Example: Lengths of Secants and Tangents

Problem:

Find the value of x in the figure below. PQ is tangent to the circle at point Q. The image shows PQ has length 22 and segment PR has length 15 and RS has length x.

Solution:

Recall the property of secants that the product of the length of the outside segment times the length of the whole segment of one secant is equal to the product of the length of the outside segment times the length of the whole segment of the second secant.

In this case, the outside segment of the first secant is 15 and the whole segment is 15 plus x. The outside segment of the second secant is 22 and the whole segment is 22 plus zero. In other words, since this segment is tangent, the length of the inside portion is zero.

Distribute to get 225 plus 15 x equals 484.

Subtract 225 from both sides to get 15 x equals 259.

Divide by 15. X is approximately equal to 17.27.