

# Dilations and Similar Figures

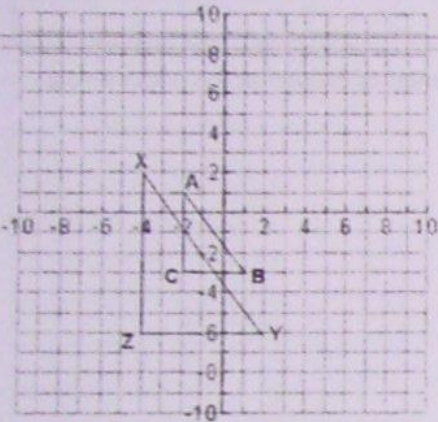
Under a transformation of a dilation, a figure will be similar to the pre-image. This means...

- 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

Note:

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

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



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

$$\overline{CA} = 4 \text{ units}$$

$$\overline{XZ} = 8 \text{ units}$$

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

$$\overline{YZ} = 6 \text{ units}$$

$$\overline{AB} = 5 \text{ units}$$

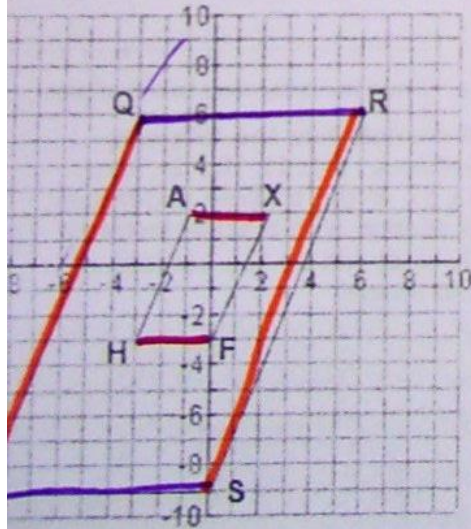
$$\overline{XY} = 10 \text{ units}$$

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.

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



Parallelogram QRST  $\sim$  Parallelogram AHXF

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

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

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

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

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

$$\frac{16}{3} \overline{AH} \approx 5\frac{1}{3} \text{ units} \approx 5.3$$

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

$$\overline{FX} \approx 5.3 \text{ units}$$

Name the congruent angles in the smaller parallelogram.

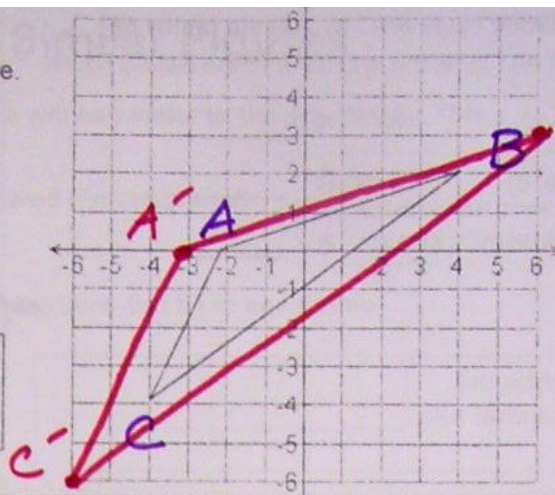
$$\angle Q \cong \angle A \quad \angle R \cong \angle X \quad \angle S \cong \angle F \quad \angle T \cong \angle H$$

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.

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

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

A (-2, 0) → A' (-3, 0)  
 B (4, 2) → B' (6, 3)  
 C (-4, -4) → C' (-6, -6)



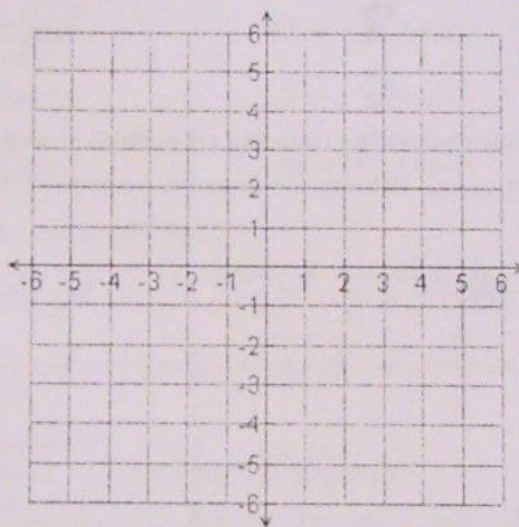
State the general rule:  $(x, y) \rightarrow (\frac{3}{2}x, \frac{3}{2}y)$

### Homework

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

A (-2, 1) → A' \_\_\_\_\_  
 B (-2, 3) → B' \_\_\_\_\_  
 C (3, 2) → C' \_\_\_\_\_

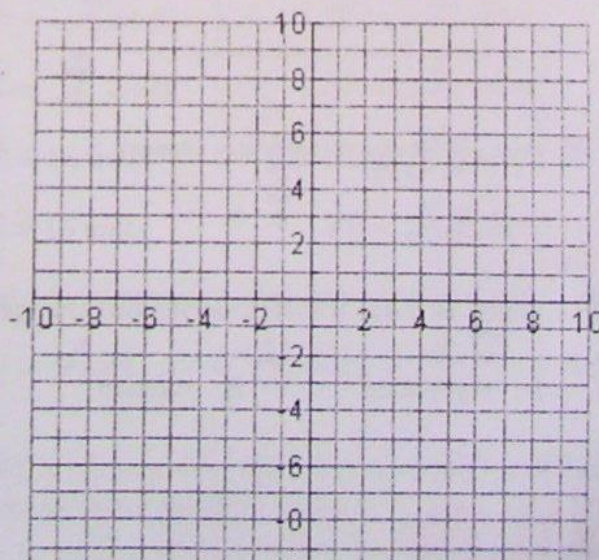
State the general rule: \_\_\_\_\_



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

(-10, 8) → A' \_\_\_\_\_  
 (-8, 6) → B' \_\_\_\_\_  
 (-6, -10) → C' \_\_\_\_\_

State the general rule: \_\_\_\_\_



Homework is continued on the next page.