

Similarities

Homework Review 7.1 - 7.3

Name _____

#1) Define ratio.

A comparison of two quantities

#2) Define proportion.

an equation stating two ratios are equal.

Solve each proportion

#3) $\frac{x}{12} = \frac{8}{30}$

$$72 \cdot \frac{x}{12} = \frac{4}{15} \cdot 12 \cdot 4$$

$$x = \frac{4 \cdot 4}{5}$$

$$x = \frac{16}{5}$$

#4) $(x+2) \cdot \frac{10}{x} = \frac{30}{x+2} \cdot 9(x+2)$

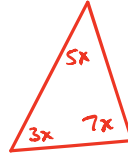
$$10(x+2) = 30 \cdot 9$$

$$10x + 20 = 270$$

$$10x = 250$$

$$x = 25$$

#5) The ratio of the measures of the angles of a triangle is 3:5:7. What is the measure of each angle in the triangle?



$$3x + 5x + 7x = 180$$

$$15x = 180$$

$$x = 12$$

$$3x = 3(12) = 36$$

$$5x = 5(12) = 60$$

$$7x = 7(12) = 84$$

#6) On a map of Ohio, three fourths of an inch represents 15 miles. If it is approximately 10 inches from Sandusky to Cambridge on the map, what is the actual distance in miles?

$$15 \cdot x \cdot \frac{\frac{3}{4} \text{ in}}{15 \text{ mi}} = \frac{10 \text{ in}}{x \text{ mi}} \cdot 15 \cdot x$$

$$\frac{3}{4} x = 10 \cdot 15$$

$$4 \cdot \frac{3}{4} x = 150 \cdot 4$$

$$3x = 600$$

$$x = 200 \text{ mi}$$

It is 200 miles from Sandusky to Cambridge.

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#7) Define scale factor.

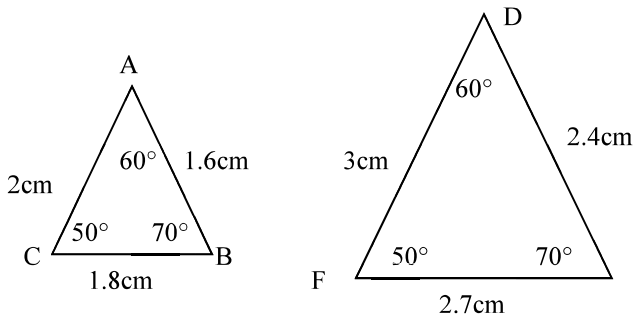
The ratio of two corresponding sides of two similar polygons.

#8) Define similar polygons.

Two polygons are similar if corresponding angles are congruent and corresponding sides are proportional.

Determine if each pair of polygons is similar by using the definition of similar. Justify your answer.

#9)



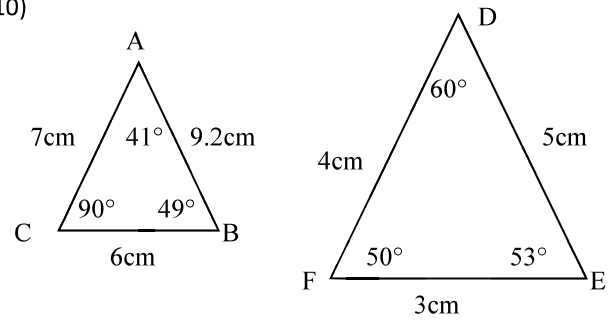
$$\frac{1.8}{2.7} = \frac{2}{3} = \frac{1.6}{2.4}$$

$$\frac{18}{27} = \frac{2}{3} = \frac{16}{24}$$

$$\frac{2}{3} = \frac{2}{3} = \frac{2}{3}$$

The triangles are similar because corresponding angles are congruent and corresponding sides are proportional.

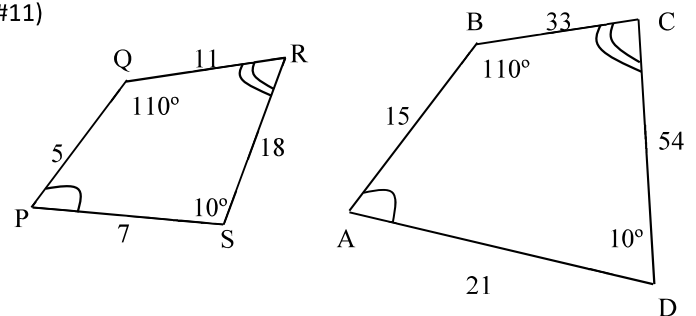
#10)



The triangles are not similar because corresponding angles are not congruent.

If quadrilateral PQRS is similar to ABCD, find the scale factor of quadrilateral PQRS to quadrilateral ABCD.

#11)



$$SF = \frac{PQRS}{ABCD} = \frac{5}{15} = \frac{1}{3}$$

Similarities

#12) State the AA Similarity

If two angles of one triangle are congruent to two angles of another, then the triangles are similar.

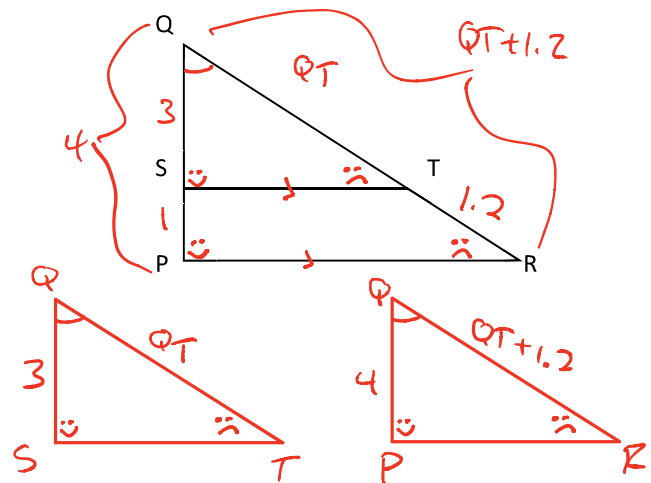
#13) State the SSS Similarity:

If 3 sides of one triangle are proportional to 3 corresponding sides of another triangle, then the triangles are similar.

#14) State the SAS Similarity:

If 2 sides of one triangle are proportional to 2 corresponding sides of another triangle and the included angles are congruent, then the triangles are similar.

#15) In the figure, $\overline{ST} \parallel \overline{PR}$, $QS = 3$, $SP = 1$, and $TR = 1.2$. Find QT .



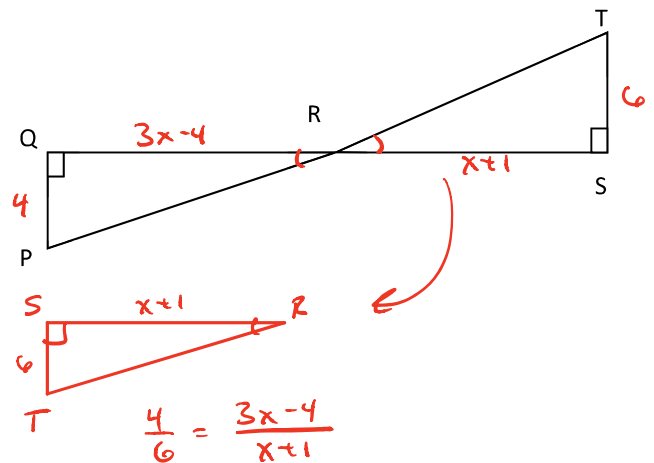
$$4(QT + 1.2) \frac{3}{4} = \frac{QT}{QT + 1.2} 4(QT + 1.2)$$

$$3(QT + 1.2) = 4QT$$

$$3QT + 3.6 = 4QT$$

$$3.6 = QT$$

#16) If $TS = 6$, $QP = 4$, $RS = x + 1$, and $QR = 3x - 4$, find the value of x



$$3(x+1) \frac{2}{6} = \frac{3x-4}{x+1} 3(x+1)$$

$$2(x+1) = 3(3x-4)$$

$$2x + 2 = 9x - 12$$

$$2 = 7x - 12$$

$$14 = 7x$$

$$2 = x$$

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#17) Jose performs a transformation on a triangle. The resulting is similar but not congruent to the original triangle. Which transformation did Jose use?

- A) Dilation
- B) Reflection
- C) Rotation
- D) Translation

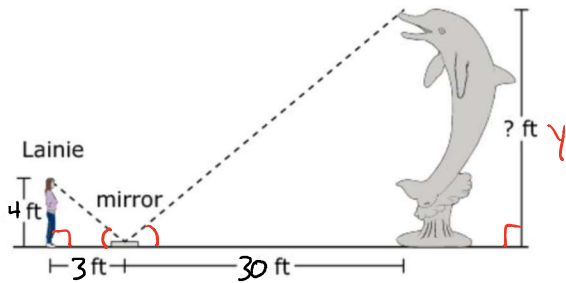
#18) A study reports that in 2000 the population of the United States was 282,054,422 people and the land area was approximately 3,531,905 square miles.

Based on the study, what was the population density, in people per square mile, of the United States in 2000? Round your answer to the nearest tenth.

$$\text{density} = \frac{\text{people}}{\text{mile}^2} = \frac{282,054,422 \text{ people}}{3,531,905 \text{ mi}^2}$$

$$\text{density} \approx 79.9 \frac{\text{people}}{\text{mile}^2}$$

#19) Lainie wants to calculate the height of the sculpture. She places a mirror on the ground so that when she looks into the mirror she sees the top of the sculpture, as shown.



What is the height, in feet, of the sculpture?

$$\frac{3}{30} = \frac{4}{y}$$

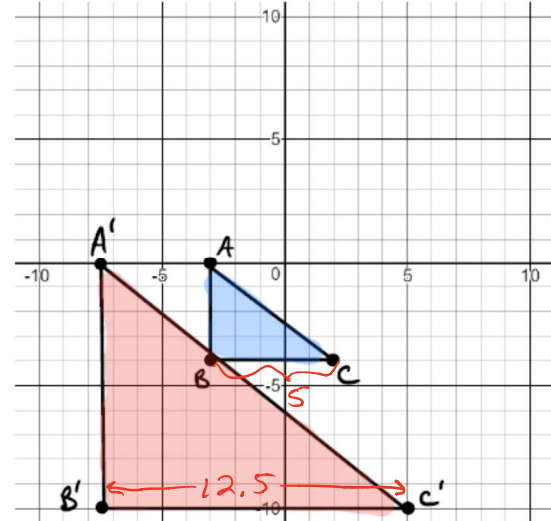
$$\text{cross } \frac{1}{10} = \frac{4}{y}$$

$$y = 4 \cdot 10$$

$$y = 40$$

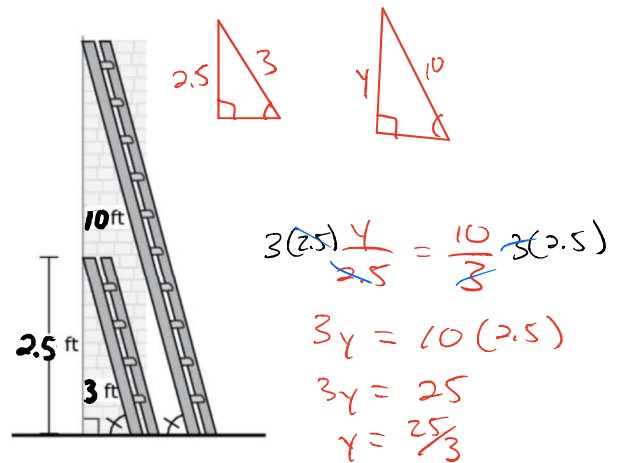
The sculpture is 40 ft tall.

#20) Triangle ABC is dilated with a scale factor of k and a center of dilation at the origin to obtain triangle $A'B'C'$.



What is the scale factor?
 $BC = k = B'C'$
 $5 \cdot k = 12.5$
 $k = \frac{12.5}{5}$
 $k = 2.5$

#21) A 10-foot ladder and a 3-foot ladder are leaning against a house. The two ladders create angles of the same measure with the ground. The 3-foot ladder has a height of 2.5 feet against the house.



What is the height, in feet, of the 10-foot ladder against the house?

The height is $\frac{25}{3}$ feet.