

Grade 8 · Congruence, Dilations and Similarity

· Worksheet

Common Core 8.G.A.2, 8.G.A.3, 8.G.A.4 · mathovore.fr

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

These twenty-four problems practice Common Core standards 8.G.A.2, 8.G.A.3 and 8.G.A.4. Move points and triangles with translations, reflections, rotations and dilations on the coordinate plane, then use scale factors to decide whether figures are similar.

The problems run from single points to word problems and two-step sequences. Work from easiest to hardest and compare your coordinates with the answer key.

Grade 8 Common Core: 8.G.A.2 · 8.G.A.3 · 8.G.A.4

Problem 1: Translate a point

Translate the point $A(3, -2)$ 4 units right and 5 units up. Write the coordinates of the image.

Problem 2: Reflect over the x-axis

Reflect the point $B(5, -3)$ across the x -axis. Write the image.

Problem 3: Reflect over the y-axis

Reflect the point $C(-4, 6)$ across the y -axis. Write the image.

Problem 4: Rotate 90 degrees

Rotate the point $D(2, 5)$ 90° counterclockwise about the origin. Write the image.

Problem 5: Rotate 180 degrees

Rotate the point $E(-3, 4)$ 180° about the origin. Write the image.

Problem 6: Rotate 270 degrees

Rotate the point $F(6, -1)$ 270° counterclockwise about the origin. Write the image.

Problem 7: Dilate a point

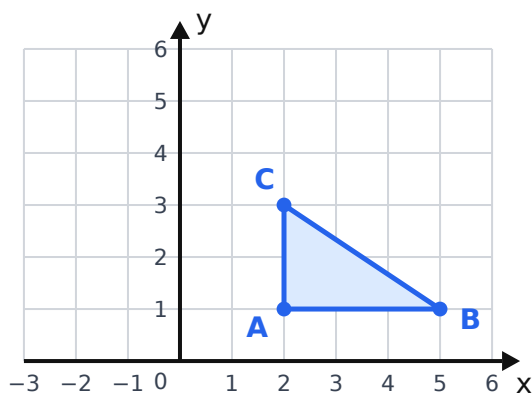
Dilate the point $G(4,-6)$ about the origin with scale factor 3. Write the image.

Problem 8: Shrink a point

Dilate the point $H(12,8)$ about the origin with scale factor $\frac{1}{4}$. Write the image.

Problem 9: Translate a triangle

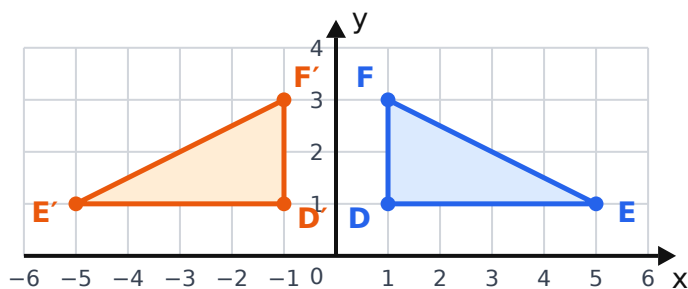
Translate triangle ABC 4 units left and 2 units up. Write the coordinates of A' , B' and C' .



Triangle ABC .

Problem 10: Name the motion

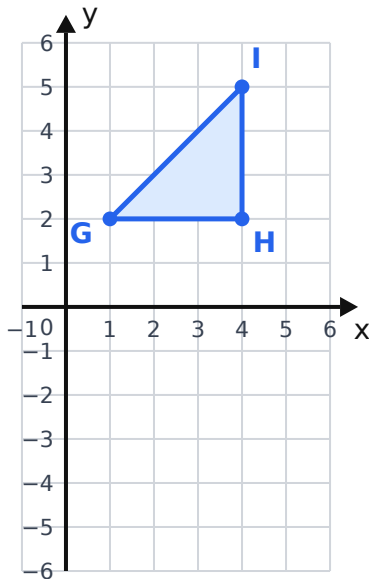
Name the single rigid motion that maps triangle DEF onto triangle $D'E'F'$. Give the rule for (x,y) .



Triangle DEF and its image.

Problem 11: Reflect a triangle

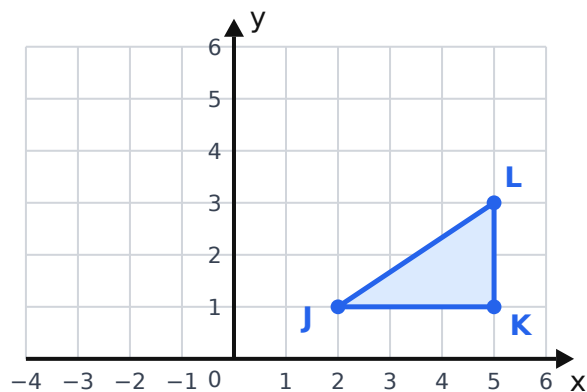
Reflect triangle GHI across the x -axis. Write the coordinates of the image vertices.



Triangle GHI .

Problem 12: Rotate a triangle

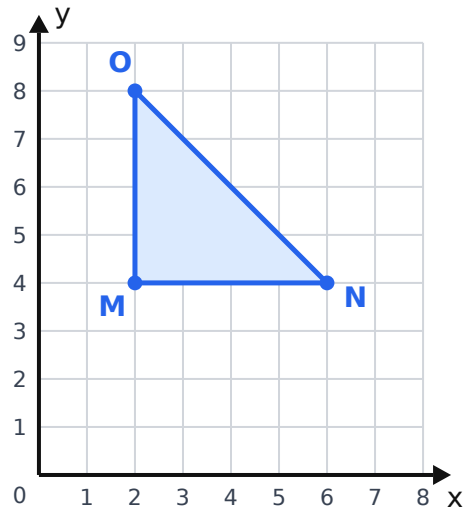
Rotate triangle JKL 90° counterclockwise about the origin. Write the coordinates of the image vertices.



Triangle JKL .

Problem 13: Dilate a triangle

Dilate triangle MNO about the origin with scale factor $\frac{1}{2}$. Write the coordinates of the image vertices.



Triangle MNO .

Problem 14: Rigid motions keep size

In triangle ABC , $AB = 6$ in and $\angle B = 52^\circ$. The triangle is reflected across a line to form triangle $A'B'C'$. Find $A'B'$ and $\angle B'$.

Problem 15: Dilation and lengths

A triangle has sides 4 in, 7 in and 9 in, and an angle of 38° . It is dilated with scale factor 3. Find the three new side lengths and the new angle measure.

Problem 16: Find the scale factor

A dilation about the origin sends $A(2,3)$ to $A'(10,15)$. Find the scale factor, then find the image of $B(-4,1)$.

Problem 17: A reducing dilation

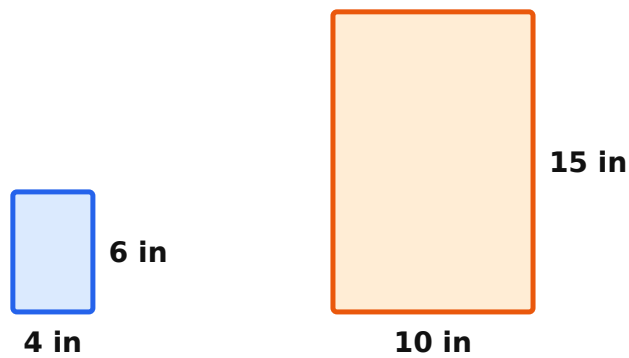
A dilation about the origin sends $P(-6,9)$ to $P'(-2,3)$. Find the scale factor, then find the image of $Q(12,-3)$.

Problem 18: Two moves in a row

Triangle RST has vertices $R(1,1)$, $S(4,1)$, $T(4,3)$. Reflect it across the x -axis, then translate the result 3 units left. Write the final vertices. Is the final triangle congruent to RST ? Explain.

Problem 19: Similar rectangles

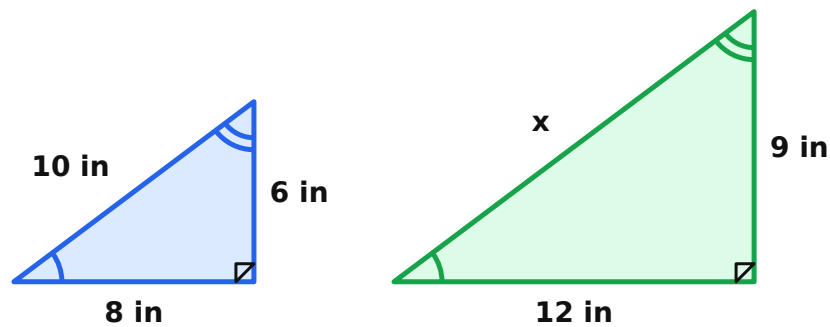
Are the two rectangles similar? If so, find the scale factor from the small rectangle to the large one.



Two rectangles, drawn to scale.

Problem 20: Missing side of a triangle

The two triangles are similar. Find the scale factor and the length x .



Two similar right triangles with matching angle marks.

Problem 21: Enlarging a photo

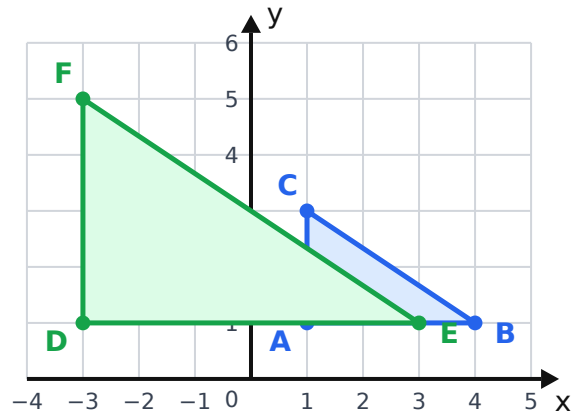
Maya has a photo that is 4 inches wide and 6 inches tall. She enlarges it, keeping the same shape, so it is 10 inches wide. How tall is the enlarged photo? Name the scale factor.

Problem 22: Logo on a screen

A school-store logo is 3 inches wide and 2 inches tall on a flyer. Jamal shrinks and enlarges copies for other uses. On a banner the logo is 4.5 inches wide. Find the scale factor and the banner height. Then find the width of a sticker copy that is 1.5 inches tall.

Problem 23: Describe a sequence

Describe a sequence of a dilation about the origin and a translation that maps triangle ABC onto triangle DEF . Are the triangles similar? Congruent?



Triangles ABC and DEF .

Problem 24: Game character

Diego designs a game character as a triangle with vertices $(2,4)$, $(6,4)$, $(2,10)$. He enlarges it with a dilation about the origin with scale factor 1.5, then flips it across the y -axis so it faces left. Write the final vertices. How long is the horizontal side of the final triangle?