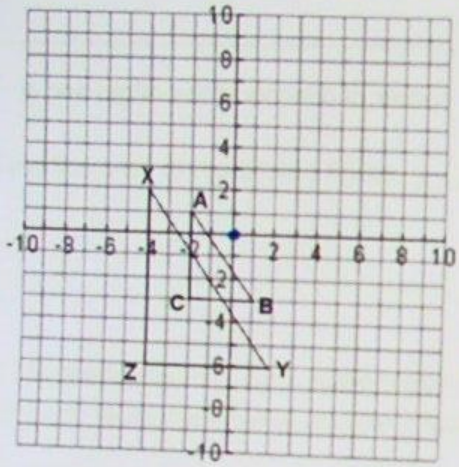
Dilations and Similar Figures

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



similar

$\Delta ABC \sim \Delta XYZ$

$\overline{CA} = 4 units$ $\quad \overline{XZ} = \underline{8} units$

$\overline{BC} = 3 units$ $\quad \overline{YZ} = \underline{6} units$

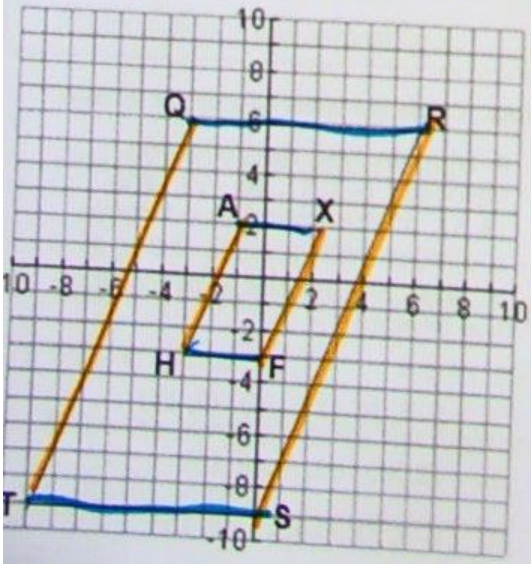
$\overline{AB} = 5 units$ $\quad \overline{XY} = \underline{10} units$

Name the congruent angles.

$\angle A \cong \underline{\angle X}$ $\quad \angle B \cong \underline{\angle Y}$ $\quad \angle C \cong \underline{\angle Z}$

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 ~ *Parallelogram* $\underline{AXFH}$

$\overline{QR} = \underline{9} units$ $\quad \overline{AX} = \underline{3} units$

$\overline{TS} = \underline{9} units$ $\quad \overline{HF} = \underline{3} units$

$\overline{QT} \approx 16 units$ $\quad \overline{SR} \approx \underline{5\frac{1}{3}} units$ $\quad \frac{16}{3} = 5\frac{1}{3}$

$\overline{SR} \approx 16 units$ $\quad \overline{FX} \approx \underline{5\frac{1}{3}} units$

Name the congruent angles in the smaller parallelogram.

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

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.

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

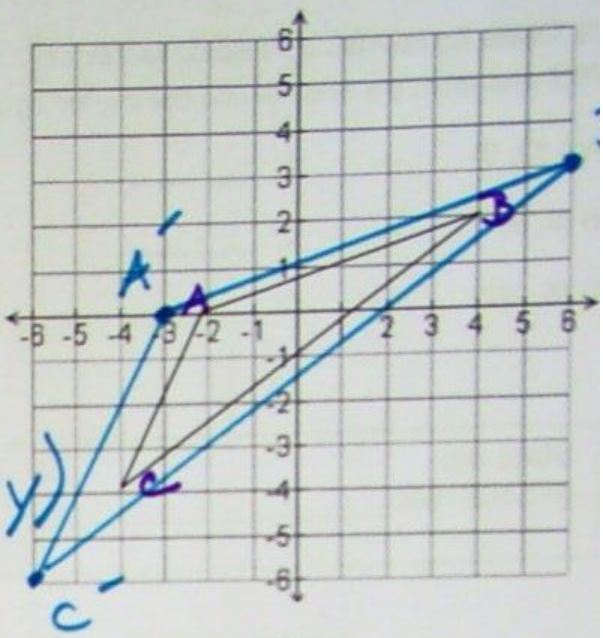
multiply by $\frac{3}{2}$ ← divide by 2

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 $(x, y) \rightarrow (\frac{3}{2}x, \frac{3}{2}y)$

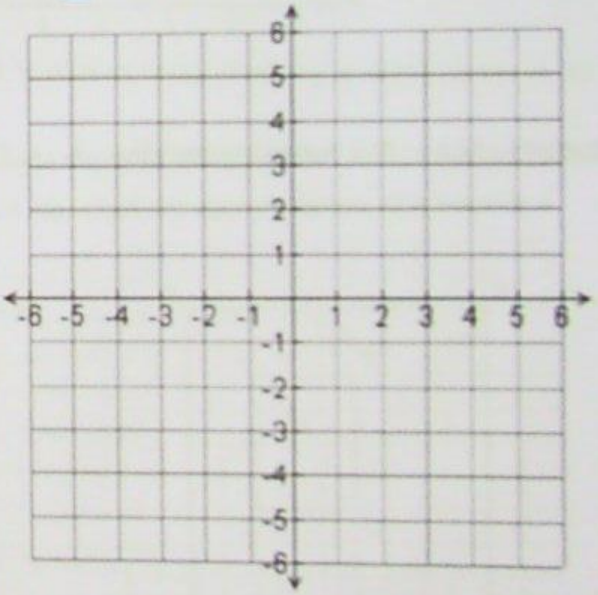
Homework

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' _____



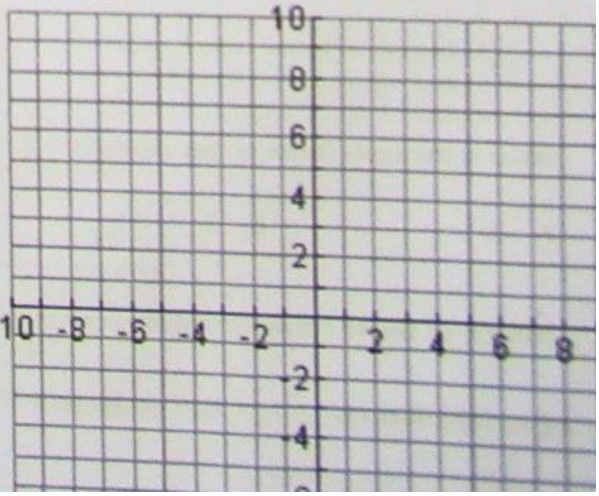
State the general rule: _____

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

A (-10, 8) → A' _____

B (-8, 6) → B' _____

C (-6, -10) → C' _____



State the general rule: _____