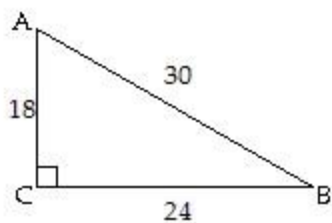


MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.
Evaluate the function requested. Write your answer as a fraction in lowest terms.

1)

1) _____



Find $\sin A$.

A) $\sin A = \frac{5}{4}$

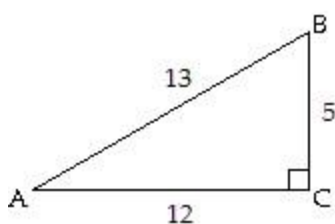
B) $\sin A = \frac{4}{5}$

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

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

2)

2) _____



Find $\tan A$.

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

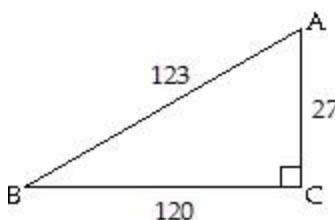
B) $\tan A = \frac{13}{5}$

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

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

3)

3) _____



Find $\cos B$.

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

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

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

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

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.

4) Find $\sin A$ when $b = 27$ and $c = 45$

4) _____

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

B) $\frac{5}{4}$

C) $\frac{4}{5}$

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

5) Find $\csc A$ when $b = 40$ and $c = 85$

5) _____

A) $\frac{8}{15}$

B) $\frac{17}{15}$

C) $\frac{15}{17}$

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

6) Find $\tan B$ when $a = 24$ and $c = 25$.

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

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

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

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

6) _____

7) Find $\sin A$ when $a = 7$ and $b = 6$.

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

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

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

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

7) _____

8) Find $\cos A$ when $a = 7$ and $b = 3$.

A) $\frac{7\sqrt{58}}{58}$

B) $\frac{\sqrt{58}}{3}$

C) $\frac{\sqrt{58}}{7}$

D) $\frac{3\sqrt{58}}{58}$

8) _____

9) Find $\cos A$ when $a = \sqrt{2}$ and $c = 12$.

A) $\frac{1}{6}$

B) $\frac{\sqrt{142}}{12}$

C) $\frac{\sqrt{2}}{12}$

D) 71

9) _____

10) Find $\csc B$ when $a = 3$ and $b = 7$.

A) $\frac{7\sqrt{58}}{58}$

B) $\frac{3\sqrt{58}}{58}$

C) $\frac{\sqrt{58}}{7}$

D) $\frac{\sqrt{58}}{3}$

10) _____

11) Find $\sec B$ when $a = 5$ and $b = 7$.

A) $\frac{7\sqrt{74}}{74}$

B) $\frac{5\sqrt{74}}{74}$

C) $\frac{5\sqrt{74}}{7}$

D) $\frac{\sqrt{74}}{5}$

11) _____

12) Find $\cot A$ when $a = 4$ and $c = 7$.

A) $\frac{\sqrt{33}}{7}$

B) $\frac{4\sqrt{33}}{33}$

C) $\frac{\sqrt{33}}{4}$

D) $\frac{7\sqrt{33}}{33}$

12) _____

13) Find $\tan B$ when $b = 7$ and $c = 8$.

A) $\frac{\sqrt{15}}{7}$

B) $\frac{7\sqrt{15}}{15}$

C) $\frac{\sqrt{15}}{8}$

D) $\frac{8\sqrt{15}}{15}$

13) _____

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

14) $\sin 30^\circ$

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

B) $\sqrt{3}$

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

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

14) _____

15) $\cos 30^\circ$

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

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

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

D) $\sqrt{3}$

15) _____

16) $\cos 60^\circ$

A) $\sqrt{3}$

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

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

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

16) _____

17) $\sin 60^\circ$

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

B) $\sqrt{3}$

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

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

17) _____

18) $\tan 60^\circ$

18) _____

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

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

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

D) $\sqrt{3}$

19) $\tan 45^\circ$

A) 1

B) $\sqrt{2}$

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

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

19) _____

20) $\cot 45^\circ$

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

B) $\sqrt{2}$

C) 1

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

20) _____

21) $\sec 45^\circ$

A) 1

B) $\sqrt{2}$

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

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

21) _____

22) $\csc 45^\circ$

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

B) $\sqrt{2}$

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

D) 1

22) _____

23) $\sec 30^\circ$

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

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

C) 1

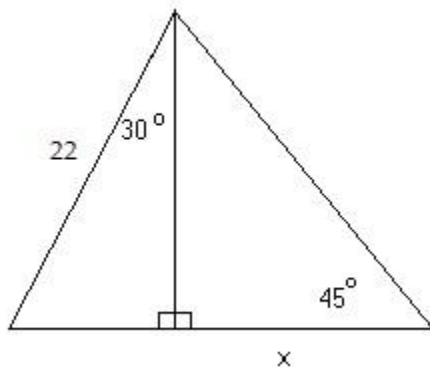
D) $\sqrt{2}$

23) _____

Solve the problem.

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

24) _____



A) $12\sqrt{3}$

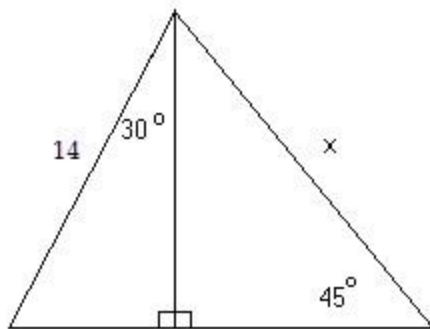
B) $9\sqrt{3}$

C) $11\sqrt{6}$

D) $11\sqrt{3}$

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

25) _____



A) $7\sqrt{2}$

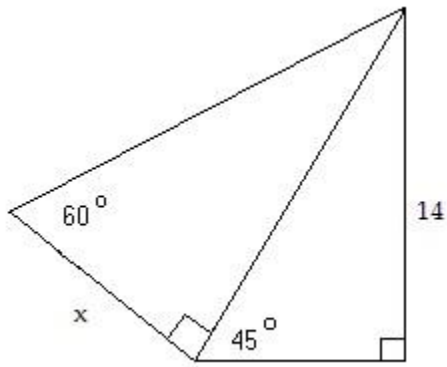
B) $7\sqrt{5}$

C) $7\sqrt{3}$

D) $7\sqrt{6}$

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

26) _____



A) $\frac{14\sqrt{6}}{3}$

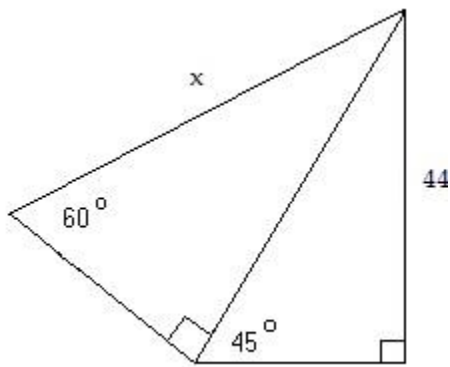
B) $7\sqrt{3}$

C) $\frac{14\sqrt{3}}{3}$

D) $7\sqrt{6}$

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

27) _____



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

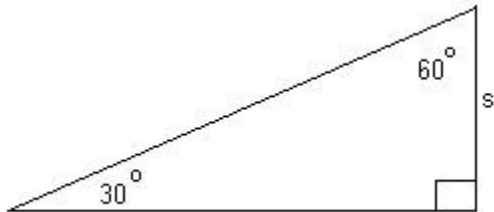
B) $\frac{88\sqrt{6}}{3}$

C) $87\sqrt{6}$

D) $\frac{82\sqrt{3}}{3}$

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

28) _____



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

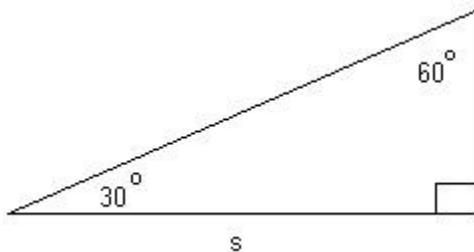
B) $\frac{\sqrt{s}}{3}$

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

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

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

29) _____



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

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

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

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

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

- | | | | | |
|--|-------------------------------|-------------------------------|-------------------------------|-----------|
| 30) $\sin 44^\circ$
A) $\csc 46^\circ$ | B) $\sin 134^\circ$ | C) $\cos 44^\circ$ | D) $\cos 46^\circ$ | 30) _____ |
| 31) $\cos 48^\circ$
A) $\sin 42^\circ$ | B) $\sec 42^\circ$ | C) $\cos 138^\circ$ | D) $\sin 48^\circ$ | 31) _____ |
| 32) $\tan 24^\circ$
A) $\cot 66^\circ$ | B) $\tan 114^\circ$ | C) $\cot 156^\circ$ | D) $\cot 24^\circ$ | 32) _____ |
| 33) $\csc 60^\circ$
A) $\sec 30^\circ$ | B) $\sin 30^\circ$ | C) $\csc 120^\circ$ | D) $\sec 60^\circ$ | 33) _____ |
| 34) $\sin(\theta + 85^\circ)$
A) $\cos(5^\circ - \theta)$ | B) $\sin(175^\circ - \theta)$ | C) $\csc(5^\circ - \theta)$ | D) $\cos(175^\circ - \theta)$ | 34) _____ |
| 35) $\tan(\theta + 15^\circ)$
A) $\tan(75^\circ - \theta)$ | B) $\cot(75^\circ - \theta)$ | C) $\cot(165^\circ - \theta)$ | D) $\cot(105^\circ - \theta)$ | 35) _____ |
| 36) $\sec(\theta - 44^\circ)$
A) $\cos(134^\circ - \theta)$ | B) $\csc(46^\circ - \theta)$ | C) $\csc(134^\circ - \theta)$ | D) $\sec(136^\circ - \theta)$ | 36) _____ |
| 37) $\cot 50.5^\circ$
A) $\tan 129.5^\circ$ | B) $\cot 39.5^\circ$ | C) $\tan 39.5^\circ$ | D) $\tan 50.5^\circ$ | 37) _____ |
| 38) $\cos 31.9^\circ$
A) $\sec 148.1^\circ$ | B) $\sin 31.9^\circ$ | C) $\sin 58.1^\circ$ | D) $\cos 148.1^\circ$ | 38) _____ |
| 39) $\sec 41.5^\circ$
A) $\cos 48.5^\circ$ | B) $\csc 41.5^\circ$ | C) $\csc 48.5^\circ$ | D) $\cos 138.5^\circ$ | 39) _____ |

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

- | | | | | |
|--|-----------------|-----------------|-----------------|-----------|
| 40) $\sin A = \cos 5A$
A) 75° | B) 5° | C) 15° | D) 85° | 40) _____ |
| 41) $\sec \theta = \csc(\theta + 32^\circ)$
A) 16° | B) 29° | C) 74° | D) 61° | 41) _____ |
| 42) $\tan(3\alpha + 32^\circ) = \cot(\alpha + 36^\circ)$
A) 9.5° | B) 2° | C) 5.5° | D) 6° | 42) _____ |
| 43) $\sin(2\beta + 10^\circ) = \cos(3\beta - 10^\circ)$
A) 20° | B) 17.5° | C) 19° | D) 18° | 43) _____ |
| 44) $\sec(\theta + 15^\circ) = \csc(2\theta + 9^\circ)$
A) 20° | B) 24.5° | C) 22° | D) 16° | 44) _____ |
| 45) $\tan(3\theta + 17^\circ) = \cot(\theta + 7^\circ)$
A) 16° | B) 18° | C) 15.5° | D) 16.5° | 45) _____ |

Decide whether the statement is true or false.

- 46) $\sin 41^\circ > \sin 29^\circ$ 46) _____
 A) True B) False
- 47) $\cos 72^\circ \leq \cos 59^\circ$ 47) _____
 A) True B) False
- 48) $\tan 35^\circ < \tan 8^\circ$ 48) _____
 A) True B) False
- 49) $\sin 86^\circ < \cos 86^\circ$ 49) _____
 A) True B) False
- 50) $\tan 26^\circ > \cot 26^\circ$ 50) _____
 A) True B) False
- 51) $\sec 13^\circ < \sec 3^\circ$ 51) _____
 A) True B) False

Solve the problem for the given information.

- 52) Find the equation of a line passing through the origin and making a 45° angle with the positive x-axis. 52) _____
 A) $y = x$ B) $y = \frac{\sqrt{2}}{2}x$ C) $y = \frac{\sqrt{3}}{3}x$ D) $y = -x$
- 53) What angle does the line $y = x$ make with the positive x-axis? 53) _____
 A) 30° B) 60° C) 45° D) 90°
- 54) Find the equation of a line passing through the origin so that the sine of the angle between the line in quadrant and the positive x-axis is $\frac{\sqrt{3}}{2}$. 54) _____
 A) $y = x$ B) $y = \frac{\sqrt{3}}{2}x$ C) $y = \frac{\sqrt{3}}{3}x$ D) $y = \sqrt{3}x$
- 55) Find the equation of a line passing through the origin so that the sine of the angle between the line in quadrant and the positive x-axis is $\frac{\sqrt{2}}{2}$. 55) _____
 A) $y = \frac{\sqrt{3}}{3}x$ B) $y = \sqrt{3}x$ C) $y = \frac{\sqrt{2}}{2}x$ D) $y = x$
- 56) Find the equation of a line passing through the origin so that the cosine of the angle between the line in quadrant and the positive x-axis is $\frac{\sqrt{3}}{2}$. 56) _____
 A) $y = \frac{\sqrt{3}}{3}x$ B) $y = \frac{\sqrt{3}}{2}x$ C) $y = x$ D) $y = \sqrt{3}x$
- 57) Find the equation of a line passing through the origin so that the cosine of the angle between the line in quadrant and the positive x-axis is $\frac{1}{2}$. 57) _____
 A) $y = \frac{\sqrt{3}}{3}x$ B) $y = \frac{\sqrt{3}}{2}x$ C) $y = x$ D) $y = \sqrt{3}x$

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

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

$$\text{D) } y = \frac{1}{2}x$$

Find the reference angle for the given angle.

58) 55°

A) 145°

B) 35°

C) 125°

D) 55°

58) _____

59) 108°

A) 82°

B) 18°

C) 72°

D) 28°

59) _____

60) 247.3°

A) 112.7°

B) 22.7°

C) 67.3°

D) 157.3°

60) _____

61) -26.1°

A) 26.6°

B) 26.1°

C) 64.4°

D) 63.9°

61) _____

62) 420°

A) 30°

B) 120°

C) 60°

D) 150°

62) _____

63) -424°

A) 64°

B) 154°

C) 116°

D) 26°

63) _____

Find the exact value of the expression.

64) $\cos 30^\circ$

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

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

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

D) $\sqrt{3}$

64) _____

65) $\tan 60^\circ$

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

B) 2

C) $\sqrt{3}$

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

65) _____

66) $\sec 45^\circ$

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

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

C) $\sqrt{3}$

D) $\sqrt{2}$

66) _____

67) $\cos 210^\circ$

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

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

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

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

67) _____

68) $\tan 300^\circ$

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

B) $-\sqrt{3}$

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

D) $\sqrt{3}$

68) _____

69) $\cot 120^\circ$

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

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

C) -1

D) $-\sqrt{3}$

69) _____

70) $\sec 240^\circ$

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

B) 2

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

D) -2

70) _____

- 71) $\sec 150^\circ$ _____
 A) $\frac{2\sqrt{3}}{3}$ B) $\frac{2\sqrt{3}}{3}$ C) $-\sqrt{2}$ D) $\sqrt{2}$
- 72) $\csc 240^\circ$ _____
 A) 2 B) $\frac{2\sqrt{3}}{3}$ C) -2 D) $\frac{2\sqrt{3}}{3}$
- 73) $\csc 330^\circ$ _____
 A) $\frac{2\sqrt{3}}{3}$ B) 2 C) -2 D) $\frac{2\sqrt{3}}{3}$
- 74) $\csc 1920^\circ$ _____
 A) $\sqrt{2}$ B) $\frac{\sqrt{3}}{3}$ C) $\frac{2\sqrt{3}}{3}$ D) -2
- 75) $\csc (-240^\circ)$ _____
 A) $\frac{2\sqrt{3}}{3}$ B) $\frac{\sqrt{3}}{3}$ C) $\sqrt{2}$ D) -2
- 76) $\sec 2655^\circ$ _____
 A) $\frac{\sqrt{2}}{2}$ B) 2 C) $-\sqrt{2}$ D) $\frac{2\sqrt{3}}{3}$
- 77) $\sec (-1575^\circ)$ _____
 A) $\frac{\sqrt{2}}{2}$ B) $\frac{\sqrt{3}}{3}$ C) -1 D) $-\sqrt{2}$
- 78) $\tan 690^\circ$ _____
 A) $\frac{\sqrt{3}}{3}$ B) $\frac{\sqrt{2}}{2}$ C) 1 D) $-\sqrt{3}$
- 79) $\cot (-1215^\circ)$ _____
 A) $\sqrt{3}$ B) 1 C) $\frac{\sqrt{3}}{3}$ D) -1
- 80) $\sin (-2820^\circ)$ _____
 A) $\frac{\sqrt{3}}{2}$ B) -1 C) $\frac{1}{2}$ D) $\frac{\sqrt{2}}{2}$
- 81) $\sin 2115^\circ$ _____
 A) $\frac{1}{2}$ B) $2\sqrt{3}$ C) $\frac{\sqrt{3}}{2}$ D) $\frac{\sqrt{2}}{2}$
- 82) $\cos 1200^\circ$ _____
 A) $-\sqrt{3}$ B) $\frac{1}{2}$ C) $\frac{\sqrt{2}}{2}$ D) $\frac{\sqrt{3}}{2}$

83) $\cos(-2850^\circ)$

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

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

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

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

83) _____

Evaluate.

84) $\sin^2 30^\circ + \cos^2 30^\circ$

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

B) 0

C) 2

D) 1

84) _____

85) $3 \tan^2 60^\circ + 3 \sin^2 30^\circ - \cos^2 360^\circ$

A) $\frac{43}{4}$

B) $\frac{43}{4}$

C) $\frac{35}{4}$

D) $\frac{29}{4}$

85) _____

86) $\cos^2 135^\circ - \sin^2 90^\circ + 5 \tan^2 210^\circ$

A) $\frac{13}{6}$

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

C) $\frac{1}{6}$

D) $\frac{19}{6}$

86) _____

87) $5 \sin^2 240^\circ + \csc^2 150^\circ - \sec^2 30^\circ$

A) $\frac{13}{12}$

B) $\frac{77}{12}$

C) $\frac{8}{3}$

D) $\frac{29}{6}$

87) _____

88) $\cot^2 315^\circ + \sin 150^\circ + 3 \tan^2 315^\circ$

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

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

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

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

88) _____

89) $2 \cot^2 90^\circ + 2 \sec^2 180^\circ - \csc^2 315^\circ$

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

B) 4

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

D) 0

89) _____

90) $3 \cot^2 135^\circ + \tan^4 60^\circ - 4 \sin^4 0^\circ$

A) 84

B) 13

C) 8

D) 12

90) _____

Determine whether the statement is true or false.

91) $\cos 45^\circ + \cos 60^\circ = \cos 105^\circ$

A) True

B) False

91) _____

92) $\cos(180^\circ + 30^\circ) = \cos 180^\circ \cdot \cos 30^\circ - \sin 180^\circ \cdot \sin 30^\circ$

A) True

B) False

92) _____

93) $\cos 540^\circ = 1 - 2 \sin^2 270^\circ$

A) True

B) False

93) _____

94) $\cos 240^\circ = 1 - \sin^2 120^\circ$

A) True

B) False

94) _____

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

A) True

B) False

95) _____

96) $\cos 60^\circ = \cos 150^\circ \cos 90^\circ + \sin 150^\circ \sin 90^\circ$ 96) _____
 A) True B) False

97) $\cos 180^\circ = 2 \cos 210^\circ \cos 30^\circ + 2 \sin 210^\circ \sin 30^\circ$ 97) _____
 A) True B) False

98) $\sin 240^\circ = 2 \sin 120^\circ$ 98) _____
 A) True B) False

99) $\sin 0^\circ = 2 \sin 0^\circ \cos 0^\circ$ 99) _____
 A) True B) False

100) $\sin 225^\circ = \sin 135^\circ \cos 90^\circ + \cos 135^\circ \sin 90^\circ$ 100) _____
 A) True B) False

Find the sign of the following.

101) $\frac{\theta}{2}$ 101) _____
 $\csc$, given that θ is in the interval $(90^\circ, 180^\circ)$.
 A) negative B) positive

102) $\frac{\theta}{2}$ 102) _____
 $\sin$, given that θ is in the interval $(180^\circ, 270^\circ)$.
 A) positive B) negative

103) $\cot(\theta + 180^\circ)$, given that θ is in the interval $(90^\circ, 180^\circ)$. 103) _____
 A) positive B) negative

104) $\cot(\theta + 180^\circ)$, given that θ is in the interval $(270^\circ, 360^\circ)$. 104) _____
 A) positive B) negative

105) $\tan(-\theta)$, given that θ is in the interval $(90^\circ, 180^\circ)$. 105) _____
 A) negative B) positive

106) $\sin(-\theta)$, given that θ is in the interval $(180^\circ, 270^\circ)$. 106) _____
 A) negative B) positive

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

107) $\frac{1}{2}$ 107) _____
 $\cos \theta =$
 A) 150° and 210° B) 60° and 300° C) 210° and 330° D) 60° and 120°

108) $\frac{\sqrt{3}}{2}$ 108) _____
 $\sin \theta =$
 A) 60° and 300° B) 150° and 210° C) 210° and 330° D) 60° and 120°

109) $\frac{1}{2}$ 109) _____
 $\sin \theta = -$
 A) 210° and 330° B) 60° and 120° C) 150° and 210° D) 60° and 300°

110) $\cos \theta = -$

$\frac{\sqrt{3}}{2}$	110)				_____
	A) 210° and 330°	B) 60° and 300°	C) 150° and 210°	D) 60° and 120°	_____
111)	sec θ is undefined				111) _____
	A) 90° and 270°	B) 0° and 180°	C) 0°	D) 90°	
112)	$\cos \theta = \frac{\sqrt{3}}{2}$				112) _____
	A) 30° and 330°	B) 45° and 225°	C) 225° and 315°	D) 135° and 225°	
113)	sec $\theta = -\sqrt{2}$				113) _____
	A) 45° and 225°	B) 135° and 225°	C) 225° and 315°	D) 45° and 315°	
114)	$\sin \theta = -\frac{\sqrt{2}}{2}$				114) _____
	A) 45° and 225°	B) 225° and 315°	C) 45° and 315°	D) 135° and 225°	
115)	tan $\theta = 1$				115) _____
	A) 135° and 225°	B) 45° and 315°	C) 225° and 315°	D) 45° and 225°	
116)	cot $\theta = 1$				116) _____
	A) 135° and 225°	B) 45° and 315°	C) 45° and 225°	D) 225° and 315°	

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

117)	$\sin 81^{\circ}15'$				117) _____
	A) 0.9983615	B) 0.9783615	C) 0.9873615	D) 0.9883615	
118)	$\cos 366^{\circ}19'$				118) _____
	A) 1.193929	B) 0.993929	C) 0.4969645	D) 0.3969645	
119)	$\tan 63^{\circ}18'$				119) _____
	A) 1.9891787	B) 1.9885787	C) 1.9888787	D) 1.9882787	
120)	$\csc 7^{\circ}15'$				120) _____
	A) 7.923995	B) 7.925995	C) 7.922995	D) 7.924995	
121)	$\sec 57^{\circ}31'$				121) _____
	A) 1.8610093	B) 3.7250186	C) 3.7240186	D) 1.8620093	
122)	$\cot 40^{\circ}41'$				122) _____
	A) 1.1634916	B) 1.1632916	C) 1.1626916	D) 1.1630916	
123)	$\sin (-54^{\circ}47')$				123) _____
	A) -0.8009056	B) -0.8169772	C) -0.8138114	D) -0.8041682	
124)	$\frac{1}{\tan 55^{\circ}33'}$				124) _____
	A) 1.4577326	B) 1.4458003	C) 0.6859969	D) 0.6916585	

$$125) \frac{\sin 61^\circ}{\cos 61^\circ} \quad 125) \underline{\hspace{2cm}}$$

- A) 1.8040478 B) 1 C) 0.0174551 D) 0.5543091

$$126) \sin 49^\circ \cos 41^\circ + \cos 49^\circ \sin 41^\circ \quad 126) \underline{\hspace{2cm}}$$

- A) 2 B) 0 C) -1 D) 1

$$127) \cos 81^\circ 59' \cos 8^\circ 1' - \sin 81^\circ 59' \sin 8^\circ 1' \quad 127) \underline{\hspace{2cm}}$$

- A) 1 B) 2 C) 0 D) -1

$$128) \sin^2 28^\circ + \cos^2 28^\circ \quad 128) \underline{\hspace{2cm}}$$

- A) 0 B) 2 C) -1 D) 1

$$129) 2 \sin 25^\circ 13' \cos 25^\circ 13' - \sin 50^\circ 26' \quad 129) \underline{\hspace{2cm}}$$

- A) -1 B) 0 C) 2 D) 1

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

$$130) \sin (45^\circ + 120^\circ) = \sin 45^\circ + \sin 120^\circ \quad 130) \underline{\hspace{2cm}}$$

- A) True B) False

$$131) \sin (30^\circ + 210^\circ) = \sin 30^\circ \cdot \cos 210^\circ + \cos 30^\circ \cdot \sin 210^\circ \quad 131) \underline{\hspace{2cm}}$$

- A) True B) False

$$132) \sin (2 \cdot 135^\circ) = 2 \cdot \sin 135^\circ \quad 132) \underline{\hspace{2cm}}$$

- A) True B) False

$$133) \sin (2 \cdot 210^\circ) = 2 \cdot \sin 210^\circ \cdot \cos 210^\circ \quad 133) \underline{\hspace{2cm}}$$

- A) True B) False

$$134) \cos (2 \cdot 180^\circ) = 2 \cdot \cos 180^\circ \quad 134) \underline{\hspace{2cm}}$$

- A) True B) False

$$135) \cos (2 \cdot 225^\circ) = \cos^2 225^\circ - \sin^2 225^\circ \quad 135) \underline{\hspace{2cm}}$$

- A) True B) False

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.

$$136) \sin \theta = 0.2239939 \quad 136) \underline{\hspace{2cm}}$$

- A) 12.9437229° B) 77.0562771° C) 192.943723° D) 167.056277°

$$137) \cos \theta = 0.22146103 \quad 137) \underline{\hspace{2cm}}$$

- A) 102.794861° B) 282.794861° C) 12.7948608° D) 77.2051392°

$$138) \tan \theta = 0.78557547 \quad 138) \underline{\hspace{2cm}}$$

- A) 51.8476914° B) 218.152309° C) 38.1523086° D) 321.847691°

$$139) \tan \theta = 1.9527292 \quad 139) \underline{\hspace{2cm}}$$

- A) 117.117157° B) 242.882843° C) 62.8828427° D) 27.1171573°

$$140) \cot \theta = 1.4100183 \quad 140) \underline{\hspace{2cm}}$$

- A) 35.3446720° B) 54.6553280° C) 44.8292718° D) 45.1707282°

141) $\sec \theta = 2.1411882$

A) 28.8032142°

B) 27.8417059°

C) 62.1582940°

D) 25.0340049°

141) _____

142) $\csc \theta = 1.7596469$

A) 60.3906112°

B) 55.3685257°

C) 34.6314743°

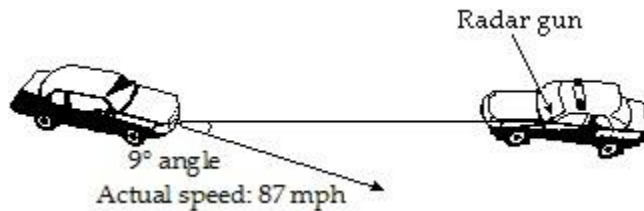
D) 29.6093888°

142) _____

Solve the problem.

- 143) 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.

143) _____



A) 87.99 mph

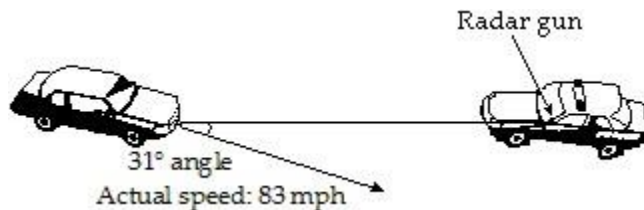
B) 86.01 mph

C) 13.61 mph

D) 85.93 mph

- 144) 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.

144) _____



A) 71.14 mph

B) 82.14 mph

C) 83.86 mph

D) 42.75 mph

- 145) 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 2000-lb car traveling uphill on a 2° grade ($\theta = 2^\circ$)?

145) _____

A) -70 lb

B) 70 lb

C) 2002 lb

D) -2002 lb

- 146) 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.

146) _____

A) 3800 lb

B) 4300 lb

C) 4100 lb

D) 4000 lb

- 147) 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 2500-lb car traveling downhill on a 6° grade ($\theta = -6^\circ$)?

147) _____

A) 261 lb

B) -261 lb

C) -2506 lb

D) 2506 lb

- 148) 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 2050-lb car on a level road ($\theta = 0^\circ$)? 148) _____

A) undefined B) 2050 lb C) 0 lb D) -2050 lb

- 149) 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 2550-lb car has just rolled off a sheer vertical cliff ($\theta = -90^\circ$). What is the car's grade resistance? 149) _____

A) 0 lb B) 2550 lb C) undefined D) -2550 lb

- 150) If an automobile is traveling at velocity V (in feet per second), the safe radius R for a curve with 150) _____

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 53 miles per hour. If $\alpha = 4^\circ$, $g = 30.5$, and $f = 0.16$, calculate R . Round to the nearest foot. (Hint: 1 mile = 5280 feet)

A) $R = 862$ ft B) $R = 1312$ ft C) $R = 845$ ft D) $R = 882$ ft

- 151) A formula used by an engineer to determine the safe radius of a curve, R , when designing a road 151) _____ 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 $V = 80$ ft per sec, $f = 0.1$, $g = 30$, and $\alpha = 2.7^\circ$, find R . Round to the nearest foot.

A) $R = 1450$ ft B) $R = 1453$ ft C) $R = 1460$ ft D) $R = 1447$ ft

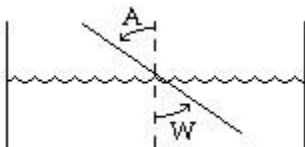
- 152) A formula used by an engineer to determine the safe radius of a curve, R , when designing a 152) _____ particular road is:

$R = \frac{V^2}{g(f + \tan \alpha)}$, where α is the superelevation of the road and V is the velocity (in feet per second) for which the curve is designed. If $\alpha = 1.1^\circ$, $f = 0.1$, $g = 30$, and $R = 1331.36$ ft, find V . Round to the nearest foot per second.

A) $V = 72$ ft per sec B) $V = 69$ ft per sec
C) $V = 65$ ft per sec D) $V = 67$ ft per sec

- 153) The index of refraction for air, I_a , is 1.0003. The index of refraction for water, I_w , is 1.3. If 153) _____

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



A) 23.7° B) 22.7° C) 20.7° D) 21.7°

- 154) 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 $c_1 = 3 \times 10^9$, 154) _____

$\theta_1 = 44^\circ$, and $\theta_2 = 38^\circ$, find c_2 .

A) $c_2 = 2.66 \times 10^8$ B) $c_2 = 2.66 \times 10^9$ C) $c_2 = 3.19 \times 10^9$ D) $c_2 = 2.42 \times 10^9$

- 155) $\frac{c_1}{c_2} = \frac{\sin \theta_1}{\sin \theta_2}$. Snell's Law states that $c_2 = 5.38 \times 10^9$, $\theta_1 = 50^\circ$, find θ_2 . Use this law to find the requested value. If $c_1 = 8 \times 10^9$, Round your answer to the nearest degree. 155) _____
- A) $\theta_2 = 31^\circ$ B) $\theta_2 = 30^\circ$ C) $\theta_2 = 33^\circ$ D) $\theta_2 = 34^\circ$

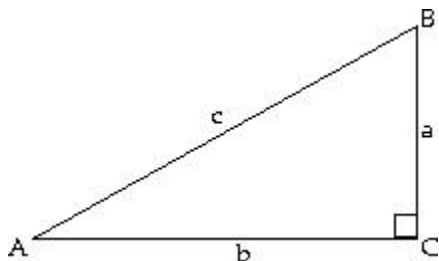
- 156) $\frac{c_1}{c_2} = \frac{\sin \theta_1}{\sin \theta_2}$. Snell's Law states that $c_2 = 4.47 \times 10^8$, $\theta_2 = 33^\circ$, find θ_1 . Use this law to find the requested value. If $c_1 = 6 \times 10^8$, Round your answer to the nearest degree. 156) _____
- A) $\theta_1 = 50^\circ$ B) $\theta_1 = 47^\circ$ C) $\theta_1 = 48^\circ$ D) $\theta_1 = 45^\circ$

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

- 157) 17 ft 157) _____
- A) 16.9 ft to 17.1 ft B) 16.75 ft to 17.25 ft
- C) 16.5 ft to 17.5 ft D) 16 ft to 18 ft
- 158) 4.5 m 158) _____
- A) 3.5 m to 5.5 m B) 4.49 m to 4.51 m
- C) 4.475 m to 4.525 m D) 4.45 m to 4.55 m
- 159) 35.53 k 159) _____
- A) 35.529 kg to 35.531 kg B) 34.53 kg to 36.53 kg
- C) 35.5275 kg to 35.5325 kg D) 35.525 kg to 35.535 kg

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

- 160) 160) _____



$A = 17^\circ 39'$, $c = 224$ ft

Round side lengths to two decimal places.

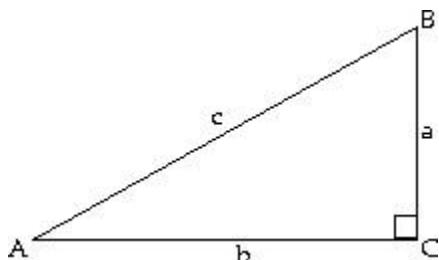
A) $B = 73^\circ 20'$; $a = 67.92$ ft; $b = 209.46$ ft

C) $B = 72^\circ 21'$; $a = 67.35$ ft; $b = 212.57$ ft

B) $B = 72^\circ 21'$; $a = 67.92$ ft; $b = 213.46$ ft

D) $B = 72^\circ 20'$; $a = 71.12$ ft; $b = 214.66$ ft

- 161) 161) _____
- $B = 68^\circ 14'$; $a = 17$ km. Round side length

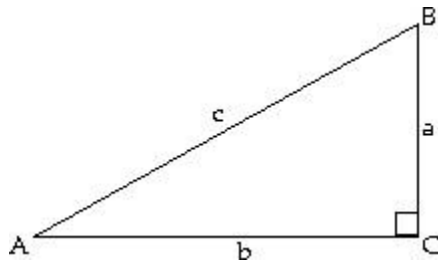


161) _____

- A) $A = 21^\circ 46'$; $c = 18.3$ km; $a = 6.8$ km
 C) $A = 21^\circ 46'$; $c = 45.8$ km; $a = 6.8$ km

- B) $A = 21^\circ 46'$; $c = 45.8$ km; $a = 18.3$ km
 D) $A = 21^\circ 46'$; $c = 18.3$ km; $a = 45.7$ km

162)



$A = 33.3^\circ$, $b = 3.8$ m

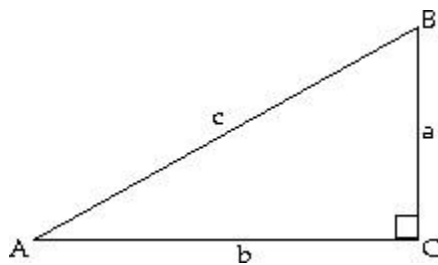
Round side lengths to one decimal place.

- A) $B = 56.7^\circ$; $a = 2.5$ m; $c = 4.5$ m
 C) $B = 56.7^\circ$; $a = 1.4$ m; $c = 4.0$ m

- B) $B = 56.7^\circ$; $a = 1.4$ m; $c = 5.0$ m
 D) $B = 56.7^\circ$; $a = 5.0$ m; $c = 6.3$ m

162) _____

163)



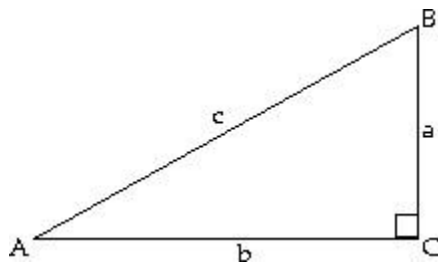
$B = 65.4834^\circ$, $c = 3829.0$ m

Give side lengths to two decimal places.

- A) $A = 24.5166^\circ$; $a = 1499.05$ m; $b = 3468.48$ m
 B) $A = 24.5166^\circ$; $a = 1651.45$ m; $b = 3483.78$ m
 C) $A = 24.5166^\circ$; $a = 1588.87$ m; $b = 3438.39$ m
 D) $A = 24.5166^\circ$; $a = 1588.87$ m; $b = 3483.78$ m

163) _____

164)



$B = 58.45^\circ$, $a = 565.4$ m

Give side lengths to two decimal places.

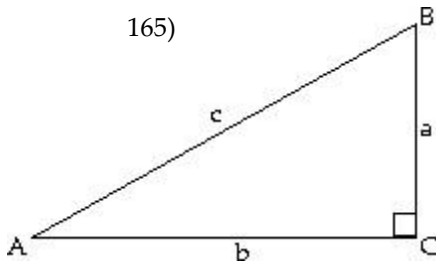
- A) $A = 31.55^\circ$; $b = 864.30$ m; $c = 1080.57$ m
 C) $A = 31.55^\circ$; $b = 920.84$ m; $c = 1080.57$ m

- B) $A = 31.55^\circ$; $b = 977.38$ m; $c = 1067.00$ m
 D) $A = 31.55^\circ$; $b = 920.84$ m; $c = 1093.22$ m

164) _____

165)

165)

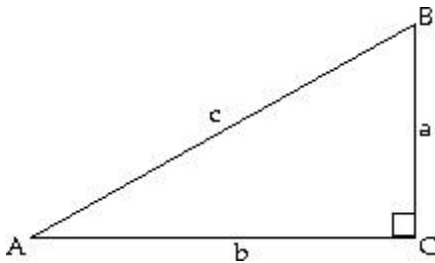


$a = 20.3$
 cm , $b =$
 20.8 cm
 Round
 the
 missing
 side
 length to
 one
 decimal
 place.

- A) $A = 77^\circ 25'$; $B = 12^\circ 35'$; $c = 27.1 \text{ cm}$
 C) $A = 44^\circ 18'$; $B = 45^\circ 42'$; $c = 30.8 \text{ cm}$

- B) $A = 77^\circ 25'$; $B = 12^\circ 35'$; $c = 29.1 \text{ cm}$
 D) $A = 44^\circ 18'$; $B = 45^\circ 42'$; $c = 29.1 \text{ cm}$

166)



$a = 82.32 \text{ ft}$, $c = 291 \text{ ft}$

Round the missing side length to two decimal places.

- A) $A = 14^\circ 26'$, $B = 75^\circ 34'$, $b = 293.07 \text{ ft}$
 C) $A = 17^\circ 26'$, $B = 72^\circ 34'$, $b = 279.11 \text{ ft}$

- B) $A = 16^\circ 26'$, $B = 73^\circ 34'$, $b = 259.57 \text{ ft}$
 D) $A = 16^\circ 26'$; $B = 73^\circ 34'$; $b = 279.11 \text{ ft}$

Solve the right triangle.

167) $a = 3.4 \text{ cm}$, $b = 3.2 \text{ cm}$, $C = 90^\circ$

Round values to one decimal place.

- A) $A = 46.7^\circ$, $B = 43.3^\circ$, $c = 4.7 \text{ cm}$
 C) $A = 43.3^\circ$, $B = 46.7^\circ$, $c = 4.7 \text{ cm}$

- B) $A = 42.2^\circ$, $B = 47.8^\circ$, $c = 4.7 \text{ cm}$
 D) $A = 70.3^\circ$, $B = 19.7^\circ$, $c = 6.6 \text{ cm}$

168) $a = 3.5 \text{ m}$, $B = 41.5^\circ$, $C = 90^\circ$

Round values to one decimal place.

- A) $A = 48.5^\circ$, $b = 5.6 \text{ m}$, $c = 6.6 \text{ m}$
 C) $A = 48.5^\circ$, $b = 3.1 \text{ m}$, $c = 4.7 \text{ m}$

- B) $A = 48.5^\circ$, $b = 5.6 \text{ m}$, $c = 4.7 \text{ m}$
 D) $A = 48.5^\circ$, $b = 2 \text{ m}$, $c = 4.0 \text{ m}$

169) $a = 2.4 \text{ in.}$, $A = 51.6^\circ$, $C = 90^\circ$

Round values to one decimal place.

- A) $b = 0.8 \text{ in.}$, $B = 38.4^\circ$, $c = 2.5 \text{ in.}$
 C) $b = 3.6 \text{ in.}$, $B = 38.4^\circ$, $c = 3.1 \text{ in.}$

- B) $b = 1.9 \text{ in.}$, $B = 38.4^\circ$, $c = 3.1 \text{ in.}$
 D) $b = 3.6 \text{ in.}$, $B = 38.4^\circ$, $c = 4.3 \text{ in.}$

166) _____

167) _____

168) _____

169) _____

170) $B = 34.4^\circ$, $c = 4.6$ mm, $C = 90^\circ$

Round values to one decimal place.

A) $a = 2.6$ mm, $A = 55.6^\circ$, $b = 3.8$ mm

C) $a = 3.8$ mm, $A = 55.6^\circ$, $b = 3$ mm

B) $a = 3.8$ mm, $A = 55.6^\circ$, $b = 2.6$ mm

D) $a = 3$ mm, $A = 55.6^\circ$, $b = 3.5$ mm

170) _____

171) $A = 14^\circ 14'$, $c = 269$ ft, $C = 90^\circ$

Round side lengths to two decimal places, if necessary.

A) $B = 76^\circ 45'$, $a = 66.14$ ft, $b = 256.74$ ft

C) $B = 75^\circ 46'$, $a = 65.57$ ft, $b = 259.85$ ft

B) $B = 75^\circ 46'$, $a = 66.14$ ft, $b = 260.74$ ft

D) $B = 75^\circ 45'$, $a = 69.34$ ft, $b = 261.94$ ft

171) _____

172) $A = 64^\circ 13'$, $c = 219$ m, $C = 90^\circ$

Round side lengths to two decimal places, if necessary.

A) $B = 25^\circ 13'$, $a = 198.4$ m, $b = 88.26$ m

C) $B = 25^\circ 47'$, $a = 197.4$ m, $b = 102.26$ m

B) $B = 26^\circ 37'$, $a = 197.4$ m, $b = 95.26$ m

D) $B = 25^\circ 47'$, $a = 197.2$ m, $b = 95.26$ m

172) _____

Solve the problem.

173) 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) 49 m

B) 21 m

C) 63 m

D) 45 m

173) _____

174) 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?

A) 24 m

B) 51 m

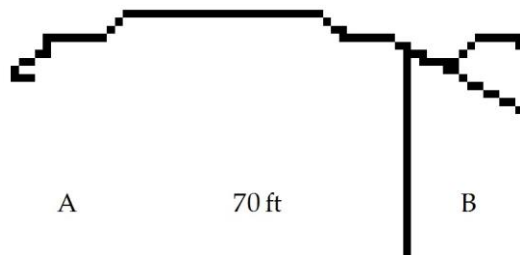
C) 72 m

D) 64 m

174) _____

175) To measure the width of a river, a surveyor starts at point A on one bank and walks 70 feet down the river to point B. He then measures the angle ABC to be $24^\circ 38' 12''$. Estimate the width of the river to the nearest foot. See the figure below.

C



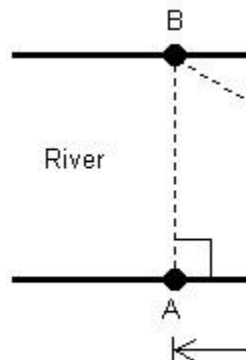
A) 29 ft

B) 64 ft

C) 32 ft

D) 153 ft

176) 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 90 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)?



176)

A) 52 ft

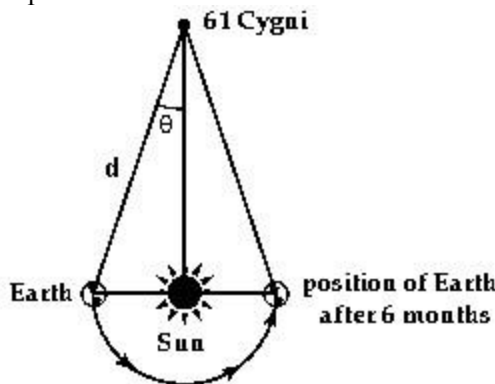
B) 104 ft

C) 45 ft

D) 156 ft

- 177) 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 $\theta = 0.314$ seconds = $\frac{0.314}{60}$ minutes = $\frac{0.314}{60 \cdot 60}$ degrees, determine the distance d from Earth to 61 Cygni using Bessel's figures. Express the answer in scientific notation.

A) 2.28×10^{13} kmB) 1.97×10^{14} kmC) 1.05×10^{14} kmD) 9.85×10^{13} km

- 178) A tunnel is to be dug from point A to point B. Both A and B are visible from point C. If AC is 220 miles and BC is 547 miles, and if angle C is 90° , find the measure of angle B. Round your answer to the tenths place.

A) 31.4° B) 21.9° C) 34.1° D) 18.7°

- 179) The length of the base of an isosceles triangle is 55.07 meters. Each base angle is 31.89° . Find the length of each of the two equal sides of the triangle. Round your answer to the hundredths place.

A) 52.12 m

B) 44.25 m

C) 32.43 m

D) 64.86 m

- 180) From a boat on the lake, the angle of elevation to the top of a cliff is $30^\circ 59'$. If the base of the cliff is 1194 feet from the boat, how high is the cliff (to the nearest foot)?

A) 727 ft

B) 730 ft

C) 717 ft

D) 720 ft

- 181) From a boat on the river below a dam, the angle of elevation to the top of the dam is $22^\circ 56'$. If the dam is 1688 feet above the level of the river, how far is the boat from the base of the dam (to the nearest foot)?

A) 3990 ft

B) 3970 ft

C) 3980 ft

D) 3960 ft

- 182) From a balloon 834 feet high, the angle of depression to the ranger headquarters is $72^\circ 28'$. How far is the headquarters from a point on the ground directly below the balloon (to the nearest foot)?

A) 263 ft

B) 268 ft

C) 253 ft

D) 258 ft

- 183) When sitting atop a tree and looking down at his pal Joey, the angle of depression of Mack's line of sight is $34^\circ 15'$. If Joey is known to be standing 10 feet from the base of the tree, how tall is the tree (to the nearest foot)?

A) 7 ft

B) 11 ft

C) 13 ft

D) 9 ft

- 184) From the top of a vertical tower, 374 feet above the the surface of the earth, the angle of depression to a doghouse is $24^{\circ} 34'$. How far is it from the doghouse to the foot of the tower? Round your answer to the hundredths place when necessary. 184) _____

A) 920.74 ft

B) 802.55 ft

C) 818.14 ft

D) 830.54 ft

- 185) A 33-foot ladder is leaning against the side of a building. If the ladder makes an angle of $22^{\circ} 38'$ 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. 185) _____

A) 14 ft

B) 12.7 ft

C) 18.4 ft

D) 3.33 ft

- 186) A 39-foot ladder is leaning against the side of a building. If the ladder makes an angle of $23^{\circ} 41'$ 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. 186) _____

A) 33.15 ft

B) 35.72 ft

C) 38.88 ft

D) 36.92 ft

- 187) A contractor needs to know the height of a building to estimate the cost of a job. From a point 91 feet away from the base of the building, the angle of elevation to the top of the building is found to be $47^{\circ} 53'$. Find the height of the building. Round your answer to the hundredths place when necessary. 187) _____

A) 100.65 ft

B) 99.12 ft

C) 103.55 ft

D) 104.88 ft

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.

- 188) (7, 0) 188) _____
 A) 90° ; N 90° E or S 90° E
 B) 270° ; N 90° E or S 90° E
 C) 270° ; N 90° W or S 90° W
 D) 90° ; N 90° W or S 90° W

- 189) (-3, -3) 189) _____
 A) 315° ; N 45° E
 B) 315° ; N 45° W
 C) 225° ; S 45° W
 D) 225° ; S 45° E

- 190) (3, -3) 190) _____
 A) 45° ; S 45° E
 B) 135° ; S 45° E
 C) 135° ; N 45° W
 D) 45° ; N 45° W

- 191) (0, -9) 191) _____
 A) 180° ; N 0° W or N 0° E
 B) 180° ; S 0° W or S 0° E
 C) 0° ; N 0° W or N 0° E
 D) 0° ; S 0° W or S 0° E

Solve the problem.

- 192) A fire is sighted due west of lookout A. The bearing of the fire from lookout B, 12.6 miles due south of A, is N $40^{\circ} 50'$ W. How far is the fire from B (to the nearest tenth of a mile)? 192) _____

A) 16.7 mi

B) 19.7 mi

C) 17.7 mi

D) 18.7 mi

- 193) A boat sails for 5 hours at 25 mph in a direction $164^{\circ} 23'$. How far south has it sailed (to the nearest mile)? 193) _____

A) 118 mi

B) 120 mi

C) 116 mi

D) 122 mi

- 194) A boat sails for 5 hours at 30 mph in a direction $164^{\circ} 56'$. How far south has it sailed (to the nearest mile)? 194) _____

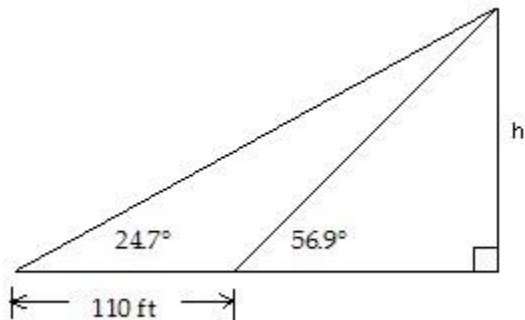
A) 141 mi

B) 147 mi

C) 143 mi

D) 145 mi

- 195) An airplane travels at 200 km/h for 1 hr in a direction of 323° from Greenville. At the end of this time, how far west of Greenville is the plane (to the nearest kilometer)? 195) ____
 A) 160 km B) 265 km C) 332 km D) 120 km
- 196) An airplane travels at 145 km/h for 5 hr in a direction of 97° from a local airport. At the end of this time, how far east of the airport is the plane (to the nearest kilometer)? 196) ____
 A) 720 km B) 730 km C) 89 km D) 88 km
- 197) A ship travels 58 km on a bearing of 21° , and then travels on a bearing of 111° for 123 km. Find the distance from the starting point to the end of the trip, to the nearest kilometer. 197) ____
 A) 21 km B) 136 km C) 54 km D) 181 km
- 198) 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. 198) ____
 A) 5.07 mi B) 4.57 mi C) 7.05 mi D) 7.55 mi
- 199) Find h as indicated in the figure. Round to the nearest foot. 199) ____



- A) 72 ft B) 77 ft C) 69 ft D) 75 ft
- 200) Find h as indicated in the figure. Round to the nearest meter. 200) ____
-
- A right triangle with a vertical leg of height h and a horizontal leg. A point on the horizontal leg is 85 m from the left vertex. The angle of elevation from the left vertex to the top is $26^\circ 4'$. The angle of elevation from the point 85 m from the left vertex to the top is $55^\circ 17'$.
- A) 83 m B) 63 m C) 163 m D) 48 m
- 201) The angle of elevation from a point on the ground to the top of a tower is $35^\circ 16'$. The angle of elevation from a point 130 feet farther back from the tower is $24^\circ 18'$. Find the height of the tower. Round to the nearest foot. 201) ____
 A) 162 ft B) 1624 ft C) 158 ft D) 173 ft
- 202) Bob is driving along a straight and level road straight toward a mountain. At some point on his trip he

measures 202)

the angle

of

elevation

to the

top of

the

mountain

and

finds it

to be

$22^{\circ} 39'$.

He then

drives 1

mile

(1 mile = 5280 ft)

more

and

measures

the angle

of

elevation

to be

$33^{\circ} 58'$.

Find the

height of

the

mountain

to the

nearest

foot.

A) 5889 ft

B) 57,893 ft

C) 578,931 ft

D) 5789 ft

203) 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 $19^{\circ} 25'$. When the boat stops, the angle of depression is $48^{\circ} 5'$. 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.

203) _____

A) 433 ft

B) 388 ft

C) 373 ft

D) 410 ft

204) 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 $27^{\circ} 4'$. When the car stops, the angle of depression is $49^{\circ} 11'$. The building is 210 feet tall. How far did the car travel from when it was first noticed until it stopped? Round to the nearest foot.

204) _____

A) 430 ft

B) 256 ft

C) 209 ft

D) 230 ft

205) 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 $49^{\circ} 48'$. When the car stops, the angle of depression is $23^{\circ} 16'$. The building is 210 feet tall. How far did the car travel from when it was first noticed until it stopped? Round to the nearest foot.

205) _____

A) 290 ft

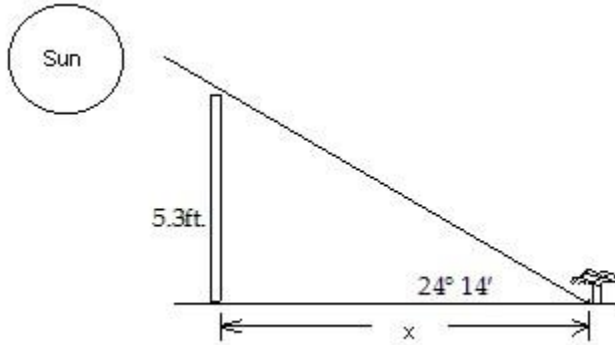
B) 511 ft

C) 311 ft

D) 337 ft

- 206) In one area, the lowest angle of elevation of the sun in winter is $24^\circ 14'$. Find the minimum distance x that a plant needing full sun can be placed from a fence that is 5.3 feet high. Round your answer to the tenths place when necessary.

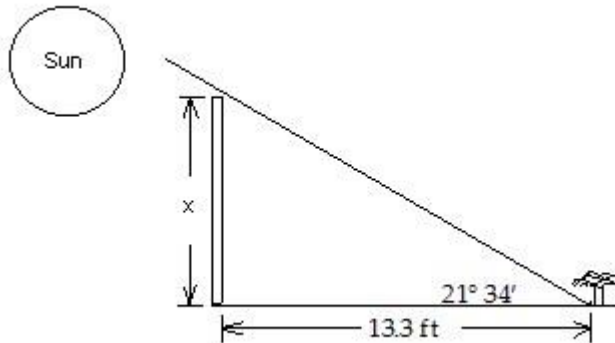
206) _____



- A) 15.2 ft B) 11.4 ft C) 11.8 ft D) 12 ft

- 207) In one area, the lowest angle of elevation of the sun in winter is $21^\circ 34'$. A fence is to be built 13.3 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.

207) _____

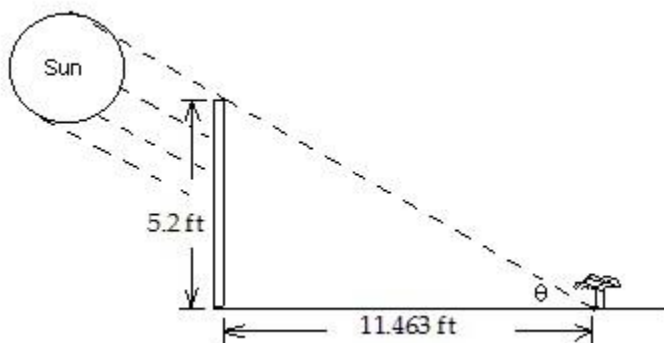


necessary.

- A) 5.6 ft B) 4.6 ft C) 5.3 ft D) 6.8 ft

- 208) A 5.2-ft fence is 11.463 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.

208) _____



- A) $\theta = 24.6^\circ$ B) $\theta = 24.4^\circ$ C) $\theta = 25.8^\circ$ D) $\theta = 24.2^\circ$

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

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

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

156) B
157) C
158) D
159) D
160) B
161) A
162) A
163) D
164) C
165) D
166) D
167) A
168) C
169) B
170) B
171) B
172) D
173) B
174) A
175) C
176) A
177) D
178) B
179) C
180) C
181) A
182) A
183) A
184) C
185) B
186) B
187) A
188) A
189) C
190) B
191) B
192) A
193) B
194) D
195) D
196) A
197) B
198) A
199) A
200) B
201) A
202) D
203) B
204) D
205) C
206) C
207) C

208) B