

62. Which expression is NOT equal to the other three expressions? **C**
- A. $\frac{2}{\tan \theta}$ B. $\frac{\cot \theta}{\frac{1}{2}}$ C. $\frac{\sin \theta}{\frac{1}{2}\cos \theta}$ D. $\frac{2\cos \theta}{\sin \theta}$
63. Which equation is NOT true? **H**
- F. $\cos^2 \theta = 1 - \sin^2 \theta$ G. $\cot^2 \theta = \csc^2 \theta - 1$
H. $\sin^2 \theta = \cos^2 \theta - 1$ J. $\tan^2 \theta = \sec^2 \theta - 1$
64. Which expressions are equivalent? **C**
- I. $(\sin \theta)(\csc \theta - \sin \theta)$ II. $\sin^2 \theta - 1$ III. $\cos^2 \theta$
- A. I and II only B. II and III only
C. I and III only D. I, II, and III
65. How can you express $\csc^2 \theta - 2 \cot^2 \theta$ in terms of $\sin \theta$ and $\cos \theta$? **F**
- F. $\frac{1 - 2\cos^2 \theta}{\sin^2 \theta}$ G. $\frac{1 - 2\sin^2 \theta}{\sin^2 \theta}$
H. $\sin^2 \theta - 2 \cos^2 \theta$ J. $\frac{1}{\sin^2 \theta} - \frac{2}{\tan^2 \theta}$
66. Which expression is equivalent to $\frac{\tan \theta}{\cos \theta - \sec \theta}$? **C**
- A. $\csc \theta$ B. $\sec \theta$ C. $-\csc \theta$ D. $\tan^2 \theta$
67. Show that $(\sec \theta + 1)(\sec \theta - 1) = \tan^2 \theta$ is an identity. **See margin.**
68. Show that $\frac{\cos x}{1 - \sin^2 x} = \sec x$ is an identity. **See back of book.**

$$\begin{aligned}
 67. [2] \quad & (\sec \theta + 1)(\sec \theta - 1) \\
 & = \sec^2 \theta + \sec \theta - \\
 & \quad \sec \theta - 1 \\
 & = \sec^2 \theta - 1 = \tan^2 \theta
 \end{aligned}$$

[1] does not show work

Test-taking strategies with
Transparencies

$$\begin{aligned}
 31. [4] \quad & 2 \sin^2 \theta = -\sin \theta \\
 & 2 \sin^2 \theta + \sin \theta = 0 \\
 & \sin \theta (2 \sin \theta + 1) = 0 \\
 & \sin \theta = 0 \quad 2 \sin \theta + 1 = 0 \\
 & \sin \theta = -\frac{1}{2} \\
 & \sin^{-1} 0 = 0, \pi \\
 & \sin^{-1} \left(-\frac{1}{2}\right) = \frac{11\pi}{6}, \frac{7\pi}{6}
 \end{aligned}$$

[3] appropriate methods, with minor error

[2] answer only, without work shown

[1] finds only one solution for each instance where it might equal 0



Test Prep

Multiple Choice

$$\begin{aligned}
 80. [2] \quad & 2 \cos \theta = \sqrt{2} \\
 & \cos \theta = \frac{\sqrt{2}}{2} \\
 & \cos^{-1} \frac{\sqrt{2}}{2} = \theta \\
 & \theta = \frac{\pi}{4} \text{ and } \frac{7\pi}{4}
 \end{aligned}$$

[1] finds solution in Quadrant I only

Short Response

Extended Response

75. Which of the following is NOT equal to 60° ? **D**
- A. $\sin^{-1} \frac{\sqrt{3}}{2}$ B. $\cos^{-1} \frac{1}{2}$ C. $\tan^{-1} \sqrt{3}$ D. $\tan^{-1} \frac{\sqrt{3}}{3}$
76. In which quadrants are the solutions to $\tan \theta + 1 = 0$? **H**
- F. Quadrants I and II G. Quadrants II and III
H. Quadrants II and IV J. Quadrants III and IV
77. Which of these angles have a sine of about -0.6 ? **C**
- I. 143.1° II. 216.9° III. 323.1°
- A. I and II only B. I and III only
C. II and III only D. I, II, and III
78. What is the solution of $2 \sin \theta - \sqrt{3} = 0$ for $0 \leq \theta < 2\pi$? **G**
- F. $\frac{\pi}{6}$ and $\frac{5\pi}{6}$ G. $\frac{\pi}{3}$ and $\frac{2\pi}{3}$
H. $\frac{2\pi}{3}$ and $\frac{4\pi}{3}$ J. $\frac{4\pi}{3}$ and $\frac{5\pi}{3}$
79. Suppose $a > 0$. Under what conditions for a and b will a $\sin \theta = b$ have exactly two solutions in the interval $0 \leq \theta < 2\pi$? **D**
- A. $a = b$ B. $b > a$
C. $a = -b$ D. $a > b > -a$
80. Solve $2 \cos \theta = \sqrt{2}$ for $0 \leq \theta < 2\pi$. **See left.**
81. Solve $2 \sin^2 \theta = -\sin \theta$ for $0 \leq \theta < 2\pi$. Show your work. **See margin.**

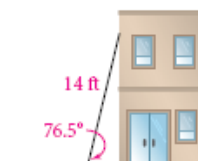


Test Prep

Multiple Choice

54. A ladder rests against a vertical building, as shown at the right. The ladder is 14 ft long and forms an angle of 76.5° with the ground. Which statement is NOT true? **A**

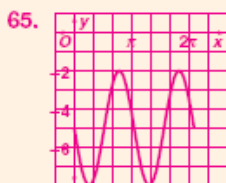
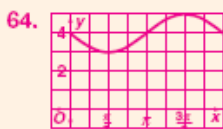
- A. The bottom of the ladder is 13.6 ft from the base of the building.
- B. The bottom of the ladder is 3.3 ft from the base of the building.
- C. The top of the ladder is 13.6 ft from the ground.
- D. The ladder forms an angle of 13.5° with the building.



55. The sides of a rectangle are 25 cm and 8 cm. What is the measure of the angle formed by the short side and the diagonal of the rectangle? **J**

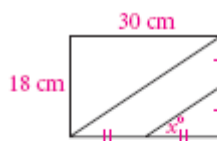
- F. 17.7°
- G. 18.7°
- H. 71.3°
- J. 72.3°

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56. The figure at the right is a rectangle. What is the value of x ? **A**

- A. 31.0
- B. 36.9
- C. 53.1
- D. 59.0



57. In $\triangle XYZ$, $\angle Z$ is a right angle and $\tan X = \frac{8}{15}$.

What is $\sin Y$? **G**

- F. $\frac{8}{17}$
- G. $\frac{15}{17}$
- H. $\frac{17}{15}$
- J. $\frac{15}{8}$

58. In the right triangle at the right, $\cos y^\circ = \frac{5}{13}$.

If $x + 2z = 7.1$, what is the value of z ? **C**

- A. 67.3
- B. 22.6
- C. -7.76
- D. -30.1



59. Find the measures of the acute angles of a

right triangle, to the nearest tenth, if the legs are 135 cm and 95 cm.

See back of book.



Test Prep

Multiple Choice

49. [2] Area = $\frac{1}{2}ab \sin C$

$$\sin C = \frac{2(\text{Area})}{ab}$$

$$= \frac{2(31.5)}{9(14)} = 0.5$$

$$m\angle C = \sin^{-1}0.5 = 30^\circ$$

[1] answer only OR
minor computational
error

Short Response

50. [2] 45° and 105°

[1] one angle measure
correct

51. [2] Area = $\frac{1}{2}ab \sin M$

$$= \frac{1}{2}(3.1)(6.0)\sin(45^\circ)$$

$$\approx 6.6$$

Area is 6.6 cm^2

[1] answer only OR
minor computational
error

46. In $\triangle GDL$, $m\angle D = 57^\circ$, $DL = 10.1$, and $GL = 9.4$. What is the best estimate for $m\angle G$?

- A. 64 B. 51 C. 39 D. 26

47. For which set of given information can you compute the area of a triangle?

- J F. Given: the length of one side and the measure of the angle opposite it
G. Given: the length of one side and the measure of an angle adjacent to it
H. Given: the lengths of two sides and the measure of a nonincluded angle
J. Given: the lengths of two sides and the measure of the included angle

48. A surveyor picks two points 250 m apart in front of a tall building. The angle of elevation from one point is 37° . The angle of elevation from the other point is 13° . What is the best estimate for the height of the building?

- A. 150 m B. 138 m C. 83 m D. 56 m

49. Two sides of a scalene triangle are 9 m and 14 m. The area of the triangle is 31.5 m^2 . Find the measure of one of the angles of the triangle to the nearest tenth of a degree. Show your work. **See left.**

Use the diagram for Exercises 50 and 51.

50. Let $m\angle N = 30^\circ$. Find the measures of the other two angles to the nearest degree.

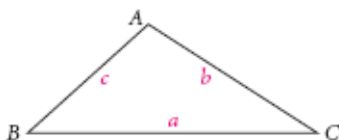
51. Let $m\angle M = 45^\circ$. Find the area of the triangle to the nearest tenth of a square centimeter. Show your work.



Test Prep

Gridded Response

Use the diagram below for Questions 53–58. Angle measures are in degrees.



53. Let $a = 23.2$, $b = 18.5$, and $m\angle C = 42$. Find c to the nearest tenth. **15.6**

54. Use the information in Question 53 to find $m\angle A$ to the nearest tenth. **85.4**

55. Suppose $a = 45.25$, $b = 39.75$, and $c = 20.65$. Find $m\angle B$ to the nearest tenth. **61.4**

56. Use the information in Question 55 to find $m\angle C$ to the nearest tenth. **27.1**

57. Suppose $b = 11.0$, $c = 11.7$, and $m\angle A = 22$. Find the length of the altitude from A to the nearest tenth. **11.0**

58. Use the information in Question 57 to find the area of $\triangle ABC$ to the nearest tenth of a square unit. **24.1**

58. Which expressions are equivalent? **D**
 I. $\cos \theta$ II. $\cos (-\theta)$ III. $\frac{\sin (-\theta)}{\tan (-\theta)}$
 A. I and II only B. II and III only C. I and III only D. I, II, and III
59. Which expressions are equivalent? **J**
 I. $-\tan\left(\frac{\pi}{2} - \theta\right)$ II. $\tan\left(\theta - \frac{\pi}{2}\right)$ III. $\tan\left(-\left(\frac{\pi}{2} - \theta\right)\right)$
 F. I and II only G. II and III only H. I and III only J. I, II, and III
60. Which expression is equal to $\cos 50^\circ$? **D**
 A. $\sin 20^\circ \cos 30^\circ + \cos 20^\circ \sin 30^\circ$ B. $\sin 20^\circ \cos 30^\circ - \cos 20^\circ \sin 30^\circ$
 C. $\cos 20^\circ \cos 30^\circ + \sin 20^\circ \sin 30^\circ$ D. $\cos 20^\circ \cos 30^\circ - \sin 20^\circ \sin 30^\circ$
61. Which expression is NOT equivalent to $\cos \theta$? **G**
 F. $-\sin(\theta - 90^\circ)$ G. $-\cos(-\theta)$ H. $\sin(\theta + 90^\circ)$ J. $-\cos(\theta + 180^\circ)$

Test Prep

Multiple Choice

58. If θ is in Quadrant I and $\tan \theta = \frac{5}{12}$, what is the value of $\frac{\tan 4\theta}{5}$ to the nearest hundredth? **D**
 A. 18.10 B. 0.33 C. 0.32 D. -23.90
59. If θ is in Quadrant I and $\sin \theta = \frac{3}{5}$, what is an exact value of $\sin 2\theta$? **G**
 F. $\frac{9}{25}$ G. $\frac{24}{25}$ H. $\frac{6}{5}$ J. 73.7

Short Response ended Response

60. Use a half-angle identity to find an exact value of $\sin 67.5^\circ$. **See back of book.**
61. In the diagram at the right, line ℓ_1 forms an angle of θ with the positive x -axis and crosses the line $x = 1$ at $(1, 0.5)$. Line ℓ_2 forms an angle of 2θ with the positive x -axis. Find the coordinates of the point where ℓ_2 intersects $x = 1$. Show your work. **See back of book.**

