

Geometry · Dilations and Similarity Transformations · Worksheet

Common Core G-SRT.A.1, G-SRT.A.2, G-SRT.A.3 · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

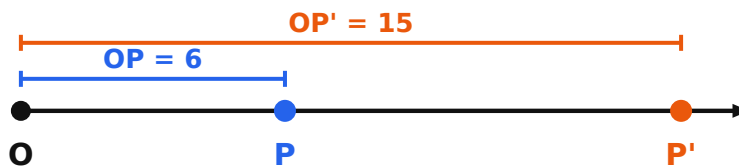
These 23 problems practice dilations and similarity transformations (G-SRT.A.1, G-SRT.A.2, G-SRT.A.3). You will find scale factors, dilate points, segments and lines on the coordinate plane, and use angles to decide when triangles are similar.

Problems go from one-step scale factors to multi-step word problems about photos, projectors and copiers. Show your work and label each image point.

GeometryCommon Core: G-SRT.A.1 · G-SRT.A.2 · G-SRT.A.3

Problem 1: Scale factor from distances

A dilation with center O maps point P to point P' . In the figure, $OP = 6$ and $OP' = 15$. Find the scale factor and tell whether the dilation is an enlargement or a reduction.



Point P' lies on ray OP , farther from the center O than P.

Problem 2: Find the image length

Segment AB is 12 inches long. After a dilation with scale factor $\frac{3}{4}$, how long is $A'B'$?

Problem 3: Find the original length

After a dilation with scale factor 2.5, a segment measures 20 centimeters. How long was the segment before the dilation?

Problem 4: Enlargement or reduction

Classify each scale factor as an enlargement, a reduction, or no change in size.

- a. $\frac{7}{4}$
- b. 0.6
- c. 1
- d. 1.2
- e. $\frac{5}{9}$

Problem 5: Dilate points about the origin

Each point is dilated about the origin with the given scale factor. Find the image.

- a. $P(3, -2)$, $k = 3$
- b. $Q(-4, 6)$, $k = \frac{1}{2}$
- c. $R(5, 0)$, $k = 4$
- d. $S(0, -7)$, $k = \frac{3}{7}$

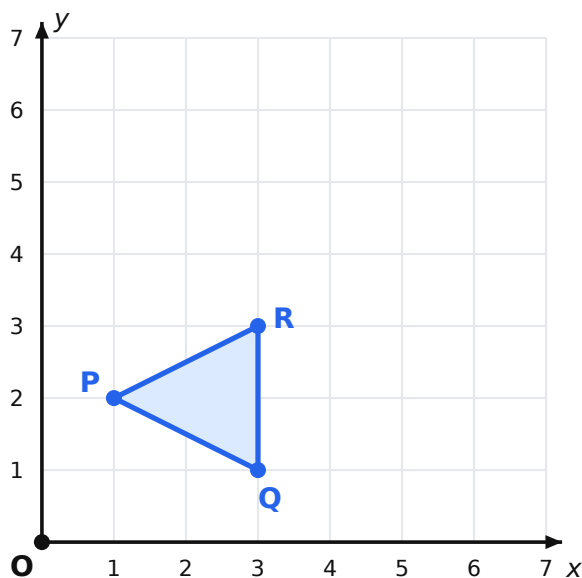
Problem 6: Scale factor from coordinates

A dilation with center at the origin maps each point to its image. Find the scale factor in each case.

- a. $A(2, 4) \rightarrow A'(5, 10)$
- b. $B(6, -9) \rightarrow B'(2, -3)$

Problem 7: Dilate a triangle

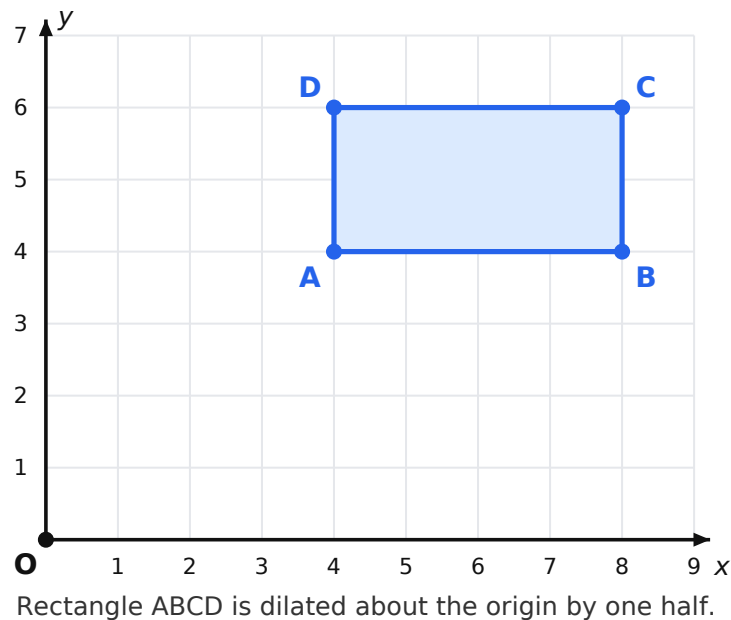
Triangle PQR is shown. Dilate it about the origin with scale factor 2. List the coordinates of P' , Q' and R' , then graph the image.



Triangle PQR is dilated about the origin.

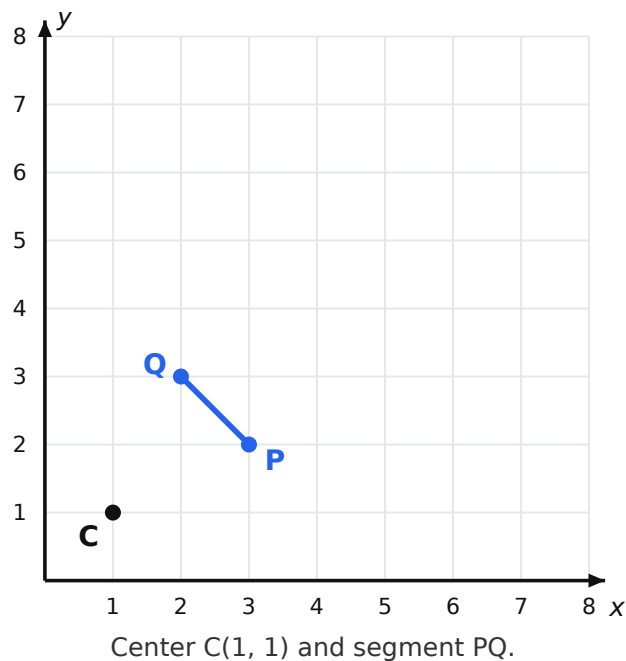
Problem 8: Shrink a rectangle

Rectangle ABCD is dilated about the origin with scale factor $\frac{1}{2}$. Find the coordinates of the image and the dimensions of the new rectangle.



Problem 9: Center not at the origin

A dilation has center $C(1,1)$ and scale factor 3. Find the images P' of $P(3,2)$ and Q' of $Q(2,3)$, then compare the lengths of PQ and $P'Q'$.



Problem 10: Dilate a line

The line $y = 3x - 2$ is dilated about the origin with scale factor 2. Write an equation of the image line.

Problem 11: Which lines stay put

A dilation about the origin has scale factor 3. For each line, decide whether the image is the same line or a different line, and write an equation of the image.

- a. $y = -3x$
- b. $y = -3x + 6$
- c. $y = \frac{1}{2}x$
- d. $y = \frac{1}{2}x - 1$

Problem 12: Perimeter after a dilation

A triangle has side lengths 7 in., 9 in. and 12 in. It is dilated with scale factor 2.5. Find the side lengths and the perimeter of the image, and compare the perimeters.

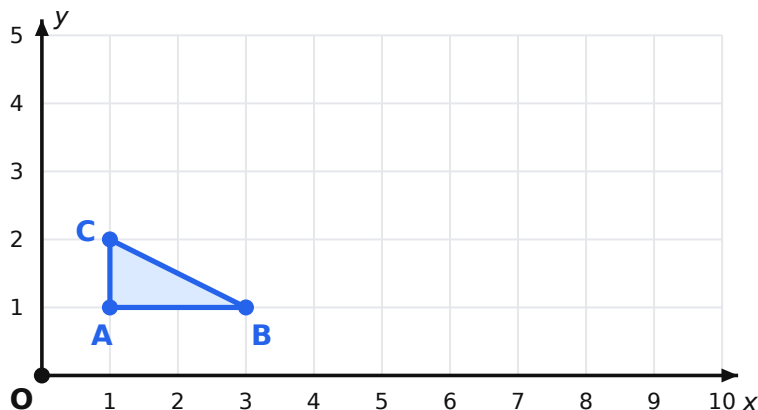
Problem 13: Angles after a dilation

In triangle ABC, $m\angle A = 48^\circ$ and $m\angle B = 67^\circ$. The triangle is dilated with scale factor 3 to get $A'B'C'$.

- a. Find $m\angle C$.
- b. Find the three angle measures of $A'B'C'$.

Problem 14: Dilation then translation

Triangle ABC has vertices $A(1,1)$, $B(3,1)$, $C(1,2)$. It is dilated about the origin with scale factor 2, and the result is translated 3 units right and 1 unit down. Find the final vertices A'' , B'' , C'' .



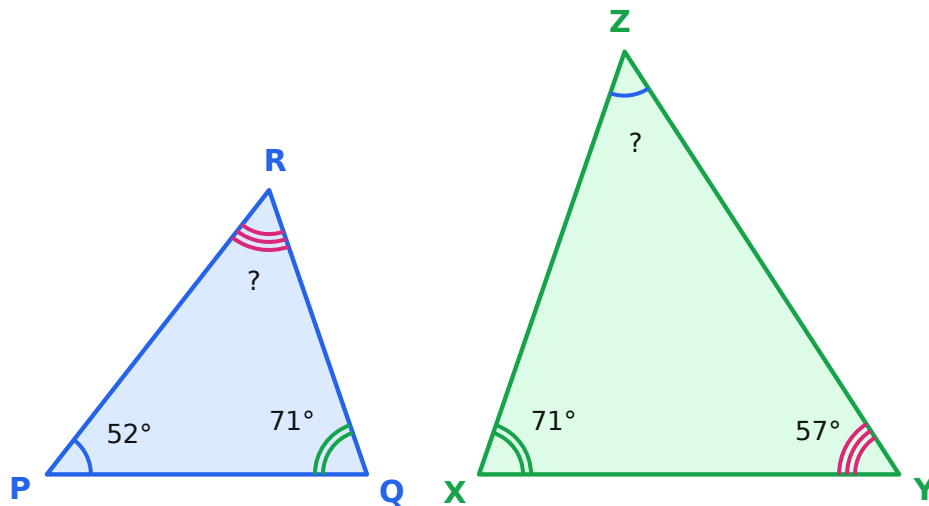
Triangle ABC will be dilated and then translated.

Problem 15: Two dilations in a row

Point $P(4,6)$ is dilated about the origin with scale factor 2. The image is then dilated about the origin with scale factor $\frac{3}{4}$. Find the final image and the single scale factor that does the same job.

Problem 16: Third angles and similarity

In the figure, triangle PQR has angles 52° and 71° , and triangle XYZ has angles 71° and 57° . Find the unmarked angles and decide whether the triangles are similar. If they are, write a similarity statement.



Triangles PQR and XYZ with two angles marked in each.

Problem 17: Similar or not

For each pair of triangles, decide whether they must be similar. Explain using angles.

- Triangle 1 has angles 35° and 80° . Triangle 2 has angles 80° and 65° .
- Triangle 3 has angles 30° and 60° . Triangle 4 has angles 45° and 45° .
- Triangle 5 is isosceles with a 40° vertex angle. Triangle 6 is isosceles with a 70° base angle.

Problem 18: Slope and length after dilation

Segment PQ has endpoints $P(2,1)$ and $Q(5,3)$. It is dilated about the origin with scale factor 2. Find the endpoints of $P'Q'$, then compare slopes and lengths of the two segments.

Problem 19: Photo enlargement

Maya enlarges a 4 inch by 6 inch photo with a dilation of scale factor 2.5 for the school lobby. Find the dimensions of the enlargement and compare the perimeters of the two photos.

Problem 20: Projector screen

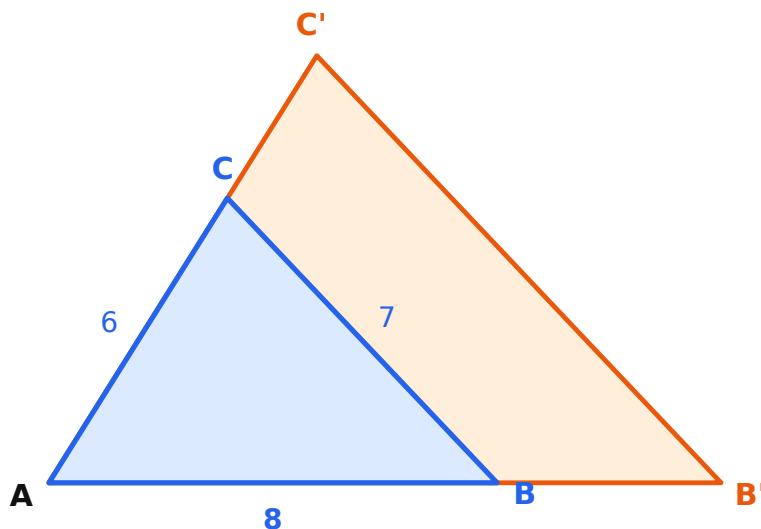
A projector throws a slide that is 8 inches wide and 6 inches tall onto a wall. The image on the wall is 6 feet wide. Find the scale factor and the height of the projected image in feet.

Problem 21: Copier reduction

Jamal reduces an 11 inch by 8.5 inch flyer on a copier set to 60%. Find the dimensions of the copy. Then find the percent setting that would return the copy to full size.

Problem 22: Dilation about a vertex

Triangle ABC has $AB=8$, $AC=6$ and $BC=7$. It is dilated about vertex A with scale factor 1.5 to get $AB'C'$, as shown. Find AB' , AC' , $B'C'$ and the perimeter of each triangle.



Triangle ABC sits inside $AB'C'$, which is the image under a dilation with center A and $k = 1.5$.

Problem 23: Find the center

A dilation with scale factor 2 maps $P(3,2)$ to $P'(5,4)$. Find the center of the dilation, then find the image of $Q(4,5)$.