Law of Cosines	**Let $\triangle ABC$ be any triangle with a, b, and c representing the measures of sides opposite angles with measures A, B, and C, respectively. Then, the following equations hold true.** $a^2 = b^2 + c^2 - 2bc \cos A$ $\quad b^2 = a^2 + c^2 - 2ac \cos B$ $\quad c^2 = a^2 + b^2 - 2ab \cos C$

The Law of Cosines can be used to solve a triangle in the following cases.

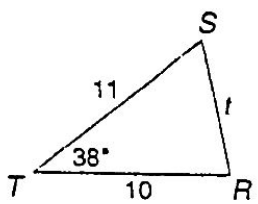
Case 1. You know the measures of two sides and the included angle.

Case 2. You know the measures of three sides.

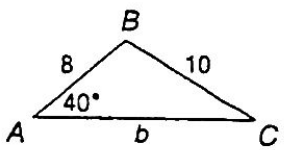
Practice

Determine whether the Law of Sines or the Law of Cosines should be used first to solve each triangle. Then solve each triangle. Round measures to the nearest tenth.

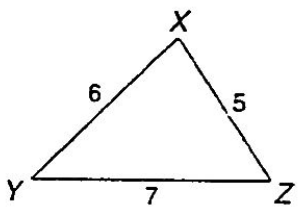
13.



14.



15.



Sketch each $\triangle RGD$. Determine whether the Law of Sines or the Law of Cosines should be used first to solve each triangle. Then solve each triangle. Round measures to the nearest tenth.

16. $m\angle R = 42, m\angle D = 77, d = 6$

17. $r = 9.1, g = 8.3, m\angle D = 32$

18. $r = 13, g = 16, d = 22$

19. $m\angle R = 53, m\angle D = 28, d = 14.9$

Solve each $\triangle HJK$ described below. Round measures to the nearest tenth.

20. $j = 44, h = 54, m\angle H = 23$

21. $j = 33, h = 56, k = 65$

22. $j = 19, k = 28, m\angle H = 49$

23. $m\angle J = 46, m\angle H = 55, k = 16$

24. $j = 364, h = 669, k = 436$

25. $m\angle J = 55, h = 6.3, k = 6.7$

26. $m\angle J = 27, h = 5, k = 10$

27. $k = 25, j = 27, h = 22$

28. $h = 14, k = 21, m\angle J = 60$

29. $h = 14, j = 15, k = 16$

30. $m\angle H = 51, h = 40, k = 35$

31. $h = 5, j = 6, k = 7$