Example: Properties of Tangents

Problem:

Find the length of PC in the figure below. PQ is tangent to circle C at point Q. PR is tangent to circle C at point R. The image shows PQ with length 15 and CR is length 8.

Solution:

Recall that two lines drawn tangent to a circle from the same point outside the circle have equal lengths. PR equals PQ.

PR equals 15.

Recall also, that tangents are perpendicular to the radius at the point of tangency. Angle PRC is a right angle.

The tangent line PR, the radius CR and the segment PC make a right triangle. We can use the Pythagorean Theorem to find the length of PC.

PR squared plus CR squared equals PC squared.

Using the lengths we know, 15 squared equals 8 squared equals PC squared.

Simplify to get 225 plus 64 equals PC squared. 289 equals PC squared.

17 equals PC