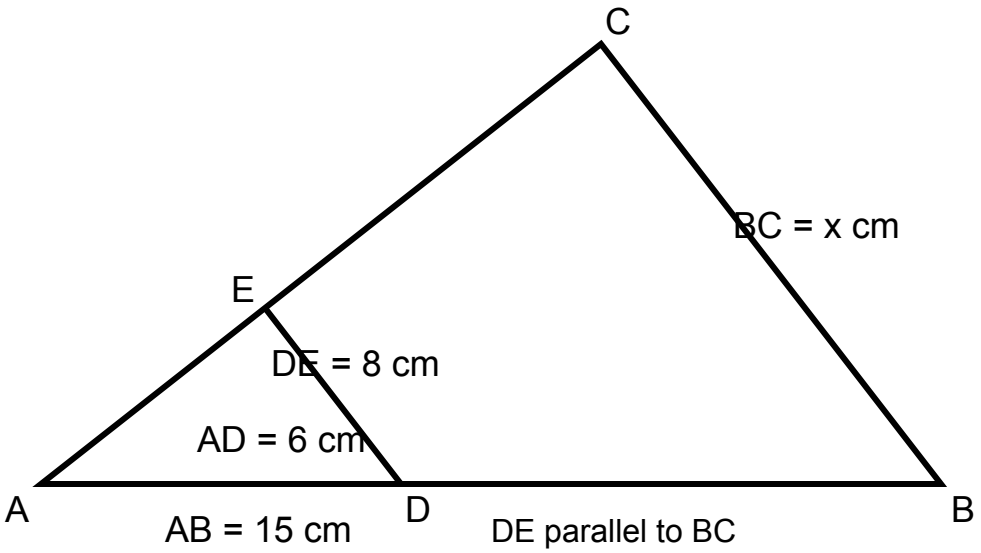
Similar Triangles: Missing Lengths

Use matching sides to write proportions and solve for a missing length

Name: _____ Date: _____

Part 1 - A line parallel to a side

Directions: Measurements are in centimeters. Do not measure the classroom diagram. In triangle ABC, point D is on AB, point E is on AC, and DE is parallel to BC.



1. Name the two similar triangles in corresponding order. What geometric fact proves they are similar?

2. Write a proportion using AD and AB, then solve for x. Show the algebra and include units.

3. Explain why the two side pairs in your proportion correspond.

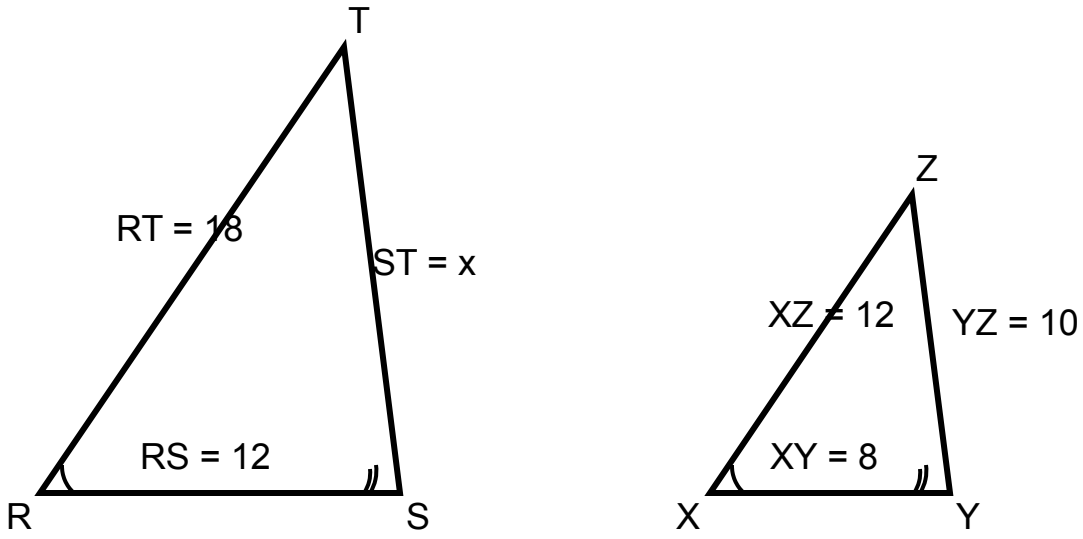
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Name: _____ Date: _____

Part 2 - Match the angle marks

Directions: Measurements are in centimeters. The matching angle marks show the correspondence. Do not measure the classroom diagram.



4. Complete the correspondence: triangle RST is similar to triangle _____. Then write one proportion using all three matching side pairs.

5. Solve for x. Show the algebra and write the answer with units.

6. In one or two sentences, explain how the angle marks and the side ratios work together in this problem.

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Answer key and teaching notes

Materials: Print and supply all student pages, keeping teacher-key pages separate. Students need pencils and may use scratch paper. No ruler or calculator is needed. The supplied diagrams are classroom-created instructional diagrams; students should use the printed measurements, not drawing measurements.

Exact setup: Give each student the two student parts face down. Display no completed proportion. Tell students to complete Part 1 before receiving or turning to Part 2. Keep this key unavailable during independent work.

Teaching script: Say: “A similarity statement is an ordered matching. First match angles, then put only matching sides in the same positions of a ratio. A parallel segment can create equal corresponding angles. Angle marks can also show the matches. Your algebra solves for a length, but your geometry tells you which lengths belong together. Include centimeters in your final answer.”

Observation method: During work, circulate with a checklist. For each student, note whether the student (1) identifies the vertex correspondence, (2) writes a ratio with matching side pairs, (3) cross-multiplies correctly, and (4) labels the final length in cm. If a ratio mixes nonmatching sides, ask only: “Which vertex matches this one?” Have the student revise the order rather than supply a ratio.

1. Triangle ADE is similar to triangle ABC. Because DE is parallel to BC, corresponding angles are congruent; the triangles are similar by AA. Accept equivalent angle naming that preserves A-to-A, D-to-B, E-to-C.

2. One valid proportion is AD/AB = DE/BC: 6/15 = 8/x. Cross-multiplying gives 6x = 120, so x = 20 cm. Equivalent correctly ordered proportions are valid.

3. Sample response: “AD corresponds to AB because D matches B, and DE corresponds to BC because E matches C. These sides are opposite matching angles in the similar triangles.”

4. Triangle RST is similar to triangle XYZ. The correspondence is R-X, S-Y, T-Z. A valid three-pair proportion is RS/XY = RT/XZ = ST/YZ, or 12/8 = 18/12 = x/10.

5. Using 12/8 = x/10: 12(10) = 8x, 120 = 8x, x = 15 cm.

6. Sample response: “The matching arc marks establish R-X and S-Y, so the third vertices match T-Z. Matching sides have one common scale factor, so ST/YZ equals RS/XY.”

Source credit: New York State Next Generation Mathematics Learning Standards reference, GEO-G.SRT.5.a, https://lessonmakerpro.com/standards/ny-nextgen-math/geo-g-srt-5-a