)

Without using a calculator, give the exact trigonometric function value with rational denominator.

25) $\sec 30^\circ$

25) _____

A) 1

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

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

D) $\sqrt{2}$

Answer: C

Explanation: A)
B)
C)
D)

26) $\sin 60^\circ$

26) _____

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

B) $\sqrt{3}$

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

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

Answer: C

Explanation: A)
B)
C)
D)

Find all values of θ , if θ is in the interval $[0, 360^\circ)$ and has the given function value.

27) $\cos \theta = \frac{1}{2}$

27) _____

A) 60° and 120°

B) 60° and 300°

C) 150° and 210°

D) 210° and 330°

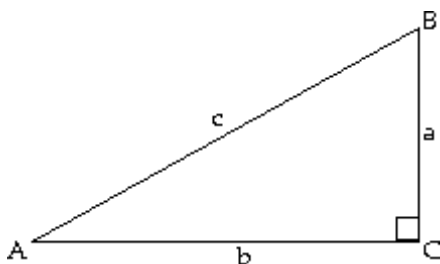
Answer: B

Explanation: A)
B)
C)
D)

Solve the right triangle. If two sides are given, give angles in degrees and minutes.

28)

28) _____



$a = 50.26$ ft, $c = 231$ ft

Round the missing side length to two decimal places.

A) $A = 13^\circ 34'$, $B = 76^\circ 26'$, $b = 225.47$ ft

B) $A = 10^\circ 34'$, $B = 79^\circ 26'$, $b = 236.74$ ft

C) $A = 12^\circ 34'$, $B = 77^\circ 26'$, $b = 209.69$ ft

D) $A = 12^\circ 34'$; $B = 77^\circ 26'$; $b = 225.47$ ft

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

- 29) An airplane travels at 165 km/h for 3 hr in a direction of 174° from a local airport. At the end of this time, how far east of the airport is the plane (to the nearest kilometer)? 29) _____

A) 4736 km B) 492 km C) 4710 km D) 52 km

Answer: D

Explanation: A)
B)
C)
D)

- 30) Snell's Law states that $\frac{c_1}{c_2} = \frac{\sin \theta_1}{\sin \theta_2}$. Use this law to find the requested value. If $c_1 = 7 \times 10^7$, 30) _____

$\theta_1 = 48^\circ$, and $\theta_2 = 33^\circ$, find c_2 .

A) $c_2 = 4.89 \times 10^9$ B) $c_2 = 5.13 \times 10^6$ C) $c_2 = 5.66 \times 10^7$ D) $c_2 = 5.13 \times 10^7$

Answer: D

Explanation: A)
B)
C)
D)

Evaluate.

- 31) $2 \cot^2 270^\circ + 2 \sec^2 0^\circ - \csc^2 225^\circ$ 31) _____

A) 0 B) $\frac{3}{2}$ C) 4 D) $\frac{5}{2}$

Answer: A

Explanation: A)
B)
C)
D)

Write the function in terms of its cofunction. Assume that any angle in which an unknown appears is an acute angle.

- 32) $\tan(\theta + 22^\circ)$ 32) _____

A) $\cot(68^\circ - \theta)$ B) $\cot(112^\circ - \theta)$ C) $\cot(158^\circ - \theta)$ D) $\tan(68^\circ - \theta)$

Answer: A

Explanation: A)
B)
C)
D)

Evaluate.

- 33) $2 \tan^2 120^\circ + 2 \sin^2 150^\circ - \cos^2 0^\circ$ 33) _____

A) $-\frac{15}{2}$ B) $\frac{11}{2}$ C) $\frac{9}{2}$ D) $\frac{15}{2}$

Answer: B

Explanation: A)
B)
C)
D)

Find the exact value of the expression.

34) $\sec 3105^\circ$

34) _____

A) $-\sqrt{2}$

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

C) 2

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

Answer: A

Explanation: A)
B)
C)
D)

Find the sign of the following.

35) $\sec(-\theta)$, given that θ is in the interval $(180^\circ, 270^\circ)$.

35) _____

A) positive

B) negative

Answer: B

Explanation: A)
B)

Find a value of θ in $[0^\circ, 90^\circ]$ that satisfies the statement. Leave answer in decimal degrees rounded to seven decimal places, if necessary.

36) $\sec \theta = 2.7259498$

36) _____

A) 21.5211475°

B) 68.4788525°

C) 54.5922708°

D) 20.1452902°

Answer: B

Explanation: A)
B)
C)
D)

Decide whether the statement is true or false.

37) $\tan 23^\circ < \tan 4^\circ$

37) _____

A) True

B) False

Answer: B

Explanation: A)
B)

Determine whether the statement is true or false.

38) $\cos 195^\circ = 2 \cos 225^\circ \cos 30^\circ + 2 \sin 225^\circ \sin 30^\circ$

38) _____

A) True

B) False

Answer: B

Explanation: A)
B)

Find a solution for the equation. Assume that all angles are acute angles.

39) $\sin(2\beta + 5^\circ) = \cos(3\beta - 25^\circ)$

39) _____

A) 23°

B) 21.5°

C) 22°

D) 24°

Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

- 40) Bob is driving along a straight and level road straight toward a mountain. At some point on his trip he measures the angle of elevation to the top of the mountain and finds it to be $21^\circ 32'$. He then drives 1 mile (1 mile = 5280 ft) more and measures the angle of elevation to be $35^\circ 7'$. Find the height of the mountain to the nearest foot. 40) _____

A) 4847 ft B) 47,467 ft C) 474,672 ft D) 4747 ft

Answer: D

Explanation: A)
B)
C)
D)

Determine whether the statement is true or false.

- 41) $\sin 60^\circ = 2 \sin 30^\circ$ 41) _____

A) True B) False

Answer: B

Explanation: A)
B)

Solve the problem.

- 42) The grade resistance F of a car traveling up or down a hill is modeled by the equation $F = W \sin \theta$, where W is the weight of the car and θ is the angle of the hill's grade ($\theta > 0$ for uphill travel, $\theta < 0$ for downhill travel). Find the weight of the car (to the nearest pound) that is traveling on a -2.2° downhill grade and which has a grade resistance of -153.55 lb. 42) _____

A) 4300 lb B) 4100 lb C) 3800 lb D) 4000 lb

Answer: D

Explanation: A)
B)
C)
D)

Solve the right triangle.

- 43) $a = 2.6$ cm, $b = 1.3$ cm, $C = 90^\circ$ 43) _____

Round values to one decimal place.

A) $A = 63.4^\circ$, $B = 26.6^\circ$, $c = 2.9$ cm B) $A = 30.0^\circ$, $B = 60.0^\circ$, $c = 3.9$ cm
C) $A = 26.6^\circ$, $B = 63.4^\circ$, $c = 2.9$ cm D) $A = 58.9^\circ$, $B = 31.1^\circ$, $c = 2.9$ cm

Answer: A

Explanation: A)
B)
C)
D)

Find the exact value of the expression.

- 44) $\cot(-1575^\circ)$ 44) _____

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

Answer: D

Explanation: A)
B)
C)
D)

Use a calculator to decide whether the statement is true or false.

45) $\sin(2 \cdot 30^\circ) = 2 \cdot \sin 30^\circ$

45) _____

A) True

B) False

Answer: B

Explanation: A)
B)

Without using a calculator, give the exact trigonometric function value with rational denominator.

46) $\csc 45^\circ$

46) _____

A) 1

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

C) $\sqrt{2}$

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

Answer: C

Explanation: A)
B)
C)
D)

Decide whether the statement is true or false.

47) $\sin 86^\circ > \sin 24^\circ$

47) _____

A) True

B) False

Answer: A

Explanation: A)
B)

Solve the problem.

48) From a boat on the river below a dam, the angle of elevation to the top of the dam is $14^\circ 57'$. If the dam is 1286 feet above the level of the river, how far is the boat from the base of the dam (to the nearest foot)?

48) _____

A) 4816 ft

B) 4796 ft

C) 4806 ft

D) 4786 ft

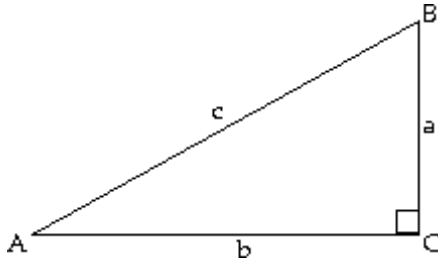
Answer: A

Explanation: A)
B)
C)
D)

Solve the right triangle. If two sides are given, give angles in degrees and minutes.

49)

49) _____



$$B = 53^\circ 47', b = 25 \text{ km}$$

Round side lengths to one decimal place.

A) $A = 36^\circ 13'; c = 42.3 \text{ km}; a = 18.3 \text{ km}$

B) $A = 36^\circ 13'; c = 31.0 \text{ km}; a = 18.3 \text{ km}$

C) $A = 36^\circ 13'; c = 42.3 \text{ km}; a = 31.0 \text{ km}$

D) $A = 36^\circ 13'; c = 31.1 \text{ km}; a = 42.0 \text{ km}$

Answer: B

Explanation: A)
B)
C)
D)

Suppose ABC is a right triangle with sides of lengths a, b, and c and right angle at C. Find the unknown side length using the Pythagorean theorem and then find the value of the indicated trigonometric function of the given angle. Rationalize the denominator if applicable.

50) Find $\csc B$ when $a = 6$ and $b = 7$.

50) _____

A) $\frac{\sqrt{85}}{7}$

B) $\frac{7\sqrt{85}}{85}$

C) $\frac{\sqrt{85}}{6}$

D) $\frac{6\sqrt{85}}{85}$

Answer: A

Explanation: A)
B)
C)
D)

Use a calculator to find the function value. Give your answer rounded to seven decimal places, if necessary.

51) $2 \sin 44^\circ 14' \cos 44^\circ 14' - \sin 88^\circ 28'$

51) _____

A) 1

B) 0

C) 2

D) -1

Answer: B

Explanation: A)
B)
C)
D)

Solve the problem.

52) The angle of elevation from a point on the ground to the top of a tower is $39^\circ 16'$. The angle of elevation from a point 114 feet farther back from the tower is $24^\circ 38'$. Find the height of the tower. Round to the nearest foot.

52) _____

A) 130 ft

B) 115 ft

C) 119 ft

D) 1190 ft

Answer: C

Explanation: A)
B)
C)
D)

The number represents an approximate measurement. State the range represented by the measurement.

53) 17.3 m

A) 17.29 m to 17.31 m

B) 17.275 m to 17.325 m

C) 17.25 m to 17.35 m

D) 16.3 m to 18.3 m

53) _____

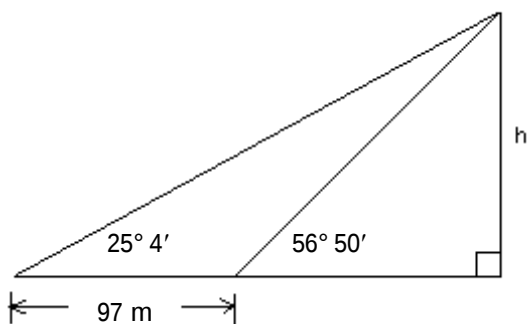
Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

54) Find h as indicated in the figure. Round to the nearest meter.

54) _____



A) 165 m

B) 50 m

C) 86 m

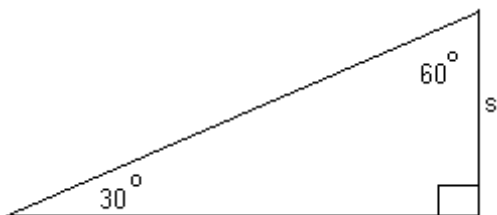
D) 65 m

Answer: D

Explanation: A)
B)
C)
D)

55) Find a formula for the area of the figure in terms of s .

55) _____



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

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

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

D) $\frac{\sqrt{3}}{6} s^2$

Answer: B

Explanation: A)
B)
C)
D)

Find a solution for the equation. Assume that all angles are acute angles.

56) $\sec(\theta + 12^\circ) = \csc(2\theta + 15^\circ)$

A) 23.5°

B) 19°

C) 15°

D) 21°

56) _____

Answer: D

Explanation: A)

B)

C)

D)

Find all values of θ , if θ is in the interval $[0, 360^\circ)$ and has the given function value.

57) $\sec \theta$ is undefined

A) 0°

B) 0° and 180°

C) 90°

D) 90° and 270°

57) _____

Answer: D

Explanation: A)

B)

C)

D)

Determine whether the statement is true or false.

58) $\cos 60^\circ = 1 - 2 \sin^2 30^\circ$

A) True

B) False

58) _____

Answer: A

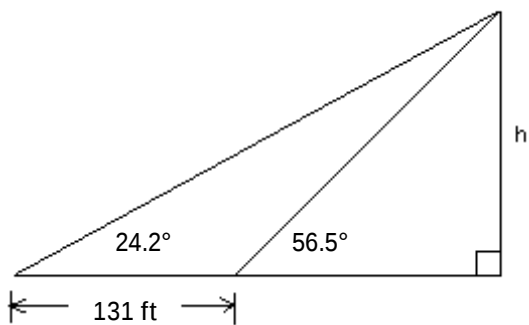
Explanation: A)

B)

Solve the problem.

59) Find h as indicated in the figure. Round to the nearest foot.

59) _____



A) 89 ft

B) 84 ft

C) 86 ft

D) 80 ft

Answer: B

Explanation: A)

B)

C)

D)

Write the function in terms of its cofunction. Assume that any angle in which an unknown appears is an acute angle.

- 60) $\cot 31.1^\circ$ 60) _____
 A) $\tan 31.1^\circ$ B) $\tan 148.9^\circ$ C) $\cot 58.9^\circ$ D) $\tan 58.9^\circ$

Answer: D

Explanation: A)
 B)
 C)
 D)

Solve the problem.

- 61) From a balloon 1037 feet high, the angle of depression to the ranger headquarters is $58^\circ 41'$. How far is the headquarters from a point on the ground directly below the balloon (to the nearest foot)? 61) _____
 A) 626 ft B) 621 ft C) 636 ft D) 631 ft

Answer: D

Explanation: A)
 B)
 C)
 D)

Find a value of θ in $[0^\circ, 90^\circ]$ that satisfies the statement. Leave answer in decimal degrees rounded to seven decimal places, if necessary.

- 62) $\csc \theta = 1.7437345$ 62) _____
 A) 60.1665137° B) 34.9933809° C) 29.8334863° D) 55.0066191°

Answer: B

Explanation: A)
 B)
 C)
 D)

Solve the right triangle.

- 63) $a = 3.6$ m, $B = 30.3^\circ$, $C = 90^\circ$ 63) _____
 Round values to one decimal place.
 A) $A = 59.7^\circ$, $b = 4.4$ m, $c = 5.7$ m B) $A = 59.7^\circ$, $b = 2.1$ m, $c = 4.2$ m
 C) $A = 59.7^\circ$, $b = 1$ m, $c = 3.7$ m D) $A = 59.7^\circ$, $b = 4.4$ m, $c = 4.2$ m

Answer: B

Explanation: A)
 B)
 C)
 D)

- 64) $A = 19^\circ 17'$, $c = 287$ ft, $C = 90^\circ$ 64) _____
 Round side lengths to two decimal places, if necessary.
 A) $B = 70^\circ 42'$, $a = 97.98$ ft, $b = 272.1$ ft B) $B = 70^\circ 43'$, $a = 94.21$ ft, $b = 270.01$ ft
 C) $B = 71^\circ 42'$, $a = 94.78$ ft, $b = 266.9$ ft D) $B = 70^\circ 43'$, $a = 94.78$ ft, $b = 270.9$ ft

Answer: D

Explanation: A)
 B)
 C)
 D)

An observer for a radar station is located at the origin of a coordinate system. For the point given, find the bearing of an airplane located at that point. Express the bearing using both methods.

65) (0,)

65) _____

- A) 0° ; S 0° W or S 0° E
C) 0° ; N 0° W or N 0° E

- B) 180° ; N 0° W or N 0° E
D) 180° ; S 0° W or S 0° E

Answer: C

Explanation: A)
B)
C)
D)

Suppose ABC is a right triangle with sides of lengths a, b, and c and right angle at C. Find the unknown side length using the Pythagorean theorem and then find the value of the indicated trigonometric function of the given angle. Rationalize the denominator if applicable.

66) Find $\sec B$ when $a = 2$ and $b = 9$.

66) _____

A) $\frac{2\sqrt{85}}{85}$

B) $\frac{9\sqrt{85}}{85}$

C) $\frac{\sqrt{85}}{2}$

D) $\frac{2\sqrt{85}}{9}$

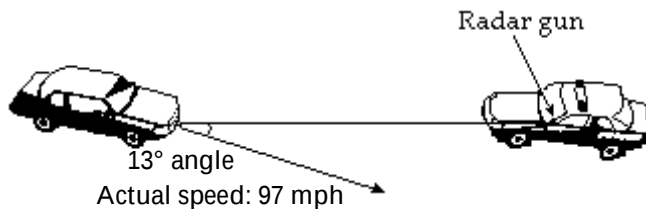
Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

67) Any offset between a stationary radar gun and a moving target creates a "cosine effect" that reduces the radar mileage reading by the cosine of the angle between the gun and the vehicle. That is, the radar speed reading is the product of the actual reading and the cosine of the angle. Find the radar reading to the nearest hundredth for the auto shown in the figure.

67) _____



A) 21.82 mph

B) 97.97 mph

C) 94.51 mph

D) 96.03 mph

Answer: C

Explanation: A)
B)
C)
D)

Find the sign of the following.

68) $\csc(-\theta)$, given that θ is in the interval $(90^\circ, 180^\circ)$.

68) _____

A) positive

B) negative

Answer: B

Explanation: A)
B)

69) $\cos(\theta + 180^\circ)$, given that θ is in the interval $(90^\circ, 180^\circ)$.

A) positive

B) negative

69) _____

Answer: A

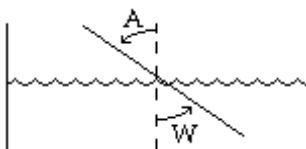
Explanation: A)
B)

Solve the problem.

70) The index of refraction for air, I_a , is 1.0003. The index of refraction for water, I_w , is 1.3. If

70) _____

$\frac{I_w}{I_a} = \frac{\sin A}{\sin W}$, and $A = 31.5^\circ$, find W to the nearest tenth.



A) 22.7°

B) 23.7°

C) 21.7°

D) 20.7°

Answer: B

Explanation: A)
B)
C)
D)

Find a solution for the equation. Assume that all angles are acute angles.

71) $\tan(3\theta + 16^\circ) = \cot(\theta + 4^\circ)$

71) _____

A) 19°

B) 16.5°

C) 17.5°

D) 17°

Answer: C

Explanation: A)
B)
C)
D)

An observer for a radar station is located at the origin of a coordinate system. For the point given, find the bearing of an airplane located at that point. Express the bearing using both methods.

72) $(, -7)$

72) _____

A) 45° ; S 45° E

B) 135° ; S 45° E

C) 45° ; N 45° W

D) 135° ; N 45° W

Answer: B

Explanation: A)
B)
C)
D)

Determine whether the statement is true or false.

73) $\sin 390^\circ = \sin 120^\circ \cos 270^\circ + \cos 120^\circ \sin 270^\circ$

73) _____

A) True

B) False

Answer: A

Explanation: A)
B)

Use a calculator to find the function value. Give your answer rounded to seven decimal places, if necessary.

74) $\cos 39^\circ 5' \cos 50^\circ 55' - \sin 39^\circ 5' \sin 50^\circ 55'$

74) _____

A) 2

B) -1

C) 0

D) 1

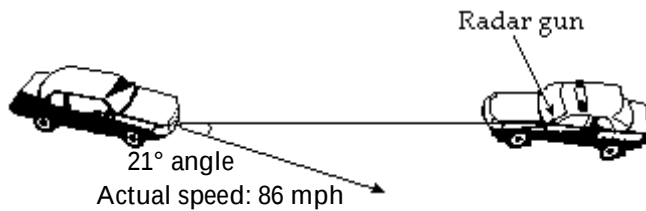
Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

75) Any offset between a stationary radar gun and a moving target creates a "cosine effect" that reduces the radar mileage reading by the cosine of the angle between the gun and the vehicle. That is, the radar speed reading is the product of the actual reading and the cosine of the angle. Find the radar reading to the nearest hundredth for the auto shown in the figure.

75) _____



A) 86.93 mph

B) 80.29 mph

C) 85.07 mph

D) 30.82 mph

Answer: B

Explanation: A)
B)
C)
D)

Find the sign of the following.

76) $\tan \frac{\theta}{2}$, given that θ is in the interval $(90^\circ, 180^\circ)$.

76) _____

A) positive

B) negative

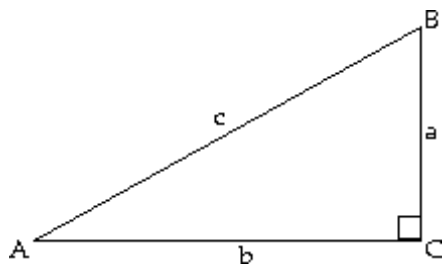
Answer: A

Explanation: A)
B)

Solve the right triangle. If two sides are given, give angles in degrees and minutes.

77)

77) _____



$A = 41.3^\circ$, $b = 2.5$ m

Round side lengths to one decimal place.

A) $B = 48.7^\circ$; $a = 1.1$ m; $c = 4.0$ m

C) $B = 48.7^\circ$; $a = 2.2$ m; $c = 3.3$ m

B) $B = 48.7^\circ$; $a = 4.0$ m; $c = 4.7$ m

D) $B = 48.7^\circ$; $a = 1.1$ m; $c = 2.7$ m

Answer: C

Explanation: A)
B)
C)
D)

Suppose ABC is a right triangle with sides of lengths a , b , and c and right angle at C. Find the unknown side length using the Pythagorean theorem and then find the value of the indicated trigonometric function of the given angle. Rationalize the denominator if applicable.

78) Find $\tan B$ when $b = 8$ and $c = 9$.

78) _____

A) $\frac{\sqrt{17}}{9}$

B) $\frac{8\sqrt{17}}{17}$

C) $\frac{9\sqrt{17}}{17}$

D) $\frac{\sqrt{17}}{8}$

Answer: B

Explanation: A)
B)
C)
D)

Use a calculator to find the function value. Give your answer rounded to seven decimal places, if necessary.

79) $\cos 47^\circ \cos 133^\circ - \sin 47^\circ \sin 133^\circ$

79) _____

A) 2

B) 0

C) 1

D) -1

Answer: D

Explanation: A)
B)
C)
D)

Determine whether the statement is true or false.

80) $\cos 60^\circ = \cos 180^\circ - \cos 120^\circ$

80) _____

A) True

B) False

Answer: B

Explanation: A)
B)

Write the function in terms of its cofunction. Assume that any angle in which an unknown appears is an acute angle.

81) $\sin(\theta + 14^\circ)$

A) $\sin(104^\circ - \theta)$

B) $\cos(104^\circ - \theta)$

C) $\cos(76^\circ - \theta)$

D) $\csc(76^\circ - \theta)$

81) _____

Answer: C

Explanation: A)

B)

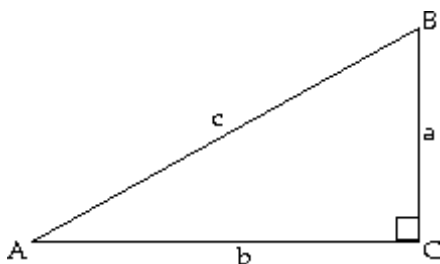
C)

D)

Solve the right triangle. If two sides are given, give angles in degrees and minutes.

82)

82) _____



$a = 10.9$ cm, $b = 21.7$ cm

Round the missing side length to one decimal place.

A) $A = 30^\circ 9'$; $B = 59^\circ 51'$; $c = 22.6$ cm

B) $A = 26^\circ 40'$; $B = 63^\circ 20'$; $c = 25.8$ cm

C) $A = 26^\circ 40'$; $B = 63^\circ 20'$; $c = 24.3$ cm

D) $A = 30^\circ 9'$; $B = 59^\circ 51'$; $c = 24.3$ cm

Answer: C

Explanation: A)

B)

C)

D)

Write the function in terms of its cofunction. Assume that any angle in which an unknown appears is an acute angle.

83) $\sec(\theta - 13^\circ)$

A) $\sec(167^\circ - \theta)$

B) $\cos(103^\circ - \theta)$

C) $\csc(77^\circ - \theta)$

D) $\csc(103^\circ - \theta)$

83) _____

Answer: D

Explanation: A)

B)

C)

D)

Without using a calculator, give the exact trigonometric function value with rational denominator.

84) $\tan 45^\circ$

84) _____

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

B) $\sqrt{2}$

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

D) 1

Answer: D

Explanation: A)

B)

C)

D)

Use a calculator to find the function value. Give your answer rounded to seven decimal places, if necessary.

85) $\cos 164^\circ 5'$

A) -0.5808308

B) -0.4808308

C) -0.7616616

D) -0.9616616

85) _____

Answer: D

Explanation: A)
B)
C)
D)

Determine whether the statement is true or false.

86) $\sin 120^\circ = 2 \sin 60^\circ \cos 60^\circ$

A) True

B) False

86) _____

Answer: A

Explanation: A)
B)

Find the exact value of the expression.

87) $\cos (-390^\circ)$

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

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

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

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

87) _____

Answer: B

Explanation: A)
B)
C)
D)

Use a calculator to find the function value. Give your answer rounded to seven decimal places, if necessary.

88) $\sin^2 57^\circ + \cos^2 57^\circ$

A) 1

B) -1

C) 0

D) 2

88) _____

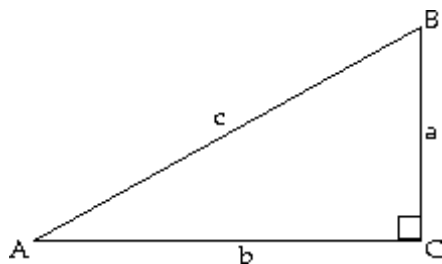
Answer: A

Explanation: A)
B)
C)
D)

Solve the right triangle. If two sides are given, give angles in degrees and minutes.

89)

89) _____



$B = 58.45^\circ$, $a = 434.7$ m

Give side lengths to two decimal places.

A) $A = 31.55^\circ$; $b = 707.98$ m; $c = 843.43$ m

B) $A = 31.55^\circ$; $b = 707.98$ m; $c = 830.78$ m

C) $A = 31.55^\circ$; $b = 664.51$ m; $c = 830.78$ m

D) $A = 31.55^\circ$; $b = 751.45$ m; $c = 817.21$ m

Answer: B

Explanation: A)
B)
C)
D)

Decide whether the statement is true or false.

90) $\cos 43^\circ \leq \cos 5^\circ$

90) _____

A) True

B) False

Answer: A

Explanation: A)
B)

Solve the problem.

91) The length of the base of an isosceles triangle is 33.28 meters. Each base angle is 37.57° . Find the length of each of the two equal sides of the triangle. Round your answer to the hundredths place.

91) _____

A) 27.29 m

B) 21.63 m

C) 41.99 m

D) 20.99 m

Answer: D

Explanation: A)
B)
C)
D)

Find the sign of the following.

92) $\cot(\theta + 180^\circ)$, given that θ is in the interval $(270^\circ, 360^\circ)$.

92) _____

A) negative

B) positive

Answer: A

Explanation: A)
B)

Without using a calculator, give the exact trigonometric function value with rational denominator.

93) $\sin 30^\circ$

A) $\sqrt{3}$

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

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

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

93) _____

Answer: C

Explanation: A)
B)
C)
D)

Find the reference angle for the given angle.

94) -7.5°

A) 83°

B) 82.5°

C) 8°

D) 7.5°

94) _____

Answer: D

Explanation: A)
B)
C)
D)

Determine whether the statement is true or false.

95) $\cos 135^\circ = \cos 225^\circ \cos 90^\circ + \sin 225^\circ \sin 90^\circ$

A) True

B) False

95) _____

Answer: A

Explanation: A)
B)

96) $\cos 30^\circ + \cos 45^\circ = \cos 75^\circ$

A) True

B) False

96) _____

Answer: B

Explanation: A)
B)

Solve the problem.

97) On a sunny day, a flag pole and its shadow form the sides of a right triangle. If the hypotenuse is 35 meters long and the shadow is 28 meters, how tall is the flag pole?

A) 21 m

B) 49 m

C) 45 m

D) 63 m

97) _____

Answer: A

Explanation: A)
B)
C)
D)

Find all values of θ , if θ is in the interval $[0, 360^\circ)$ and has the given function value.

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

98) _____

A) 30° and 330°

B) 45° and 225°

C) 225° and 315°

D) 135° and 225°

Answer: A

Explanation: A)
B)
C)
D)

Decide whether the statement is true or false.

99) $\sin 59^\circ < \cos 59^\circ$

99) _____

A) True

B) False

Answer: B

Explanation: A)
B)

Find a solution for the equation. Assume that all angles are acute angles.

100) $\sec \theta = \csc(\theta + 46^\circ)$

100) _____

A) 23°

B) 67°

C) 22°

D) 68°

Answer: C

Explanation: A)
B)
C)
D)

Find the exact value of the expression.

101) $\csc 840^\circ$

101) _____

A) -2

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

C) $\sqrt{2}$

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

Answer: B

Explanation: A)
B)
C)
D)

Write the function in terms of its cofunction. Assume that any angle in which an unknown appears is an acute angle.

102) $\cos 33^\circ$

102) _____

A) $\cos 123^\circ$

B) $\sin 57^\circ$

C) $\sec 57^\circ$

D) $\sin 33^\circ$

Answer: B

Explanation: A)
B)
C)
D)

Find a value of θ in $[0^\circ, 90^\circ]$ that satisfies the statement. Leave answer in decimal degrees rounded to seven decimal places, if necessary.

103) $\cot \theta = 1.7009187$

A) 59.5479812°

B) 36.0093720°

C) 30.4520188°

D) 53.9906280°

103) _____

Answer: C

Explanation: A)
B)
C)
D)

Write the function in terms of its cofunction. Assume that any angle in which an unknown appears is an acute angle.

104) $\csc 35^\circ$

A) $\sin 55^\circ$

B) $\csc 145^\circ$

C) $\sec 35^\circ$

D) $\sec 55^\circ$

104) _____

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

105) A person is watching a car from the top of a building. The car is traveling on a straight road away from the building. When first noticed, the angle of depression to the car is $45^\circ 56'$. When the car stops, the angle of depression is $22^\circ 34'$. The building is 270 feet tall. How far did the car travel from when it was first noticed until it stopped? Round to the nearest foot.

105) _____

A) 415 ft

B) 588 ft

C) 367 ft

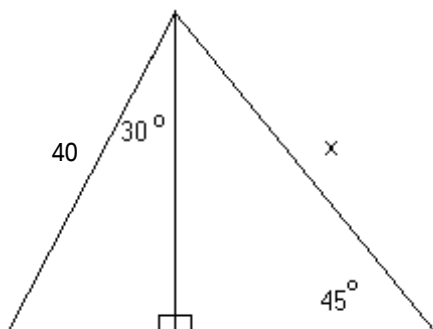
D) 388 ft

Answer: D

Explanation: A)
B)
C)
D)

106) Find the exact value of x in the figure.

106) _____



A) $20\sqrt{5}$

B) $20\sqrt{2}$

C) $20\sqrt{6}$

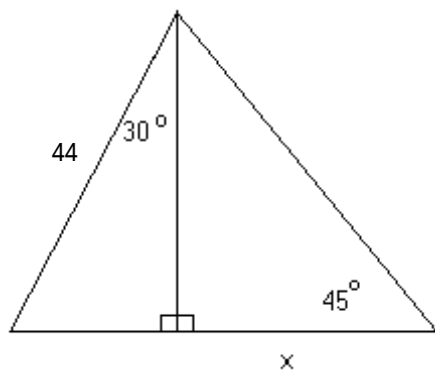
D) $20\sqrt{3}$

Answer: C

Explanation: A)
B)
C)
D)

107) Find the exact value of x in the figure.

107) _____



A) $23\sqrt{3}$

B) $22\sqrt{6}$

C) $22\sqrt{3}$

D) $20\sqrt{3}$

Answer: C

Explanation: A)
B)
C)
D)

Without using a calculator, give the exact trigonometric function value with rational denominator.

108) $\sec 45^\circ$

108) _____

A) $\sqrt{2}$

B) 1

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

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

Answer: A

Explanation: A)
B)
C)
D)

Find all values of θ , if θ is in the interval $[0, 360^\circ)$ and has the given function value.

109) $\sin \theta = -\frac{\sqrt{2}}{2}$

109) _____

A) 45° and 225°

B) 225° and 315°

C) 45° and 315°

D) 135° and 225°

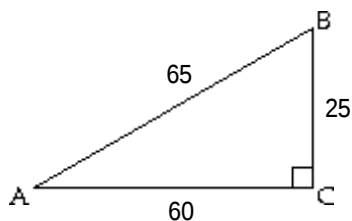
Answer: B

Explanation: A)
B)
C)
D)

Evaluate the function requested. Write your answer as a fraction in lowest terms.

110)

110) _____



Find $\tan A$.

A) $\tan A = \frac{5}{13}$

B) $\tan A = \frac{5}{12}$

C) $\tan A = \frac{13}{5}$

D) $\tan A = \frac{12}{5}$

Answer: B

Explanation: A)
B)
C)
D)

Write the function in terms of its cofunction. Assume that any angle in which an unknown appears is an acute angle.

111) $\tan 41^\circ$

111) _____

A) $\cot 49^\circ$

B) $\cot 139^\circ$

C) $\tan 131^\circ$

D) $\cot 41^\circ$

Answer: A

Explanation: A)
B)
C)
D)

Use a calculator to find the function value. Give your answer rounded to seven decimal places, if necessary.

112) $\sin (-34^\circ 20')$

112) _____

A) -0.5640066

B) -0.5562956

C) -0.5543603

D) -0.5620834

Answer: A

Explanation: A)
B)
C)
D)

Find the reference angle for the given angle.

113) 236.6°

113) _____

A) 56.6°

B) 123.4°

C) 146.6°

D) 33.4°

Answer: A

Explanation: A)
B)
C)
D)

Solve the problem.

114) A formula used by an engineer to determine the safe radius of a curve, R , when designing a particular road is: $R = \frac{V^2}{g(f + \tan \alpha)}$, where α is the superelevation of the road and V is the velocity (in feet per second) for which the curve is designed. If $\alpha = 2.1^\circ$, $f = 0.1$, $g = 30$, and $R = 1229.5$ ft, find V . Round to the nearest foot per second.

A) $V = 74$ ft per sec

B) $V = 69$ ft per sec

C) $V = 71$ ft per sec

D) $V = 67$ ft per sec

Answer: C

Explanation: A)
B)
C)
D)

114) _____

Find the exact value of the expression.

115) $\tan 300^\circ$

A) $-\sqrt{3}$

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

C) $\sqrt{3}$

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

Answer: A

Explanation: A)
B)
C)
D)

115) _____

Find a solution for the equation. Assume that all angles are acute angles.

116) $\tan(3\alpha + 12^\circ) = \cot(\alpha + 36^\circ)$

A) 10.5°

B) 16°

C) 14.5°

D) 12°

Answer: A

Explanation: A)
B)
C)
D)

116) _____

Find the exact value of the expression.

117) $\cos 45^\circ$

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

B) $\sqrt{2}$

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

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

Answer: D

Explanation: A)
B)
C)
D)

117) _____

Solve the problem.

- 118) A 35-foot ladder is leaning against the side of a building. If the ladder makes an angle of $24^\circ 10'$ with the side of the building, how far is the bottom of the ladder from the base of the building?
Round your answer to the hundredths place when necessary.

A) 14.33 ft B) 4.96 ft C) 15.63 ft D) 20.03 ft

Answer: A

Explanation: A)
B)
C)
D)

118) _____

Find all values of θ , if θ is in the interval $[0, 360^\circ)$ and has the given function value.

- 119) $\cot \theta = 1$

A) 45° and 315° B) 135° and 225° C) 225° and 315° D) 45° and 225°

Answer: D

Explanation: A)
B)
C)
D)

119) _____

Solve the right triangle.

- 120) $a = 2.6$ in., $A = 49.8^\circ$, $C = 90^\circ$

Round values to one decimal place.

A) $b = 2.2$ in., $B = 40.2^\circ$, $c = 3.4$ in.
C) $b = 4.0$ in., $B = 40.2^\circ$, $c = 3.4$ in.

B) $b = 4.0$ in., $B = 40.2^\circ$, $c = 4.8$ in.
D) $b = 1.1$ in., $B = 40.2^\circ$, $c = 2.8$ in.

Answer: A

Explanation: A)
B)
C)
D)

120) _____

Find the exact value of the expression.

- 121) $\sin 2835^\circ$

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

Answer: C

Explanation: A)
B)
C)
D)

121) _____

Solve the problem for the given information.

- 122) Find the equation of a line passing through the origin so that the cosine of the angle between the line in quadrant I and the positive x-axis is $\frac{\sqrt{3}}{2}$. 122) _____

A) $y = \sqrt{3}x$

B) $y = \frac{\sqrt{3}}{2}x$

C) $y = \frac{\sqrt{3}}{3}x$

D) $y = x$

Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

- 123) An airplane travels at 195 km/h for 1 hr in a direction of 287° from Greenville. At the end of this time, how far west of Greenville is the plane (to the nearest kilometer)? 123) _____

A) 186 km

B) 204 km

C) 60 km

D) 57 km

Answer: A

Explanation: A)
B)
C)
D)

Evaluate.

- 124) $3 \cot^2 45^\circ + \tan^4 300^\circ - 5 \sin^4 0^\circ$ 124) _____
A) 7 B) 12 C) 84 D) 14

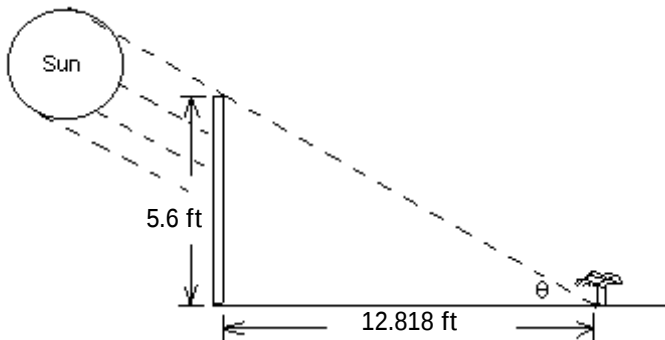
Answer: B

Explanation: A)
B)
C)
D)

Solve the problem.

- 125) A 5.6-ft fence is 12.818 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 when necessary.

125) _____



A) $\theta = 25^\circ$

B) $\theta = 23.8^\circ$

C) $\theta = 23.6^\circ$

D) $\theta = 23.4^\circ$

Answer: C

Explanation: A)
B)
C)
D)

- 126) The grade resistance F of a car traveling up or down a hill is modeled by the equation $F = W \sin \theta$, where W is the weight of the car and θ is the angle of the hill's grade ($\theta > 0$ for uphill travel, $\theta < 0$ for downhill travel). What is the grade resistance (to the nearest pound) of a 3000-lb car traveling uphill on a 3° grade ($\theta = 3^\circ$)?

126) _____

A) 157 lb

B) -3003 lb

C) -157 lb

D) 3003 lb

Answer: A

Explanation: A)
B)
C)
D)

Use a calculator to decide whether the statement is true or false.

127) $\cos (2 \cdot 30^\circ) = 2 \cdot \cos 30^\circ$

127) _____

A) True

B) False

Answer: B

Explanation: A)
B)

Evaluate.

128) $\sin^2 45^\circ + \cos^2 45^\circ$

128) _____

A) $\frac{1}{4}$

B) 2

C) 0

D) 1

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

129) A tunnel is to be dug from point A to point B. Both A and B are visible from point C. If AC is 235 miles and BC is 625 miles, and if angle C is 90° , find the measure of angle B. Round your answer to the tenths place.

129) _____

A) 34.1°

B) 20.6°

C) 18.7°

D) 31.4°

Answer: B

Explanation: A)
B)
C)
D)

Find all values of θ , if θ is in the interval $[0, 360^\circ)$ and has the given function value.

130) $\sec \theta = -\sqrt{2}$

130) _____

A) 45° and 225°

B) 45° and 315°

C) 225° and 315°

D) 135° and 225°

Answer: D

Explanation: A)
B)
C)
D)

Find the exact value of the expression.

131) $\cos 840^\circ$

131) _____

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

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

C) $-\sqrt{3}$

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

Answer: D

Explanation: A)
B)
C)
D)

132) $\tan 2130^\circ$

132) _____

A) 1

B) $-\sqrt{3}$

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

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

Answer: D

Explanation: A)
B)
C)
D)

Use a calculator to find the function value. Give your answer rounded to seven decimal places, if necessary.

133) $\tan 55^\circ 50'$

A) 1.4735983

B) 1.4738983

C) 1.4741983

D) 1.4732983

133) _____

Answer: D

Explanation: A)
B)
C)
D)

134) $\sec 70^\circ 28'$

A) 5.9816624

B) 5.9826624

C) 2.9898312

D) 2.9908312

134) _____

Answer: D

Explanation: A)
B)
C)
D)

Find the exact value of the expression.

135) $\sin 30^\circ$

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

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

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

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

135) _____

Answer: A

Explanation: A)
B)
C)
D)

Use a calculator to find the function value. Give your answer rounded to seven decimal places, if necessary.

136) $\csc 30^\circ 5'$

A) 1.9939764

B) 1.9959764

C) 1.9949764

D) 1.9969764

136) _____

Answer: C

Explanation: A)
B)
C)
D)

Find the exact value of the expression.

137) $\sin (-2040^\circ)$

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

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

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

D) -1

137) _____

Answer: C

Explanation: A)
B)
C)
D)

Suppose ABC is a right triangle with sides of lengths a, b, and c and right angle at C. Find the unknown side length using the Pythagorean theorem and then find the value of the indicated trigonometric function of the given angle. Rationalize the denominator if applicable.

138) Find $\cos A$ when $a = 5$ and $b = 3$.

138) _____

A) $\frac{3\sqrt{34}}{34}$

B) $\frac{\sqrt{34}}{5}$

C) $\frac{5\sqrt{34}}{34}$

D) $\frac{\sqrt{34}}{3}$

Answer: A

Explanation: A)
B)
C)
D)

Use a calculator to find the function value. Give your answer rounded to seven decimal places, if necessary.

139) $\frac{1}{\tan 38^\circ 46'}$

139) _____

A) 1.245232

B) 0.8030632

C) 1.2589754

D) 0.7942967

Answer: A

Explanation: A)
B)
C)
D)

Solve the problem.

140) A 37-foot ladder is leaning against the side of a building. If the ladder makes an angle of $24^\circ 16'$ with the side of the building, how far up from the ground does the ladder make contact with the building? Round your answer to the hundredths place when necessary.

140) _____

A) 36.89 ft

B) 34.93 ft

C) 33.73 ft

D) 31.16 ft

Answer: C

Explanation: A)
B)
C)
D)

141) The grade resistance F of a car traveling up or down a hill is modeled by the equation $F = W \sin \theta$, where W is the weight of the car and θ is the angle of the hill's grade ($\theta > 0$ for uphill travel, $\theta < 0$ for downhill travel). What is the grade resistance (to the nearest pound) of a 1750-lb car on a level road ($\theta = 0^\circ$)?

141) _____

A) undefined

B) 1750 lb

C) 0 lb

D) -1750 lb

Answer: C

Explanation: A)
B)
C)
D)

An observer for a radar station is located at the origin of a coordinate system. For the point given, find the bearing of an airplane located at that point. Express the bearing using both methods.

142) (, 0)

- A) 270°; N 90° E or S 90° E
C) 270°; N 90° W or S 90° W

- B) 90°; N 90° W or S 90° W
D) 90°; N 90° E or S 90° E

142) _____

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem for the given information.

143) Find the equation of a line passing through the origin and making a 45° angle with the positive x-axis.

143) _____

A) $y = -x$

B) $y = \frac{\sqrt{3}}{3}x$

C) $y = x$

D) $y = \frac{\sqrt{2}}{2}x$

Answer: C

Explanation: A)
B)
C)
D)

Use a calculator to find the function value. Give your answer rounded to seven decimal places, if necessary.

144) $\cot 40^\circ 44'$

A) 1.16104

B) 1.16064

C) 1.16144

D) 1.16124

144) _____

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

145) If an automobile is traveling at velocity V (in feet per second) , the safe radius R for a curve with

145) _____

superelevation α is given by the formula $R = \frac{v^2}{g(f + \tan \alpha)}$, where f and g are constants. A road is

being constructed for automobiles traveling at 50 miles per hour. If $\alpha = 4^\circ$, $g = 32.4$, and $f = 0.16$, calculate R . Round to the nearest foot. (Hint: 1 mile = 5280 feet)

A) $R = 1172$ ft

B) $R = 706$ ft

C) $R = 722$ ft

D) $R = 742$ ft

Answer: C

Explanation: A)
B)
C)
D)

146) Snell's Law states that $\frac{c_1}{c_2} = \frac{\sin \theta_1}{\sin \theta_2}$. Use this law to find the requested value. If $c_1 = 8 \times 10^8$, 146) _____

$c_2 = 6.14 \times 10^8$, $\theta_2 = 36^\circ$, find θ_1 . Round your answer to the nearest degree.

- A) $\theta_1 = 48^\circ$ B) $\theta_1 = 51^\circ$ C) $\theta_1 = 53^\circ$ D) $\theta_1 = 50^\circ$

Answer: D

Explanation: A)
B)
C)
D)

Write the function in terms of its cofunction. Assume that any angle in which an unknown appears is an acute angle.

147) $\sin 77^\circ$ 147) _____
A) $\csc 13^\circ$ B) $\sin 167^\circ$ C) $\cos 13^\circ$ D) $\cos 77^\circ$

Answer: C

Explanation: A)
B)
C)
D)

Find the exact value of the expression.

148) $\cot 120^\circ$ 148) _____
A) -1 B) $-\sqrt{3}$ C) $-\frac{\sqrt{3}}{3}$ D) $\frac{\sqrt{3}}{3}$

Answer: C

Explanation: A)
B)
C)
D)

Use a calculator to decide whether the statement is true or false.

149) $\sin (150^\circ + 30^\circ) = \sin 150^\circ + \sin 30^\circ$ 149) _____
A) True B) False

Answer: B

Explanation: A)
B)

Solve the problem for the given information.

150) Find the equation of a line passing through the origin so that the cosine of the angle between the line in quadrant I and the positive x-axis is $\frac{1}{2}$. 150) _____

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

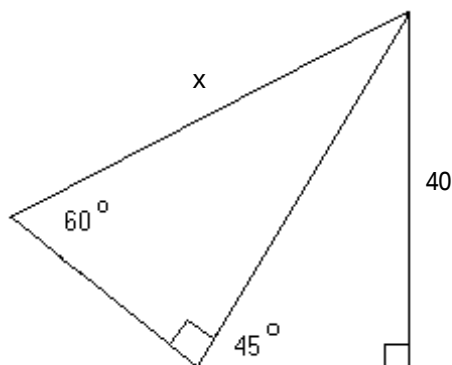
Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

151) Find the exact value of x in the figure.

151) _____



A) $\frac{74\sqrt{3}}{3}$

B) $79\sqrt{6}$

C) $\frac{20\sqrt{6}}{3}$

D) $\frac{80\sqrt{6}}{3}$

Answer: D

Explanation: A)
B)
C)
D)

Find a solution for the equation. Assume that all angles are acute angles.

152) $\sin A = \cos 8A$

A) 8°

B) 82°

C) 10°

D) 80°

152) _____

Answer: C

Explanation: A)
B)
C)
D)

Without using a calculator, give the exact trigonometric function value with rational denominator.

153) $\cos 60^\circ$

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

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

C) $\sqrt{3}$

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

153) _____

Answer: A

Explanation: A)
B)
C)
D)

Solve the problem for the given information.

154) What angle does the line $y = x$ make with the positive x -axis?

A) 90°

B) 60°

C) 30°

D) 45°

154) _____

Answer: D

Explanation: A)
B)
C)
D)

Decide whether the statement is true or false.

155) $\sec 50^\circ < \sec 4^\circ$

155) _____

A) True

B) False

Answer: B

Explanation: A)
B)

Solve the problem.

156) A boat sails for 2 hours at 30 mph in a direction $95^\circ 58'$. How far south has it sailed (to the nearest mile)?

156) _____

A) 4 mi

B) 2 mi

C) 8 mi

D) 6 mi

Answer: D

Explanation: A)
B)
C)
D)

Solve the right triangle.

157) $B = 25.9^\circ$, $c = 4.1$ mm, $C = 90^\circ$

157) _____

Round values to one decimal place.

A) $a = 3.7$ mm, $A = 64.1^\circ$, $b = 1.8$ mm

B) $a = 3.7$ mm, $A = 64.1^\circ$, $b = 2.9$ mm

C) $a = 1.8$ mm, $A = 64.1^\circ$, $b = 3.7$ mm

D) $a = 2.9$ mm, $A = 64.1^\circ$, $b = 2.9$ mm

Answer: A

Explanation: A)
B)
C)
D)

Find the exact value of the expression.

158) $\sec 150^\circ$

158) _____

A) $-\sqrt{2}$

B) $\sqrt{2}$

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

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

Answer: C

Explanation: A)
B)
C)
D)

The number represents an approximate measurement. State the range represented by the measurement.

159) 24.35 k

159) _____

A) 24.349 kg to 24.351 kg

B) 24.3475 kg to 24.3525 kg

C) 24.345 kg to 24.355 kg

D) 23.35 kg to 25.35 kg

Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

- 160) The grade resistance F of a car traveling up or down a hill is modeled by the equation $F = W \sin \theta$, where W is the weight of the car and θ is the angle of the hill's grade ($\theta > 0$ for uphill travel, $\theta < 0$ for downhill travel). A 2025-lb car has just rolled off a sheer vertical cliff ($\theta = -90^\circ$). What is the car's grade resistance? 160) _____

A) undefined B) 0 lb C) -2025 lb D) 2025 lb

Answer: C

Explanation: A)
B)
C)
D)

Suppose ABC is a right triangle with sides of lengths a , b , and c and right angle at C. Find the unknown side length using the Pythagorean theorem and then find the value of the indicated trigonometric function of the given angle. Rationalize the denominator if applicable.

- 161) Find $\sin A$ when $a = 4$ and $b = 5$. 161) _____

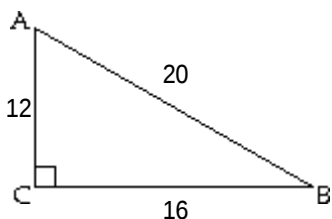
A) $\frac{\sqrt{41}}{4}$ B) $\frac{4\sqrt{41}}{41}$ C) $\frac{\sqrt{41}}{5}$ D) $\frac{5\sqrt{41}}{41}$

Answer: B

Explanation: A)
B)
C)
D)

Evaluate the function requested. Write your answer as a fraction in lowest terms.

- 162) 162) _____



Find $\sin A$.

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

Answer: C

Explanation: A)
B)
C)
D)

Evaluate.

163) $\cot^2 45^\circ + \sin 150^\circ + 4 \tan^2 45^\circ$

163) _____

A) $\frac{7}{2}$

B) $\frac{5}{2}$

C) $\frac{9}{2}$

D) $\frac{11}{2}$

Answer: D

Explanation: A)
B)
C)
D)

Find a value of θ in $[0^\circ, 90^\circ]$ that satisfies the statement. Leave answer in decimal degrees rounded to seven decimal places, if necessary.

164) $\sin \theta = 0.81107642$

164) _____

A) 54.2012343°

B) 35.7987657°

C) 125.798766°

D) 234.201234°

Answer: A

Explanation: A)
B)
C)
D)

Solve the problem for the given information.

165) Find the equation of a line passing through the origin so that the sine of the angle between the line in quadrant I and the positive x-axis is $\frac{\sqrt{2}}{2}$.

165) _____

A) $y = \sqrt{3}x$

B) $y = \frac{\sqrt{2}}{2}x$

C) $y = \frac{\sqrt{3}}{3}x$

D) $y = x$

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

166) A boat sails for 3 hours at 25 mph in a direction $93^\circ 2'$. How far south has it sailed (to the nearest mile)?

166) _____

A) 2 mi

B) 6 mi

C) 4 mi

D) 0 mi

Answer: C

Explanation: A)
B)
C)
D)

167) Snell's Law states that $\frac{c_1}{c_2} = \frac{\sin \theta_1}{\sin \theta_2}$. Use this law to find the requested value. If $c_1 = 6 \times 10^8$, 167) _____

$c_2 = 4.66 \times 10^8$, $\theta_1 = 43^\circ$, find θ_2 . Round your answer to the nearest degree.

- A) $\theta_2 = 31^\circ$ B) $\theta_2 = 34^\circ$ C) $\theta_2 = 32^\circ$ D) $\theta_2 = 35^\circ$

Answer: C

Explanation: A)
B)
C)
D)

168) A person is watching a boat from the top of a lighthouse. The boat is approaching the lighthouse directly. When first noticed, the angle of depression to the boat is $13^\circ 12'$. When the boat stops, the angle of depression is $49^\circ 49'$. The lighthouse is 200 feet tall. How far did the boat travel from when it was first noticed until it stopped? Round to the nearest foot. 168) _____

- A) 706 ft B) 668 ft C) 729 ft D) 684 ft

Answer: D

Explanation: A)
B)
C)
D)

Find the reference angle for the given angle.

169) 388° 169) _____

- A) 152° B) 28° C) 62° D) 118°

Answer: B

Explanation: A)
B)
C)
D)

Solve the problem.

170) A person is watching a car from the top of a building. The car is traveling on a straight road directly toward the building. When first noticed, the angle of depression to the car is $26^\circ 53'$. When the car stops, the angle of depression is $42^\circ 31'$. The building is 240 feet tall. How far did the car travel from when it was first noticed until it stopped? Round to the nearest foot. 170) _____

- A) 212 ft B) 412 ft C) 238 ft D) 191 ft

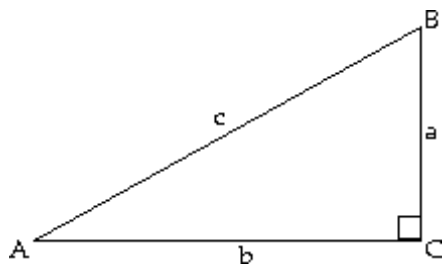
Answer: A

Explanation: A)
B)
C)
D)

Solve the right triangle. If two sides are given, give angles in degrees and minutes.

171)

171) _____



$$A = 11^\circ 32', c = 213 \text{ ft}$$

Round side lengths to two decimal places.

A) $B = 79^\circ 27'$; $a = 42.59 \text{ ft}$; $b = 204.70 \text{ ft}$

B) $B = 78^\circ 28'$; $a = 42.02 \text{ ft}$; $b = 207.81 \text{ ft}$

C) $B = 78^\circ 27'$; $a = 45.79 \text{ ft}$; $b = 209.90 \text{ ft}$

D) $B = 78^\circ 28'$; $a = 42.59 \text{ ft}$; $b = 208.70 \text{ ft}$

Answer: D

Explanation: A)
B)
C)
D)

Find the exact value of the expression.

172) $\csc(-2460^\circ)$

172) _____

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

B) $\sqrt{2}$

C) -2

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

Answer: D

Explanation: A)
B)
C)
D)

Find all values of θ , if θ is in the interval $[0, 360^\circ)$ and has the given function value.

173) $\sin \theta = \frac{\sqrt{3}}{2}$

173) _____

A) 60° and 300°

B) 60° and 120°

C) 210° and 330°

D) 150° and 210°

Answer: B

Explanation: A)
B)
C)
D)

Evaluate.

174) $\cos^2 315^\circ - \sin^2 270^\circ + 4 \tan^2 30^\circ$

174) _____

A) $\frac{17}{6}$

B) $\frac{11}{6}$

C) $\frac{5}{6}$

D) $-\frac{1}{6}$

Answer: C

Explanation: A)
B)
C)
D)

An observer for a radar station is located at the origin of a coordinate system. For the point given, find the bearing of an airplane located at that point. Express the bearing using both methods.

175) (,)

A) 45° ; S 45° W

B) 45° ; N 45° W

C) 45° ; N 45° E

D) 45° ; S 45° E

175) _____

Answer: C

Explanation: A)
B)
C)
D)

Suppose ABC is a right triangle with sides of lengths a, b, and c and right angle at C. Find the unknown side length using the Pythagorean theorem and then find the value of the indicated trigonometric function of the given angle. Rationalize the denominator if applicable.

176) Find $\tan B$ when $a = 48$ and $c = 50$.

A) $\frac{7}{25}$

B) $\frac{24}{25}$

C) $\frac{24}{7}$

D) $\frac{7}{24}$

176) _____

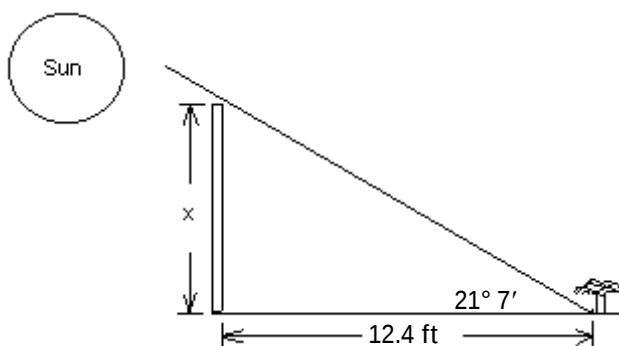
Answer: D

Explanation: A)
B)
C)
D)

Solve the problem.

177) In one area, the lowest angle of elevation of the sun in winter is $21^\circ 7'$. A fence is to be built 12.4 ft away from a plant in the direction of the sun. (See drawing) Find the maximum height, x, for the fence so that the plant will get full sun. Round your answer to the tenths place when necessary.

177) _____



A) 6.3 ft

B) 4.1 ft

C) 4.8 ft

D) 5.1 ft

Answer: C

Explanation: A)
B)
C)
D)

Use a calculator to decide whether the statement is true or false.

178) $\cos(2 \cdot 90^\circ) = \cos^2 90^\circ - \sin^2 90^\circ$

178) _____

A) True

B) False

Answer: A

Explanation: A)
B)

Solve the problem.

179) On a sunny day, a tree and its shadow form the sides of a right triangle. If the hypotenuse is 40 meters long and the tree is 32 meters tall, how long is the shadow?

179) _____

A) 51 m

B) 72 m

C) 64 m

D) 24 m

Answer: D

Explanation: A)
B)
C)
D)

180) A formula used by an engineer to determine the safe radius of a curve, R , when designing a road is:

180) _____

$$R = \frac{V^2}{g(f + \tan \alpha)}$$
, where α is the superelevation of the road and V is the velocity (in feet per second)

for which the curve is designed. If $V = 84$ ft per sec, $f = 0.1$, $g = 30$, and $\alpha = 1.1^\circ$, find R . Round to the nearest foot.

A) $R = 1973$ ft

B) $R = 1977$ ft

C) $R = 1983$ ft

D) $R = 1970$ ft

Answer: A

Explanation: A)
B)
C)
D)

Use a calculator to decide whether the statement is true or false.

181) $\sin(180^\circ + 225^\circ) = \sin 180^\circ \cdot \cos 225^\circ + \cos 180^\circ \cdot \sin 225^\circ$

181) _____

A) True

B) False

Answer: A

Explanation: A)
B)

Find the exact value of the expression.

182) $\sec 240^\circ$

182) _____

A) -2

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

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

D) 2

Answer: A

Explanation: A)
B)
C)
D)

Find a value of θ in $[0^\circ, 90^\circ]$ that satisfies the statement. Leave answer in decimal degrees rounded to seven decimal places, if necessary.

183) $\cos \theta = 0.49566425$

A) 119.713561°

B) 60.2864387°

C) 299.713561°

D) 29.7135613°

183) _____

Answer: B

Explanation: A)
B)
C)
D)

Solve the problem.

184) A contractor needs to know the height of a building to estimate the cost of a job. From a point 90 feet away from the base of the building, the angle of elevation to the top of the building is found to be $42^\circ 17'$. Find the height of the building. Round your answer to the hundredths place when necessary.

184) _____

A) 84.75 ft

B) 80.32 ft

C) 81.85 ft

D) 86.08 ft

Answer: C

Explanation: A)
B)
C)
D)

Find the exact value of the expression.

185) $\csc 240^\circ$

185) _____

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

B) -2

C) 2

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

Answer: D

Explanation: A)
B)
C)
D)

Solve the problem for the given information.

186) Find the equation of a line passing through the origin so that the sine of the angle between the line in quadrant I and the positive x-axis is $\frac{\sqrt{3}}{2}$.

186) _____

A) $y = \frac{\sqrt{3}}{3}x$

B) $y = x$

C) $y = \sqrt{3}x$

D) $y = \frac{\sqrt{3}}{2}x$

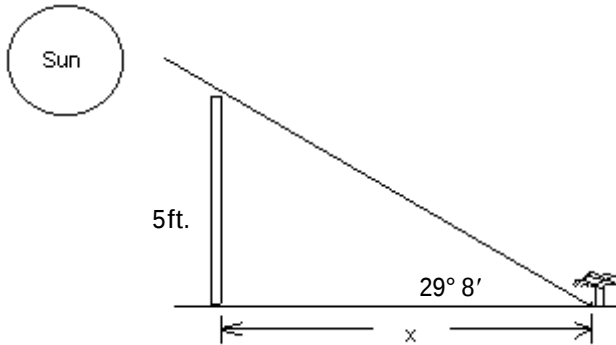
Answer: C

Explanation: A)
B)
C)
D)

Solve the problem.

- 187) In one area, the lowest angle of elevation of the sun in winter is $29^\circ 8'$. Find the minimum distance x that a plant needing full sun can be placed from a fence that is 5 feet high. Round your answer to the tenths place when necessary.

187) _____



- A) 8.6 ft B) 9 ft C) 12.4 ft D) 9.2 ft

Answer: B

Explanation: A)
B)
C)
D)

Evaluate.

- 188) $5 \sin^2 300^\circ + \csc^2 150^\circ - \sec^2 30^\circ$

188) _____

- A) $\frac{29}{6}$ B) $\frac{77}{12}$ C) $\frac{8}{3}$ D) $\frac{13}{12}$

Answer: B

Explanation: A)
B)
C)
D)

Decide whether the statement is true or false.

- 189) $\tan 28^\circ > \cot 28^\circ$

189) _____

- A) True B) False

Answer: B

Explanation: A)
B)

Suppose ABC is a right triangle with sides of lengths a , b , and c and right angle at C. Find the unknown side length using the Pythagorean theorem and then find the value of the indicated trigonometric function of the given angle. Rationalize the denominator if applicable.

- 190) Find $\sin A$ when $b = 33$ and $c = 55$

190) _____

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

Answer: A

Explanation: A)
B)
C)
D)

Write the function in terms of its cofunction. Assume that any angle in which an unknown appears is an acute angle.

191) $\cos 31.2^\circ$

A) $\cos 148.8^\circ$

B) $\sin 58.8^\circ$

C) $\sec 148.8^\circ$

D) $\sin 31.2^\circ$

191) _____

Answer: B

Explanation: A)

B)

C)

D)

Find a value of θ in $[0^\circ, 90^\circ]$ that satisfies the statement. Leave answer in decimal degrees rounded to seven decimal places, if necessary.

192) $\tan \theta = 1.5047547$

A) 56.3935717°

B) 123.606428°

C) 33.6064283°

D) 236.393572°

192) _____

Answer: A

Explanation: A)

B)

C)

D)

Write the function in terms of its cofunction. Assume that any angle in which an unknown appears is an acute angle.

193) $\sec 29.7^\circ$

A) $\cos 60.3^\circ$

B) $\cos 150.3^\circ$

C) $\csc 60.3^\circ$

D) $\csc 29.7^\circ$

193) _____

Answer: C

Explanation: A)

B)

C)

D)

Solve the right triangle.

194) $A = 72^\circ 6'$, $c = 278$ m, $C = 90^\circ$

Round side lengths to two decimal places, if necessary.

A) $B = 17^\circ 54'$, $a = 264.54$ m, $b = 85.45$ m

B) $B = 17^\circ 6'$, $a = 265.74$ m, $b = 78.45$ m

C) $B = 17^\circ 54'$, $a = 264.74$ m, $b = 92.45$ m

D) $B = 18^\circ 44'$, $a = 264.74$ m, $b = 85.45$ m

194) _____

Answer: A

Explanation: A)

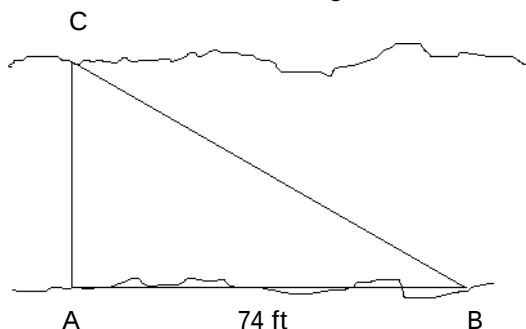
B)

C)

D)

Solve the problem.

- 195) To measure the width of a river, a surveyor starts at point A on one bank and walks 74 feet down the river to point B. He then measures the angle ABC to be $25^{\circ}36'14''$. Estimate the width of the river to the nearest foot. See the figure below. 195) _____



- A) 32 ft B) 67 ft C) 154 ft D) 35 ft

Answer: D

Explanation: A)
B)
C)
D)

Suppose ABC is a right triangle with sides of lengths a, b, and c and right angle at C. Find the unknown side length using the Pythagorean theorem and then find the value of the indicated trigonometric function of the given angle. Rationalize the denominator if applicable.

- 196) Find $\csc A$ when $b = 24$ and $c = 51$ 196) _____

- A) $\frac{8}{15}$ B) $\frac{17}{15}$ C) $\frac{15}{17}$ D) $\frac{17}{8}$

Answer: B

Explanation: A)
B)
C)
D)

Find a value of θ in $[0^{\circ}, 90^{\circ}]$ that satisfies the statement. Leave answer in decimal degrees rounded to seven decimal places, if necessary.

- 197) $\tan \theta = 0.83799703$ 197) _____

- A) 219.962908° B) 39.9629076° C) 320.037092° D) 50.0370924°

Answer: B

Explanation: A)
B)
C)
D)

Find the exact value of the expression.

198) $\cot 60^\circ$

198) _____

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

B) 1

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

D) $\sqrt{3}$

Answer: C

Explanation: A)
B)
C)
D)

Without using a calculator, give the exact trigonometric function value with rational denominator.

199) $\cot 45^\circ$

199) _____

A) 1

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

C) $\sqrt{2}$

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

Answer: A

Explanation: A)
B)
C)
D)

Determine whether the statement is true or false.

200) $\cos 300^\circ = 1 - \sin^2 150^\circ$

200) _____

A) True

B) False

Answer: B

Explanation: A)
B)

Solve the problem.

201) The grade resistance F of a car traveling up or down a hill is modeled by the equation $F = W \sin \theta$, where W is the weight of the car and θ is the angle of the hill's grade ($\theta > 0$ for uphill travel, $\theta < 0$ for downhill travel). What is the grade resistance (to the nearest pound) of a 2100-lb car traveling downhill on a 5° grade ($\theta = -5^\circ$)?

201) _____

A) 183 lb

B) -2105 lb

C) 2105 lb

D) -183 lb

Answer: D

Explanation: A)
B)
C)
D)

Find all values of θ , if θ is in the interval $[0, 360^\circ)$ and has the given function value.

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

202) _____

A) 210° and 330°

B) 60° and 300°

C) 60° and 120°

D) 150° and 210°

Answer: D

Explanation: A)
B)
C)
D)

Suppose ABC is a right triangle with sides of lengths a, b, and c and right angle at C. Find the unknown side length using the Pythagorean theorem and then find the value of the indicated trigonometric function of the given angle. Rationalize the denominator if applicable.

203) Find $\cot A$ when $a = 5$ and $c = 6$.

203) _____

A) $\frac{6\sqrt{11}}{11}$

B) $\frac{5\sqrt{11}}{11}$

C) $\frac{\sqrt{11}}{6}$

D) $\frac{\sqrt{11}}{5}$

Answer: D

Explanation: A)
B)
C)
D)

Determine whether the statement is true or false.

204) $\cos(30^\circ + 45^\circ) = \cos 30^\circ \cdot \cos 45^\circ - \sin 30^\circ \cdot \sin 45^\circ$

204) _____

A) True

B) False

Answer: A

Explanation: A)
B)

Use a calculator to decide whether the statement is true or false.

205) $\sin(2 \cdot 150^\circ) = 2 \cdot \sin 150^\circ \cdot \cos 150^\circ$

205) _____

A) True

B) False

Answer: A

Explanation: A)
B)

Use a calculator to find the function value. Give your answer rounded to seven decimal places, if necessary.

206) $\frac{\sin 79^\circ}{\cos 79^\circ}$

206) _____

A) 0.0174551

B) 5.144554

C) 1

D) 0.1943803

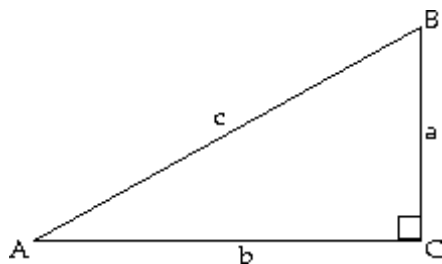
Answer: B

Explanation: A)
B)
C)
D)

Solve the right triangle. If two sides are given, give angles in degrees and minutes.

207)

207) _____



$$B = 65.4834^\circ, c = 3618.6 \text{ m}$$

Give side lengths to two decimal places.

A) $A = 24.5166^\circ$; $a = 1501.56 \text{ m}$; $b = 3292.35 \text{ m}$

B) $A = 24.5166^\circ$; $a = 1416.68 \text{ m}$; $b = 3277.05 \text{ m}$

C) $A = 24.5166^\circ$; $a = 1501.56 \text{ m}$; $b = 3246.96 \text{ m}$

D) $A = 24.5166^\circ$; $a = 1560.70 \text{ m}$; $b = 3292.35 \text{ m}$

Answer: A

Explanation: A)

B)

C)

D)

Find the exact value of the expression.

208) $\sec(-1215^\circ)$

208) _____

A) -1

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

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

D) $-\sqrt{2}$

Answer: D

Explanation: A)

B)

C)

D)

Answer Key
Testname: C2

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

Answer Key
Testname: C2

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

Answer Key

Testname: C2

- 101) B
- 102) B
- 103) C
- 104) D
- 105) D
- 106) C
- 107) C
- 108) A
- 109) B
- 110) B
- 111) A
- 112) A
- 113) A
- 114) C
- 115) A
- 116) A
- 117) D
- 118) A
- 119) D
- 120) A
- 121) C
- 122) C
- 123) A
- 124) B
- 125) C
- 126) A
- 127) B
- 128) D
- 129) B
- 130) D
- 131) D
- 132) D
- 133) D
- 134) D
- 135) A
- 136) C
- 137) C
- 138) A
- 139) A
- 140) C
- 141) C
- 142) D
- 143) C
- 144) D
- 145) C
- 146) D
- 147) C
- 148) C
- 149) B
- 150) C

Answer Key

Testname: C2

- 151) D
- 152) C
- 153) A
- 154) D
- 155) B
- 156) D
- 157) A
- 158) C
- 159) C
- 160) C
- 161) B
- 162) C
- 163) D
- 164) A
- 165) D
- 166) C
- 167) C
- 168) D
- 169) B
- 170) A
- 171) D
- 172) D
- 173) B
- 174) C
- 175) C
- 176) D
- 177) C
- 178) A
- 179) D
- 180) A
- 181) A
- 182) A
- 183) B
- 184) C
- 185) D
- 186) C
- 187) B
- 188) B
- 189) B
- 190) A
- 191) B
- 192) A
- 193) C
- 194) A
- 195) D
- 196) B
- 197) B
- 198) C
- 199) A
- 200) B

Answer Key

Testname: C2

- 201) D
- 202) D
- 203) D
- 204) A
- 205) A
- 206) B
- 207) A
- 208) D