

8.4 Dilatations

Dilatation

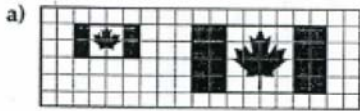
Enlargements or Reductions

- a transformation that changes the size of an object



Practice

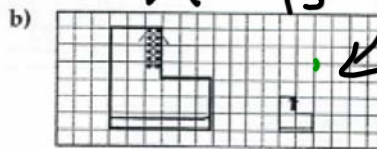
1. A figure is shown with its image to the right. What is the scale factor?



$2 \frac{8}{4}$

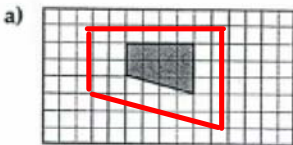
length of large flag
length of small flag

Reduce

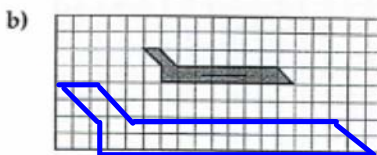


$\frac{3}{1}$

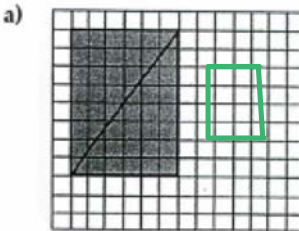
2. Enlarge the figures below by a scale factor of two.



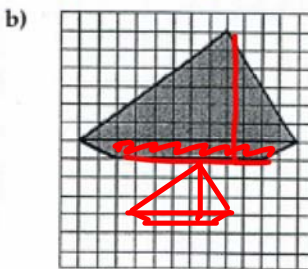
Make them twice as large.



3. Reduce each figure by a scale factor of $\frac{1}{2}$. Divide 2



Divide each side by 2.



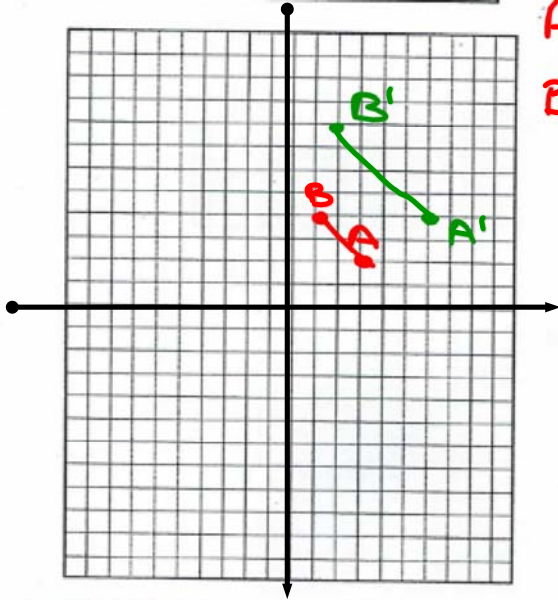
4. Draw the dilation image of each line segment under the given mapping.

Example:

Line Segment	Mapping
$L(2, 3), M(4, 1)$	$(x, y) \rightarrow (2x, 2y)$
$L'(2 \times 2, 2 \times 3)$ $= L'(4, 6)$	$M'(2 \times 4, 2 \times 1)$ $= M'(8, 2)$

Draw each line segment first.

Line Segment	Mapping
a) $A(3, 2), B(1, 4)$	$(x, y) \rightarrow (2x, 2y)$
b) $E(-1, -1), F(1, 2)$	$(x, y) \rightarrow (3x, 3y)$



Rough Work:

a) $A'(2 \times 3, 2 \times 2)$
 $= A'(6, 4)$

$B(1, 4) \rightarrow (2, 8)$

5. Draw the dilation image of each line segment under the given mapping.

Example:

Line Segment	Mapping
$P(-6, 3), Q(-3, -6)$	$(x, y) \rightarrow (\frac{1}{3}x, \frac{1}{3}y)$
$P'(\frac{-6}{3} \div 3, \frac{3}{3} \div 3)$ $= P'(-2, 1)$	$Q'(\frac{-3}{3} \div 3, \frac{-6}{3} \div 3)$ $= Q'(-1, -2)$ Divide by 3.

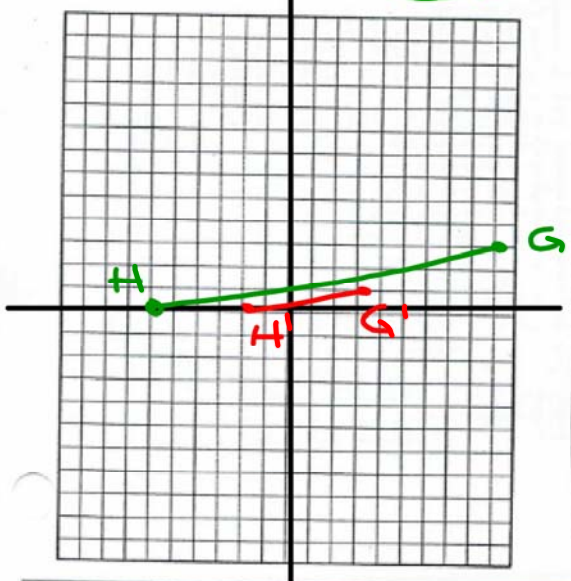
Draw each line segment first.

Line Segment	Mapping
a) $C(6, 4), D(-2, 2)$	$(x, y) \rightarrow (\frac{1}{2}x, \frac{1}{2}y)$
b) $G(9, 3), H(-6, 0)$	$(x, y) \rightarrow (\frac{1}{3}x, \frac{1}{3}y)$

Rough Work:

a) $C(6 \div 2, 4 \div 2)$
 $= C(3, 2)$

$G(9, 3) \rightarrow (3, 1)$
 $H(-6, 0) \rightarrow (-2, 0)$



6. $\triangle RST$ has vertices $R(2, 3)$, $S(-1, 4)$, and $T(-3, -2)$.

- a) Draw $\triangle RST$ on the grid.
- b) Find the image of $\triangle RST$ under the mapping $(x, y) \rightarrow (3x, 3y)$.

$$R'(3 \times \boxed{2}, 3 \times \boxed{3})$$

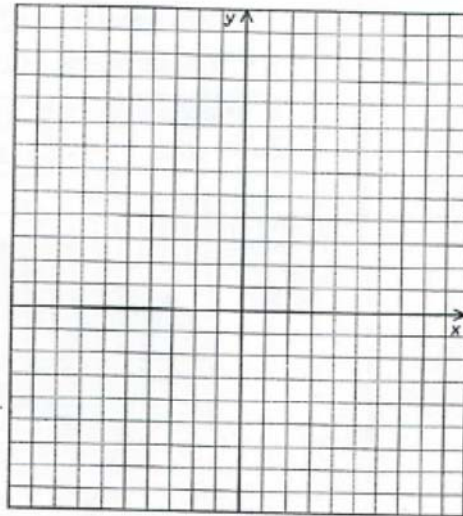
$$= R'(\boxed{}, \boxed{})$$

$$S'(3 \times \boxed{}, 3 \times \boxed{})$$

$$= S'(\boxed{}, \boxed{})$$

$$T'(\boxed{}, \boxed{})$$

$$= T'(\boxed{}, \boxed{})$$

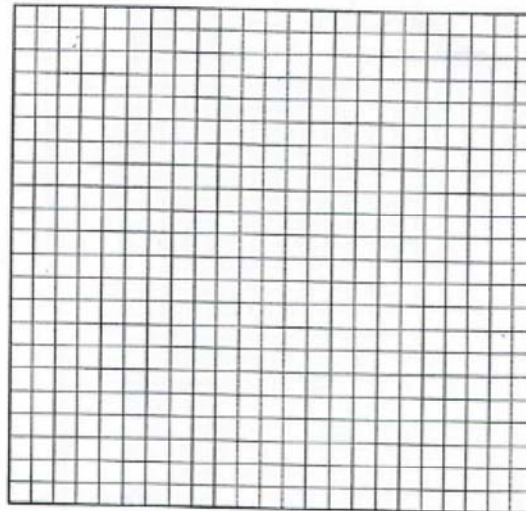


- c) Plot the image.

7. Quadrilateral $DEFG$ has vertices $D(6, 4)$, $E(-2, 6)$, $F(-4, -4)$, and $G(4, -6)$.

- a) Draw $DEFG$ on the grid.
- b) Find the image of quadrilateral $DEFG$ under the mapping $(x, y) \rightarrow (\frac{1}{2}x, \frac{1}{2}y)$.

Hint:
Divide each coordinate by 2.



- c) Plot the image.