Similar Figures

Geometry

Name _____

Per _____ Date _____

If two figures are similar and the scale factor is $\frac{a}{b}$ then the ratio of the perimeters are ___$\frac{a}{b}$___.

In addition, if two figures are similar and the scale factor is $\frac{a}{b}$ then the ratio of the areas are ___$\frac{a^2}{b^2}$___.

Shape	Scale Factor	Ratio of Perimeter	Ratio of Area
Triangle	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{4}{9}$
Square	$\frac{4}{3}$	$\frac{4}{3}$	$\frac{16}{9}$
Trapezoid	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{25}{64}$
Circle	$\frac{7}{6}$	$\frac{7}{6}$	$\frac{49}{36}$

The scale factor from Triangle A to Triangle B is 8:3. What is the ratio of the perimeters from Triangle A to B? __8:3__ What it the ratio of the areas from Triangle A to Triangle B? __64:9__

The ratio of the area of two squares is 16:49. What is the scale factor? __4:7__ What is the ratio of the perimeters? __4:7__

Each pair of figures is similar. Find the missing perimeter. (P denotes Perimeter)
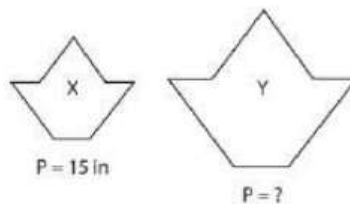
1) Scale factor of A to B is 2.6 : 9

P = ?   P = 36 ft
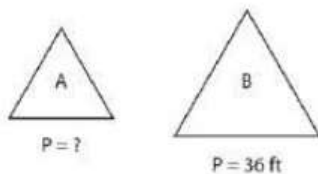
Perimeter of figure A = __10.4 ft__

$$\frac{2.6}{9} = \frac{P}{36}$$

$$\frac{9P}{9} = \frac{93.6}{9}$$

2) Scale factor of Y to X is 7.5 : 1
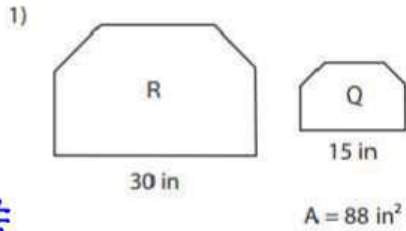

P = 15 in   P = ?

Perimeter of figure Y = _____

$$\frac{7.5}{1} = \frac{P}{15}$$

$$P = 112.5 \text{ in}$$

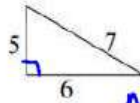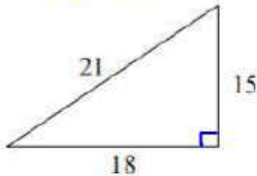Each figure is similar. Find the missing area. (A denotes area)

1)

R

Q

15 in

30 in

A = 88 in²

$x = \frac{30}{15} = \frac{2}{1}$

Areas $= \frac{4}{1}$

$\frac{4}{1} = \frac{R}{88}$

$R = 352 \text{ in}^2$

1) Scale factor of D to C is 9 : 2.5 $\frac{9}{25}$

D

C

A = 4 in²

A = ?
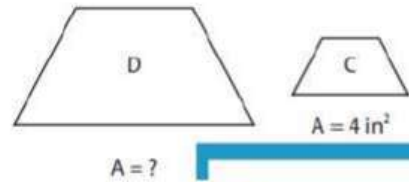
$\frac{81}{6.25} = \frac{A}{4}$

$6.25A = 324$

$A = 51.84 \text{ in}^2$

$A = \frac{1}{2}bh$

$\frac{1}{2}(18)(15)$

12.

21   15

18

5   7

6

$A = \frac{1}{2}(5)(6)$

	Perimeter	Area
Left	54	135
Right	18	15

Scale Factor: **6:18**   Perimeter Ratio: **18:54**   Area Ratio: **15:135**
1:3   **1:3**   **1:9**

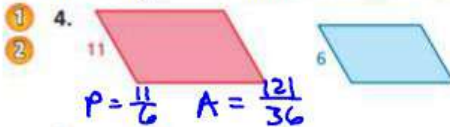13. Two similar triangles have a scale factor of $\frac{2}{3}$. The area of the larger triangle is 12 cm². What is the area of the smaller triangle? $\frac{2}{3} \times \frac{A}{12}$ $\frac{4}{9} = \frac{A}{12}$ $9A = 48$ $A = 5.3 \text{ cm}^2$
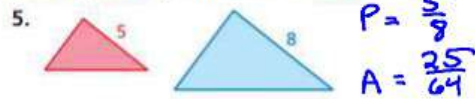
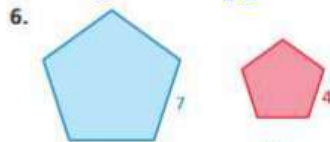The two figures are similar. Find the ratios (red to blue) of the perimeters and of the areas.

① 4.

11

6

$P = \frac{11}{6}$ $A = \frac{121}{36}$

5.

5   8

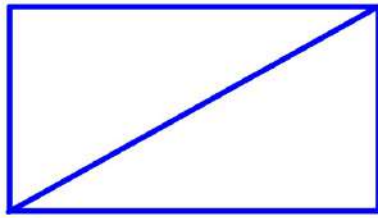$P = \frac{5}{8}$

$A = \frac{25}{64}$

6.

7   4

$P = \frac{4}{7}$ $A = \frac{16}{49}$

7.

9   14

$P = \frac{14}{9}$ $A = \frac{196}{81}$

8. How does doubling the side lengths of a triangle affect its perimeter?

9. How does tripling the side lengths of a triangle affect its perimeter?

10. How does doubling the side lengths of a rectangle affect its area?

11. How does quadrupling the side lengths of a rectangle affect its area?

$$A_\triangle = \frac{1}{2}bh$$