Similar Triangles Part 2

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Mathematics 9
Similar Triangles
Solving Similar Triangles Part 2

A. Definitions

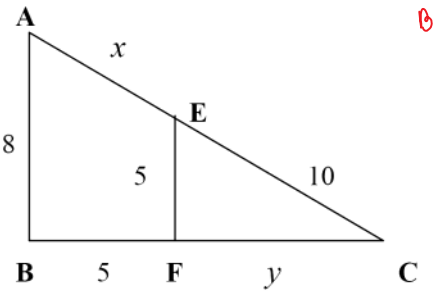
Similar Triangles: triangles which have exactly the same shape but different sizes. They have corresponding angles which are equal and the ratios of the corresponding sides are in the same proportions.

Corresponding Angles: angles that have the same relative position in two geometric figures.

Corresponding Sides: sides that have the same relative position in two geometric figures.

B. Complex Similar Triangles

1) The ΔABC is similar to ΔEFC. Find the length of the missing sides.



Small / Big: $\frac{5}{8} = \frac{10}{x+10}$ (Small / Big)

$8(x+10)$

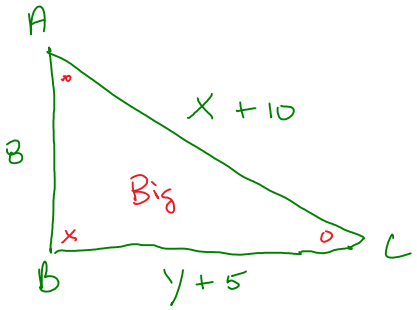
$5(x+10) = 80$

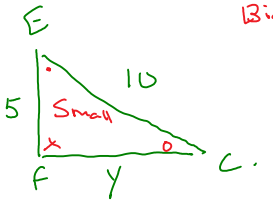
$5x + 50 = 80$

$-50 \quad -50$

$\frac{5x}{5} = \frac{30}{5}$

$x = 6$





$8(y+5)$

Small / Big: $\frac{5}{8} = \frac{y}{y+5}$ (Small / Big)

$5(y+5) = 8y$

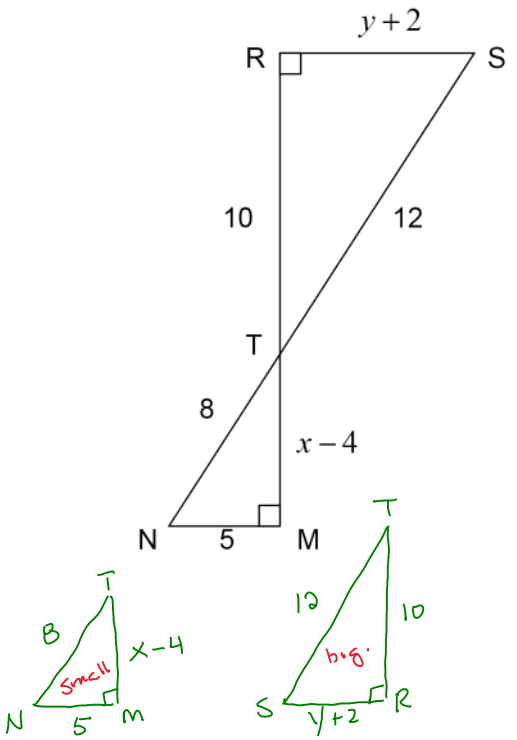
$5y + 25 = 8y$

$-5y \quad -5y$

$\frac{25}{3} = \frac{3y}{3}$

$y = \frac{25}{3}$ or $8\frac{1}{3}$

2) The ΔRST is similar to ΔMNT. Find the length of the missing values of x and y.



Small / Big: $\frac{8}{12} = \frac{x-4}{10}$ (Small / Big)

$80 = 12(x-4)$

$80 = 12x - 48$

$+48 \quad +48$

$\frac{128}{12} = \frac{12x}{12}$

$x = \frac{128}{12} = \boxed{\frac{32}{3} \text{ or } 10\frac{2}{3}}$

$12(y+2)$

Small / Big: $\frac{8}{12} = \frac{5}{y+2}$ (Small / Big)

$8(y+2) = 60$

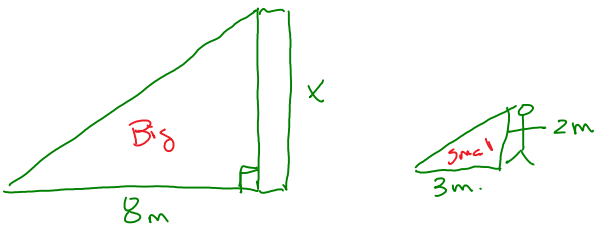
$8y + 16 = 60$

$-16 \quad -16$

$\frac{8y}{8} = \frac{44}{8}$

$y = \frac{44}{8} = \boxed{\frac{11}{2} \text{ or } 5\frac{1}{2}}$

3) A tree casts a shadow 8 m long. At the same time, a woman 2 m tall standing beside the tree casts a shadow 3 m long. How tall is the tree?



$8x$

Small / Big: $\frac{3}{8} = \frac{2}{x}$ (Small / Big)

$\frac{8x}{3} = \frac{16}{3}$

$x = \frac{16}{3} \text{ m or } 5\frac{1}{3} \text{ m.}$

The building is $5\frac{1}{3}$ m

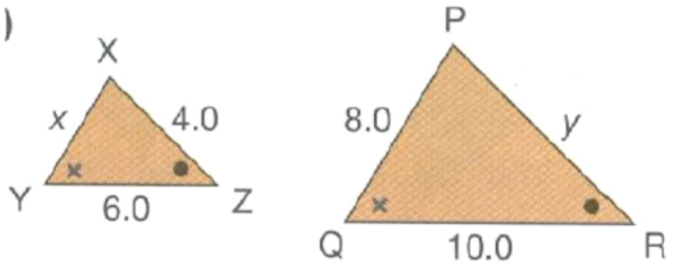
Assignment: Similar Triangles Part 2 Assignment

Name:_____

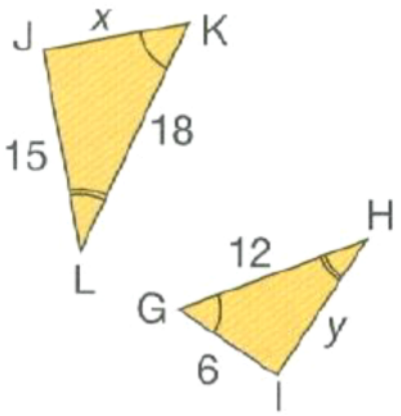
Similar Triangles Assignment

1. Each pair of triangles is similar. Use a proportion to solve for x and y.

a)

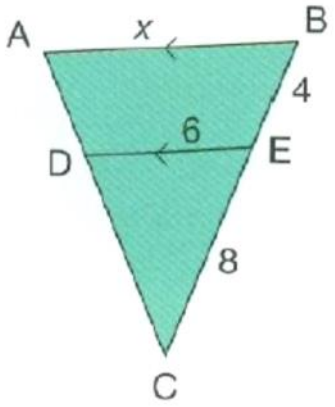


b)

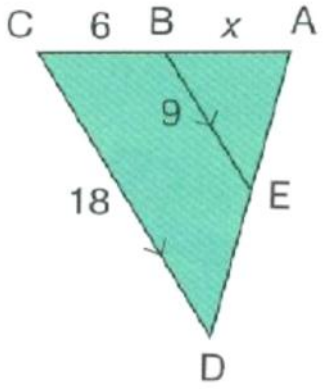


2. In the following diagrams the triangles are similar. Find the value of x.

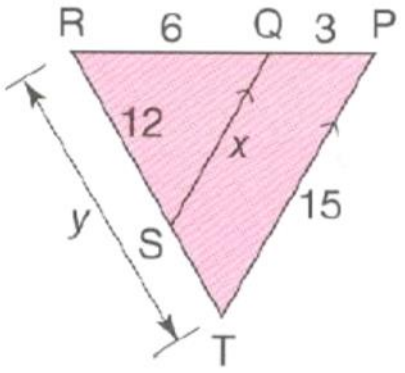
a)



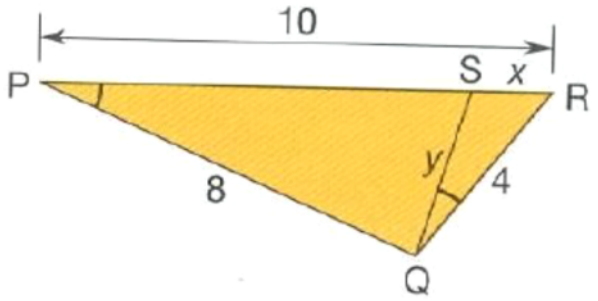
b)



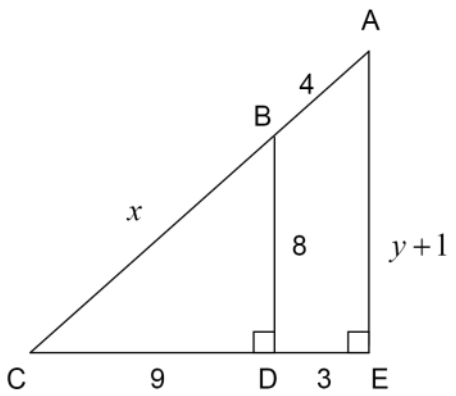
3. The ΔSQR is similar to ΔTPR. Find the length of the missing values of x and y.



4. The ΔSQR is similar to ΔQPR. Find the length of the missing values of x and y.



5. The ΔSQR is similar to ΔQPR. Find values of x and y.



6. A pole casts a shadow 5 m long. At the same time a 20 m tree casts a shadow 8 m long. How tall is the pole?

Answers

1. a) $x = \frac{24}{5}$ or $4\frac{4}{5}$, $y = \frac{20}{3}$ or $6\frac{2}{3}$

   b) $x = 9$, $y = 10$

2. a) $x = 9$

   b) $x = 6$

3. $x = 10$, $y = 18$

4. $x = \frac{8}{5}$ or $1\frac{3}{5}$, $y = \frac{16}{5}$ or $3\frac{1}{5}$

5. $x = 12$, $y = \frac{19}{3}$ or $6\frac{1}{3}$

6. Pole is $\frac{25}{2}$ m or $12\frac{1}{2}$ m