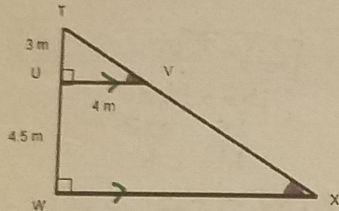# Triangle Similarity Worksheet
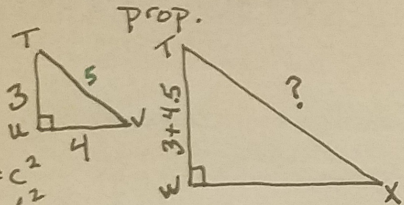
Name: _____   **Date:** _____

1. What is the length of $\overline{TX}$? Show or explain how you got your answer.

(Triangle TUVWX figure with labels: T, 3 m, U, V, 4 m, 4.5 m, W, X)

Proof

$\angle TUV \cong \angle TWX \rightarrow$ Given

$UV \parallel WX \longrightarrow$ Converse of Corrs. $\angle$'s

$\angle TVU \cong \angle TXW \longrightarrow$ Corrs $\angle$s $\cong$ when lines $\parallel$

$\triangle TVU \sim \triangle TXW \rightarrow$ AA $\sim$

⤷ so corrs. sides are prop.

(Two right triangles: one with T, 3, U, 5, V, 4; other with T, 3+4.5, W, ?, X)

$a^2 + b^2 = c^2$
$3^2 + 4^2 = c^2$
$25 = c^2$
$5 = c$

$$\frac{TV}{TX} = \frac{TU}{TW}$$
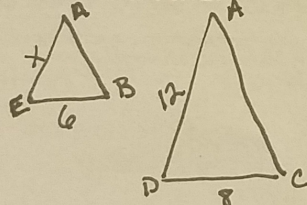
$$\frac{5}{X} \diagup \frac{3}{7.5}$$

$37.5 = 3x$

$\boxed{X = 12.5}$

2. Triangle *ACD* shown below is similar to triangle *ABE*.

- the measure of $\overline{EB}$ = 6 units
- the measure of $\overline{DC}$ = 8 units
- the measure of $\overline{AD}$ = 12 units

(Triangle A with 12 units marked, E — 6 units — B, D — 8 units — C)

What is the measure of $\overline{AE}$?

(Two triangles: A, E, 6, B; and A, 12, D, 8, C)
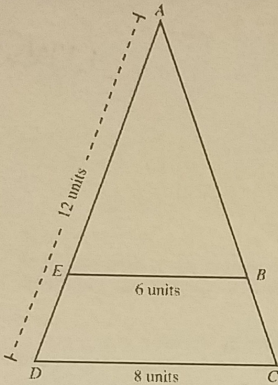
$$\frac{AE}{AD} = \frac{EB}{DC}$$

$$\frac{X}{12} \diagup \frac{6}{8}$$
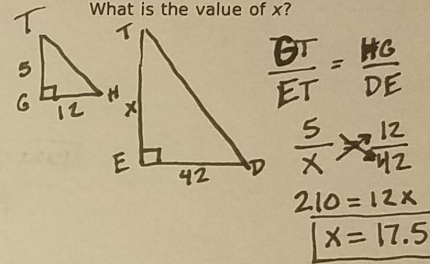
$8X = 72$

$\boxed{X = 9}$

page 1

3. Look at the figure below.
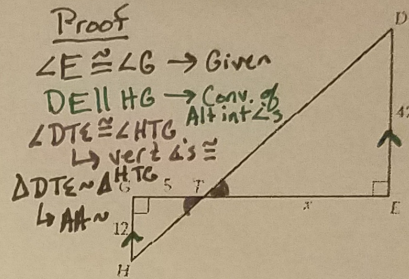
Proof

$\angle E \cong \angle G \rightarrow$ Given

$DE \parallel HG \rightarrow$ Conv. of Alt int $\angle$s

$\angle DTE \cong \angle HTG$ ⤷ vert $\angle$s $\cong$

$\triangle DTE \sim \triangle HTG$

⤷ AA$\sim$

(Figure with D, 42, E, x, T, H, 12, G)

Note: The figure is not drawn to scale.

What is the value of x?

(Two triangles: T, 5, 6, H, 12, x; and E, 42, D)

$$\frac{GT}{ET} = \frac{HG}{DE}$$

$$\frac{5}{X} \diagup \frac{12}{42}$$

$210 = 12x$

$\boxed{X = 17.5}$

4. Look at this diagram.

(Diagram with P, 6 cm, Q, R, 8 cm, 12 cm, S, T)
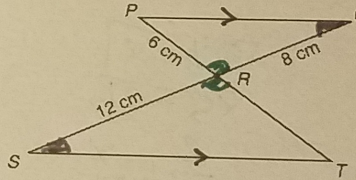
In this diagram, $\overline{PQ}$ is parallel to $\overline{ST}$. What is the length, in centimeters, of $\overline{RT}$?

Proof

$PQ \parallel ST \longrightarrow$ Given

$\angle PRQ \cong \angle TRS \rightarrow$ Vert. $\angle$s $\cong$

$\angle Q \cong \angle S \longrightarrow$ Alt. int $\angle$s $\cong$ if lines are $\parallel$

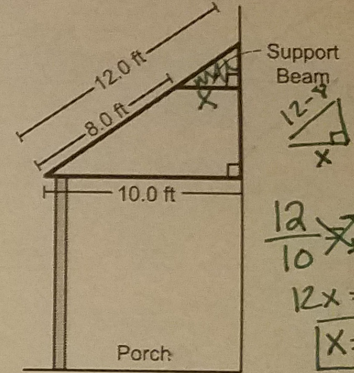$\triangle PQR \sim \triangle TSR \rightarrow$ AA$\sim$

$$\frac{PR}{TR} = \frac{RQ}{RS}$$

$$\frac{6}{X} \diagup \frac{8}{12}$$

$72 = 8x$

$\boxed{X = 9}$

page 2

5. Porch Roof

Julius is adding a porch roof to his house. The porch roof will extend 10.0 feet from his house and have a slant length of 12.0 feet. Julius plans to add support beams 8.0 feet from the end of the slanted length of the roof.

(Diagram of porch roof: 12.0 ft, 8.0 ft, Support Beam, x, 10.0 ft, Porch)

How long, in feet, will each support beam need to be? Round your answer to the nearest tenth of a foot.

$$\frac{12}{10} \diagup \frac{4}{X}$$

$12X = 40$

$\boxed{X = 3.3 f}$

6. A swimmer needs to know the width of a river without having to cross it. She made the diagram below.

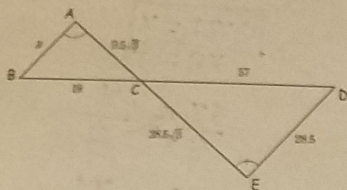*(Diagram with 50, 20, 80, w = ?)*
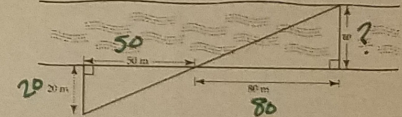
Note: The figure is not drawn to scale.

What is the width (w), in meters, of the river?

$$\frac{50}{80} = \frac{20}{X}$$

$50x = 1600$

$\boxed{X = 32 \text{ meters}}$

Triangle Similarity Worksheet

7.

Similar Triangles

In her geometry class, Karen constructed the figure above in which $\overline{AB}$ is parallel to $\overline{ED}$ and $\angle A \cong \angle E$. The two triangles in the figure are similar.

a) Name the two similar triangles (with vertices in correct order).

b) Explain why the two triangles are similar.

c) What is the measure of y? Show your procedure.

a.) $\triangle ABC \sim \triangle ECD$

b.) $\angle A \cong \angle C \rightarrow$ Alt int $\angle$'s $\cong$
$\angle ACB \cong \angle ECD \rightarrow$ Vert. $\angle$'s $\cong$
$\triangle ABC \sim \triangle EDC \rightarrow$ AA$\sim$
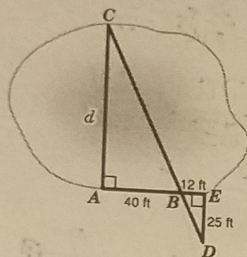
c.) $\dfrac{AB}{ED} = \dfrac{AC}{EC} = \dfrac{BC}{DC}$

$\boxed{\dfrac{y}{28.5}} = \dfrac{9.5\sqrt{3}}{28.5\sqrt{3}} \boxed{= \dfrac{19}{57}}$ easiest to use

$\dfrac{y}{28.5} = \dfrac{19}{57}$

$57y = 541.5$

$\boxed{y = 9.5}$

8.

Each morning at camp, Cindy and Josie swam across a pond. To determine the distance they swam, they placed rocks along straight lines at positions indicated by A, B, C, D, and E on the sketch below. The rocks were placed so that the angles created at A and E were right angles.

a) What is the ratio of the longer given distance to the shorter given distance in triangle BED?

$\dfrac{40}{12} = \left(\dfrac{10}{3}\right)$

b) Are triangles BAC and BED similar? Explain your reasoning. AA$\sim$

c) Write a proportion that can be used to find d, the distance across the pond.

$\dfrac{40}{12} = \dfrac{d}{25}$

d) What is d, the distance across the pond? Be sure to show your work.

$1000 = 12d$

$\boxed{d = 83.3\ \text{feet}}$
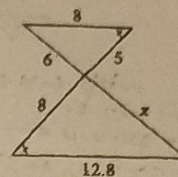
9.
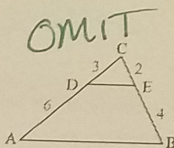
OMIT

Given: $AD = 6; DC = 3$
$BE = 4; EC = 2$

Prove: $\triangle CDE \sim \triangle CAB$

10.

In the figure above, the two triangles are similar. What is the value of x?

Answer: _____

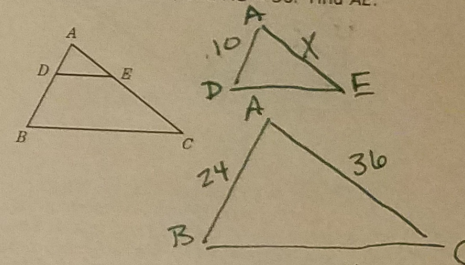$\dfrac{6}{x} = \dfrac{5}{8}$

$48 = 5x$

$\boxed{x = 9.6}$

11.

A billboard at ground level has a support length of 26 feet that extends from the top of the billboard to the ground. A post that is 5 feet tall is attached to the support and is 4 feet from where the base of the support is attached to the ground. In the figure shown, the distance, in feet, from the base of the billboard to the base of the support is labeled x.
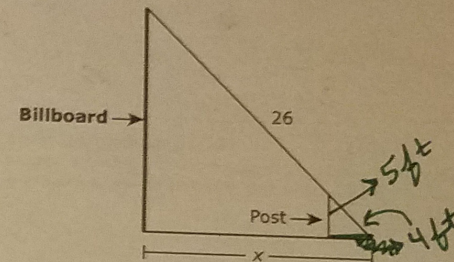
Create an equation that can be used to determine x. Discuss any assumptions that should be made concerning the equation. Use your equation to find the value of x. Show your work or explain your answer.

$\dfrac{5}{4} = \dfrac{26}{x}$ $\dfrac{4}{26} = \dfrac{5}{x}$

$4x = 130$

$\boxed{x = 32.5}$

12.

In the accompanying figure, $\overline{DE} \parallel \overline{BC}$, $AD = 10$, $AB = 24$, and $AC = 36$. Find AE.

$\dfrac{10}{24} = \dfrac{x}{36}$

$360 = 24x$

$\boxed{x = 15}$