

Origin Zoom

Dilate polygons from the origin.

GRADE 7 • 7.MG.4.a

7.MG.4.a "Given a preimage in the coordinate plane, identify the coordinates of the image of a polygon that has been dilated. Scale factors are limited to 14, 12, 2, 3, or 4. The center of the dilation will be the origin."

NAME _____

DATE _____

MULTIPLY FROM ZERO

A dilation centered at the origin multiplies each x-coordinate and each y-coordinate by the scale factor. Keep each coordinate's positive or negative sign.

WORKED EXAMPLE

Triangle ABC has A(7,-11), B(-13,17), and C(19,-23). Dilate it by a scale factor of 3.

1. Use $(x,y) \rightarrow (3x,3y)$.
2. $A' = (21,-33)$.
3. $B' = (-39,51)$.
4. $C' = (57,-69)$.

Answer: A'(21,-33), B'(-39,51), C'(57,-69)

PRACTICE 5 problems

- 1** Triangle ABC has A(2,-4), B(-8,8), and C(4,2). Dilate by $1/2$.

ANSWER _____

- 2** Quadrilateral WXYZ has W(-1,-2), X(2,-4), Y(4,1), and Z(-2,2). Dilate by 2.

ANSWER _____

- 3** Triangle EFG has E(1,2), F(-2,4), and G(4,-1). Dilate by 4.

ANSWER _____

- 4** Triangle LMN has L(-8,4), M(8,-4), and N(4,8). Dilate by $1/4$.

ANSWER _____

- 5** Triangle DEF has D(2,4), E(-4,6), and F(-1,-2). Dilate by 2.

ANSWER _____

APPLY IT Show your work

- 1** A video game designer places a triangle at $P(1,2)$, $Q(2,-1)$, and $R(4,2)$ on a map. The map dilates the triangle from the origin by 4. What are the image coordinates?

WORK SPACE

ANSWER _____

- 2** A skate park logo is a triangle with vertices $A(-4,8)$, $B(8,4)$, and $C(16,-8)$. A smaller logo is a dilation from the origin by $1/4$. What are its image coordinates?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Triangle ABC has $A(-2,4)$, $B(1,-1)$, and $C(4,2)$. It is dilated from the origin by 2. Kai says B' is $(2,2)$. Is Kai correct? Explain.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Triangle ABC has A(2,-4), B(-8,8), and C(4,2). Dilate by $\frac{1}{2}$.	A'(1,-2), B'(-4,4), C'(2,1)
2	Quadrilateral WXYZ has W(-1,-2), X(2,-4), Y(4,1), and Z(-2,2). Dilate by 2.	W'(-2,-4), X'(4,-8), Y'(8,2), Z'(-4,4)
3	Triangle EFG has E(1,2), F(-2,4), and G(4,-1). Dilate by 4.	E'(4,8), F'(-8,16), G'(16,-4)
4	Triangle LMN has L(-8,4), M(8,-4), and N(4,8). Dilate by $\frac{1}{4}$.	L'(-2,1), M'(2,-1), N'(1,2)
5	Triangle DEF has D(2,4), E(-4,6), and F(-1,-2). Dilate by 2.	D'(4,8), E'(-8,12), F'(-2,-4)

PART 2 • APPLY IT

- P'(4,8), Q'(8,-4), R'(16,8)** Multiply both coordinates of each vertex by 4.
- A'(-1,2), B'(2,1), C'(4,-2)** Multiply each coordinate by $\frac{1}{4}$, or divide each coordinate by 4.

CHALLENGE

No. B' is (2,-2) because the negative y-coordinate stays negative when multiplied by 2.

Accept coordinates written as ordered pairs or in vertex-label form. Coordinates must be listed in the same order as the original vertices.