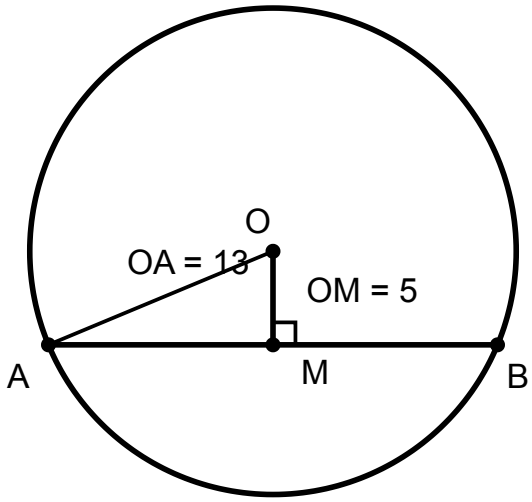
Circle Segment Relationships

Use radius-chord, tangent, and secant relationships to find missing lengths.

Name: _____ Date: _____

Part 1 - Radius and Chord

Circle relationship reminder: If a radius is perpendicular to a chord, it bisects the chord. In the diagram, OM is perpendicular to chord AB.



1. Find AB. Show the relationship you used and your calculation.

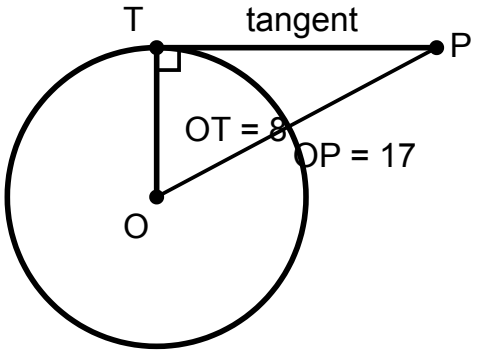
Circle Segment Relationships

Use radius-chord, tangent, and secant relationships to find missing lengths.

Name: _____ Date: _____

Part 2 - Radius and Tangent

Circle relationship reminder: A tangent touches a circle at one point. The radius to that point is perpendicular to the tangent.



2. Find PT. Name the right triangle relationship you used, then show your calculation.

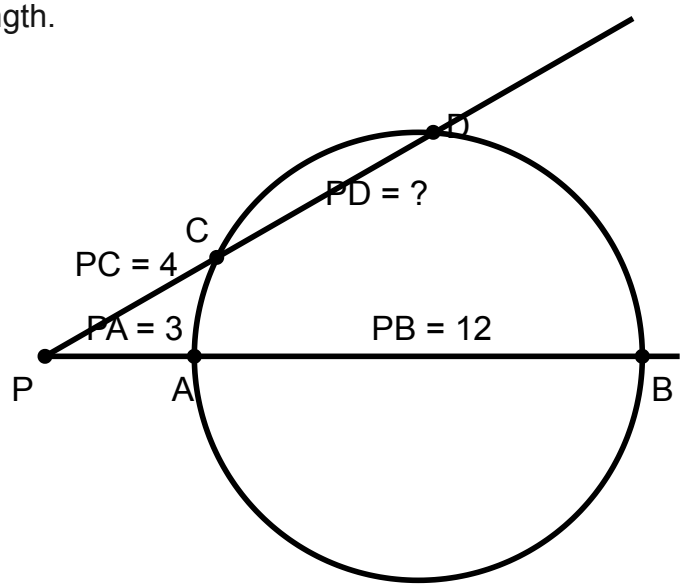
Circle Segment Relationships

Use radius-chord, tangent, and secant relationships to find missing lengths.

Name: _____ Date: _____

Part 3 - Two Secants

Circle relationship reminder: For two secants from the same outside point, multiply each external part by its whole secant length.



3. Find PD. Write the secant equation before solving.

Circle Segment Relationships

Use radius-chord, tangent, and secant relationships to find missing lengths.

Answer Key and Teaching Notes

Answers

1. Because OM is perpendicular to chord AB, M is the midpoint of AB. In right triangle OMA, AM = sqrt(13^2 - 5^2) = sqrt(144) = 12. Therefore AB = 2(12) = **24**.

2. Radius OT is perpendicular to tangent PT, so triangle OTP is right with hypotenuse OP. PT = sqrt(17^2 - 8^2) = sqrt(225) = **15**.

3. Secant-secant theorem: PA(PB) = PC(PD). Thus 3(12) = 4(PD), so PD = **9**.

Materials and setup: Print and supply all student pages, keeping teacher-key pages separate. The supplied diagrams are the required accurate labeled circle diagrams. Additionally needed: pencils and student calculators only if desired for checking. Students should not measure the drawings; all needed values are labeled. Give students the three parts in order.

Teaching script: Say: “Today, choose a relationship from the marks and labels in each diagram. In Part 1, notice the perpendicular radius and chord. In Part 2, notice the tangent and right angle. In Part 3, distinguish an external segment from a whole secant. Write an equation before you calculate.” Say: “Do not use a ruler to estimate a length.”

Observation method: Circulate while students write each first equation. For Part 1, check that students halve the chord before doubling. For Part 2, check that 17 is used as the hypotenuse. For Part 3, check that each product is external part times whole secant, not two partial pieces. Record each item as correct equation / correct arithmetic / needs conference. Accept equivalent clear algebra and units if students add them.

Source credit: New York Next Generation Mathematics, GEO-G.C.2.b task reference: https://lessonmakerpro.com/standards/ny-nextgen-math/geo-g-c-2-b