

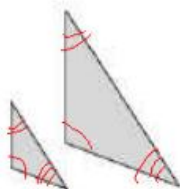
Lesson 1: What Lies Behind “Same Shape”?

Classwork

Exploratory Challenge

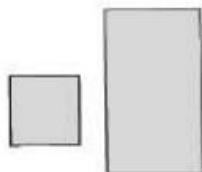
Two geometric figures are said to be similar if they have the same shape but not necessarily the same size. Using that informal definition, are the following pairs of figures similar to one another? Explain.

Pair A:



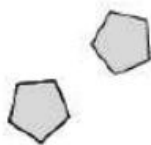
They are similar. They have the same shape but different size.

Pair B:



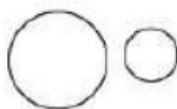
They are not similar. They don't have the same shape.

Pair C:



These shapes appear to have the same size and shape. Therefore they are congruent.

Pair D:



Yes

Pair E:



yes

Pair F:



yes

Pair G:



No

Pair H:



No

Exercises 1–6

1. Given $|OP| = 5$ in.



a. If segment OP is dilated by a scale factor $r = 4$, what is the length of segment OP' ?

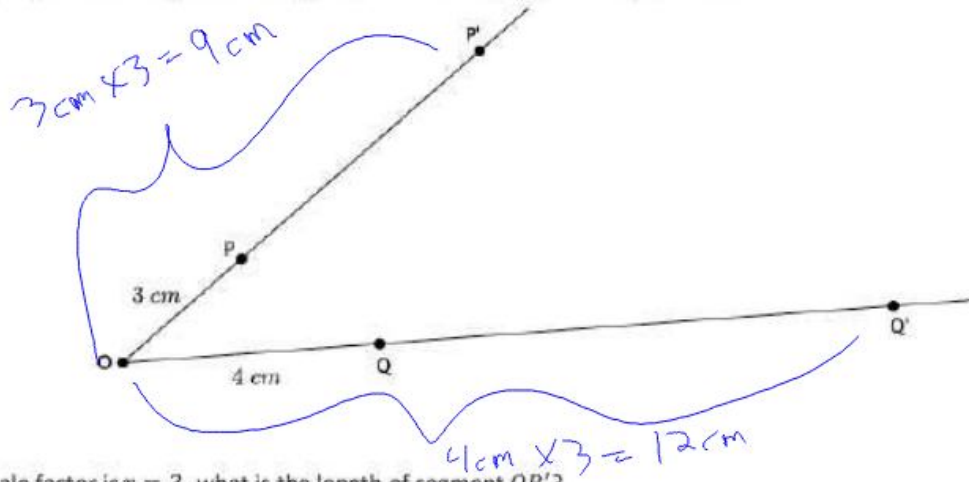
$|OP'| = 20$ in Because we multiplied the length of the original, times the scale factor
 $5 \times 4 = 20$

b. If segment OP is dilated by a scale factor $= \frac{1}{2}$, what is the length of segment OP' ?

$|OP'| = 2\frac{1}{2}$ in
 $5 \times \frac{1}{2} = \frac{5}{2} = 2\frac{1}{2}$



Use the diagram below to answer Exercises 2–6. Let there be a dilation from center O . Then $Dilation(P) = P'$ and $Dilation(Q) = Q'$. In the diagram below, $|OP| = 3$ cm and $|OQ| = 4$ cm, as shown.



2. If the scale factor is $r = 3$, what is the length of segment OP' ?

The length is 9 cm

3. Use the definition of dilation to show that your answer to Exercise 2 is correct.

$$|OP'| = r |OP| \quad |OP'| = 3 \times 3 \text{ cm} = 9 \text{ cm}$$

4. If the scale factor is $r = 3$, what is the length of segment OQ' ?

The length of OQ' is 12 cm

5. Use the definition of dilation to show that your answer to Exercise 4 is correct.

$$|OQ'| = r |OQ| \quad |OQ'| = 12 \text{ cm}$$

$$|OQ'| = 3(4 \text{ cm})$$

6. If you know that $|OP| = 3$, $|OP'| = 9$, how could you use that information to determine the scale factor?

$$|OP'| = r |OP|$$

$$r = \frac{|OP'|}{|OP|}$$

$$9 = r(3)$$

$$\frac{9}{3} = \frac{r(3)}{3}$$

$$r = \frac{9}{3} = 3$$

$$r = 3$$

$$r = \frac{\text{new}}{\text{old}}$$