

## Dilations and Similar Figures

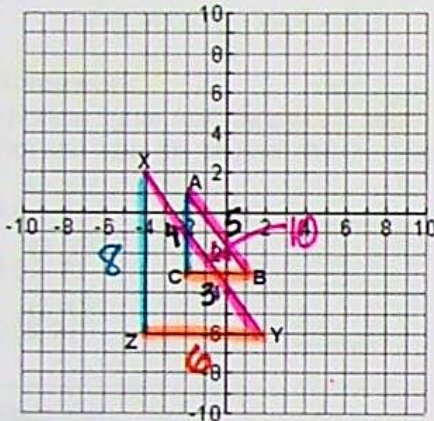
Under a transformation of a dilation, a figure will be similar to the pre-image. This means...

- the angle measures will remain the same (be congruent)
- parallel lines remain parallel
- BUT lengths of segments are NOT congruent, but be in equal ratio (proportional)

Note:  
 $\cong$  means congruent to  
 $\sim$  means similar to

Triangle ABC was dilated by a factor of 2 to create triangle XYZ

greater than 1 means enlargement!



$$\triangle ABC \sim \triangle XYZ$$

$$\overline{CA} = 4 \text{ units } (4)(2) = \overline{XZ} = 8 \text{ units}$$

$$\overline{BC} = 3 \text{ units } (3)(2) = \overline{YZ} = 6 \text{ units}$$

$$\overline{AB} = 5 \text{ units } (5)(2) = \overline{XY} = 10 \text{ units}$$

$\frac{8}{4}$   
 $\frac{6}{3}$   
 $\frac{10}{5}$   
 2

Name the congruent angles.

$$\angle A \cong \angle X \quad \angle B \cong \angle Y \quad \angle C \cong \angle Z$$

Notice the ratio of all the segment measures remains the same.

(proper) fraction  $\rightarrow$  reduction!

$\frac{\text{new length}}{\text{old length}} = \text{scale factor!}$

Parallelogram QRST was dilated by a scale factor of  $\frac{1}{3}$ . Fill in the missing values.

$$\text{Parallelogram QRST} \sim \text{Parallelogram AXFH}$$

$$\overline{QR} = 9 \text{ units}$$

$$\overline{AX} = 3 \text{ units}$$

$$\overline{TS} = 9 \text{ units}$$

$$\overline{HF} = 3 \text{ units}$$

$$\overline{QT} \approx 16 \text{ units}$$

$$\overline{AH} \approx 5\frac{1}{3} \text{ units } \left(\frac{16}{3}\right)$$

$$\overline{SR} \approx 16 \text{ units}$$

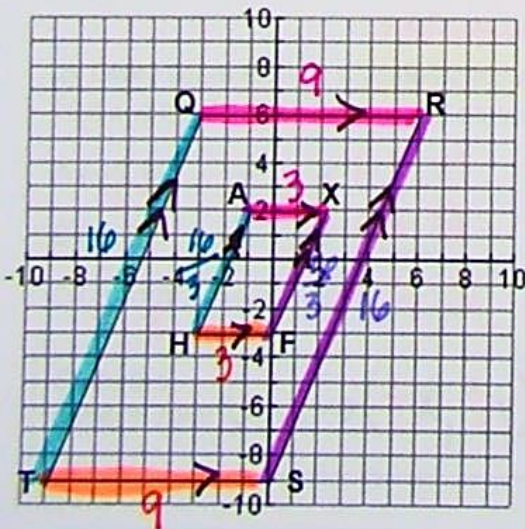
$$\overline{FX} \approx 5\frac{1}{3} \text{ units } \left(\frac{16}{3}\right)$$

Name the congruent angles in the smaller parallelogram.

$$\angle Q \cong \angle A \quad \angle R \cong \angle X \quad \angle S \cong \angle F \quad \angle T \cong \angle H$$

If  $\overline{QR} \parallel \overline{TS}$ , then  $\overline{AX} \parallel \overline{HF}$ . Therefore if  $\overline{QT} \parallel \overline{RS}$ , then name two other parallel segments.

$$\overline{AH} \parallel \overline{XF}$$

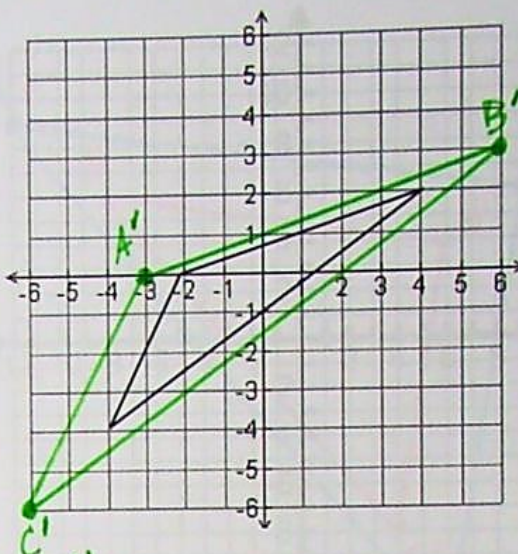




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Dilate figure ABC by a **scale factor of  $\frac{3}{2}$** . (1.5)  
 Plot and label the original and the dilated figure.

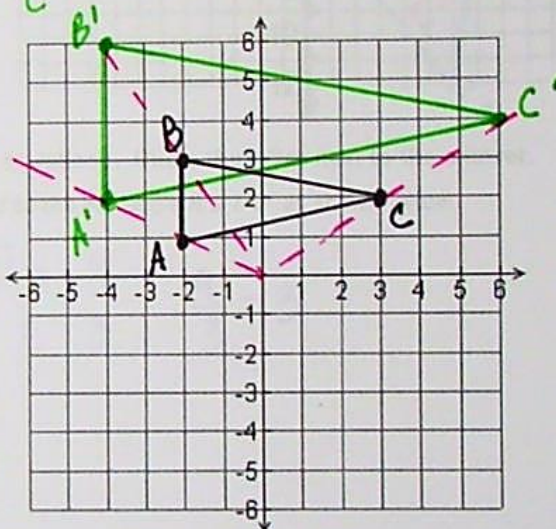
$A(-2, 0) \rightarrow A'(-3, 0)$   
 $B(4, 2) \rightarrow B'(6, 3)$   
 $C(-4, -4) \rightarrow C'(-6, -6)$



State the general rule:  $(x, y) \rightarrow (1.5x, 1.5y)$   
 (enlargement)

**Homework**  
 1) Dilate figure ABC by a **scale factor of 2**.  
 Plot and label the original and the dilated figure.

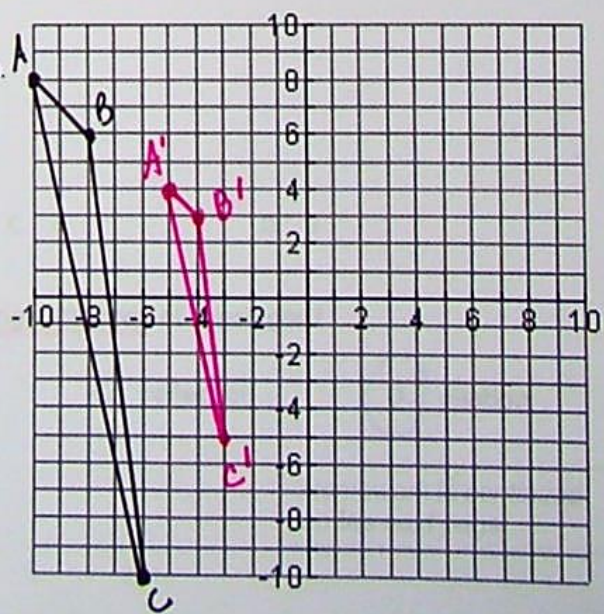
$A(-2, 1) \rightarrow A'(-4, 2)$   
 $B(-2, 3) \rightarrow B'(-4, 6)$   
 $C(3, 2) \rightarrow C'(6, 4)$



State the general rule:  $(x, y) \rightarrow (2x, 2y)$

2) Dilate figure ABC by a **scale factor of  $\frac{1}{2}$** .  
 Plot and label the original and the dilated figure.

$A(-10, 8) \rightarrow A'(-5, 4)$   
 $B(-8, 6) \rightarrow B'(-4, 3)$   
 $C(-6, -10) \rightarrow C'(-3, -5)$



State the general rule:  $(x, y) \rightarrow (\frac{1}{2}x, \frac{1}{2}y)$

Homework is continued on the next page.