

7.1 The Law of Sines

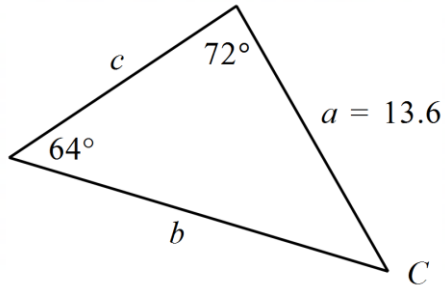
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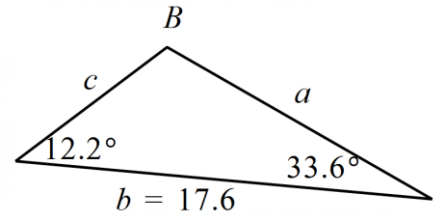
Name _____ Date _____ Period _____

Solve each triangle. Round approximate answers to the nearest tenth.

1.



2.



Solve each triangle with the given parts.

3. $A = 10.3^\circ$, $C = 143.7^\circ$, $c = 48.3$

4. $B = 120.7^\circ$, $C = 13.6^\circ$, $a = 489.3$

Determine the number of triangles with the given parts and solve each triangle.

5. $A = 39.6^\circ$, $c = 18.4$, $a = 3.7$

6. $A = 41.2^\circ$, $a = 8.1$, $b = 10.6$

7. $B = 138.1^\circ$, $c = 6.3$, $b = 15.6$

8. $C = 128.6^\circ$, $a = 9.6$, $c = 8.2$

9. $B = 32.7^\circ$, $a = 37.5$, $b = 28.6$

10. $C = 99.6^\circ$, $b = 10.3$, $c = 12.4$

Solve each problem. Show work! Draw a diagram that represents the situation.

11. A traffic report helicopter left the WKSL studios on a course with a bearing of 210° . After flying 12 miles to reach I-80, the helicopter flew due east along I-80 for some time. The helicopter headed back to WKSL on a course with a bearing of 310° and reported no accidents along I-80. For how many miles did the helicopter fly along I-80? Round to the nearest tenth of a mile.

12. The angle of elevation of the top of a cellar telephone tower from point A on the ground is 18.1° . From point B, 32.5 feet closer to the tower, the angle of elevation is 19.3° . What is the height of the tower to the nearest tenth of a foot?

13. To find the distance AB across a river, a distance BC of 1355 meters is laid off on one side of the river. It is found that $B = 115.3^\circ$ and $C = 17.1^\circ$. Find AB. Round to the nearest tenth.

14. Two tracking stations on the equator are 158 miles apart. A weather balloon is located on a bearing of $N 41^\circ E$ from the western station and on a bearing $N 21^\circ E$ from the eastern station. How far is the balloon from the western station? Round to the nearest tenth.

15. Points A and B are on opposite sides of a lake. Point C is 109.8 meters from A. The measure of $\angle BAC = 72^\circ$ and the measure of $\angle ACB = 40^\circ$. Find the distance between points A and B. Round to the nearest tenth.

16. Find the exact value of each expression without using a calculator or table.

a) $\sin\left(\frac{5\pi}{2}\right)$

b) $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right)$

c) $\tan\left(\frac{5\pi}{3}\right)$

d) $\csc\left(-\frac{\pi}{3}\right)$

e) $\sec\left(-\frac{3\pi}{4}\right)$

f) $\sin^{-1}\left(-\frac{1}{2}\right)$

17. Find all real numbers in terms of π that satisfy each equation.

a) $2\cos(x) = -1$

b) $2\sin(x) - \sqrt{2} = 0$

18. Find all angles in degrees that satisfy each equation.

a) $\tan(x) - \sqrt{3} = 0$

b) $\sin(x) = -\frac{\sqrt{2}}{2}$

19. Solve $15 = 3 + 6 - 2x$

20. Solve $(2.8)^2 = (4.1)^2 + (5.3)^2 - 2(4.1)(5.3)\cos\alpha$ for $0^\circ < \alpha < 90^\circ$