

Geometry · Dilations and Similarity Transformations · Test Answer Key

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

Use this key to score the dilations test out of 20 points. Each solution shows the full reasoning and a scoring guide, so partial credit is awarded the same way for every student.

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

Question 1: Scale factor and image lengths (2 points)

- a. $k = \frac{12.5}{5} = 2.5$
- b. $A'B' = 2.5 \cdot 3 = 7.5$ cm

k = 2.5; A'B' = 7.5 cm. (Also $OB' = 2.5 \cdot 4 = 10$ cm.)

Scoring: 1 point for the correct ratio and $k = 2.5$; 1 point for multiplying AB by k to get 7.5 cm.

Question 2: Dilate points about the origin (2 points)

- a. $(\frac{3}{2} \cdot 4, \frac{3}{2} \cdot (-6)) = (6, -9)$
- b. $(0.4 \cdot (-10), 0.4 \cdot 15) = (-4, 6)$

P'(6, -9); Q'(-4, 6).

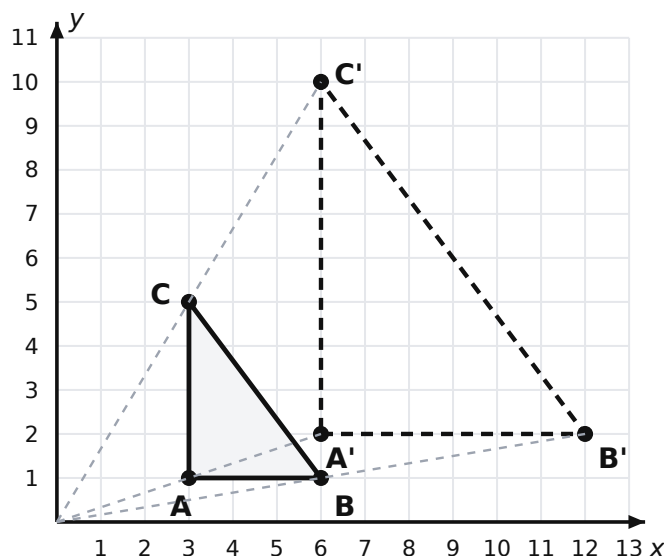
Scoring: 1 point for each image.

Question 3: Dilate a triangle on the plane (3 points)

- a. $A'(4,2), B'(10,2), C'(4,10)$
- b. $BC = \sqrt{3^2 + 4^2} = 5$ and $B'C' = \sqrt{6^2 + 8^2} = 10$, which is $2 \cdot 5$.
- c. Slope of BC : $\frac{5-1}{3-6} = -\frac{4}{3}$. Slope of $B'C'$: $\frac{10-2}{6-12} = -\frac{8}{6} = -\frac{4}{3}$. Equal slopes, so the segments are parallel.

A'(6, 2), B'(12, 2), C'(6, 10); BC = 5, B'C' = 10; both slopes are -4/3.

Scoring: 1 point for all three vertices; 1 point for both lengths; 1 point for both slopes and the conclusion.



Triangle ABC (solid) and A'B'C' (dashed), dilated about the origin by 2.

Question 4: Dilating a line (2 points)

- The line misses the origin, so the image is parallel with its intercept multiplied by 4:
 $y = -2x + 12$. (Check: $(0,3) \rightarrow (0,12)$ has slope -2 to $(2,8)$, the image of $(1,1)$.)
- The line passes through the center, so it maps to itself: $y = 3x$.

(a) $y = -2x + 12$; (b) $y = 3x$ (unchanged).

Scoring: 1 point for each equation; in (b) full credit requires saying the line is unchanged.

Question 5: Center other than the origin (2 points)

- C to A is 2 right, 2 up. Tripled: 6 right, 6 up from C: $A' = (8,7)$.
- C to B is 3 left, 1 down. Tripled: 9 left, 3 down from C: $B' = (2-9, 1-3) = (-7,-2)$.

A'(8, 7); B'(-7, -2).

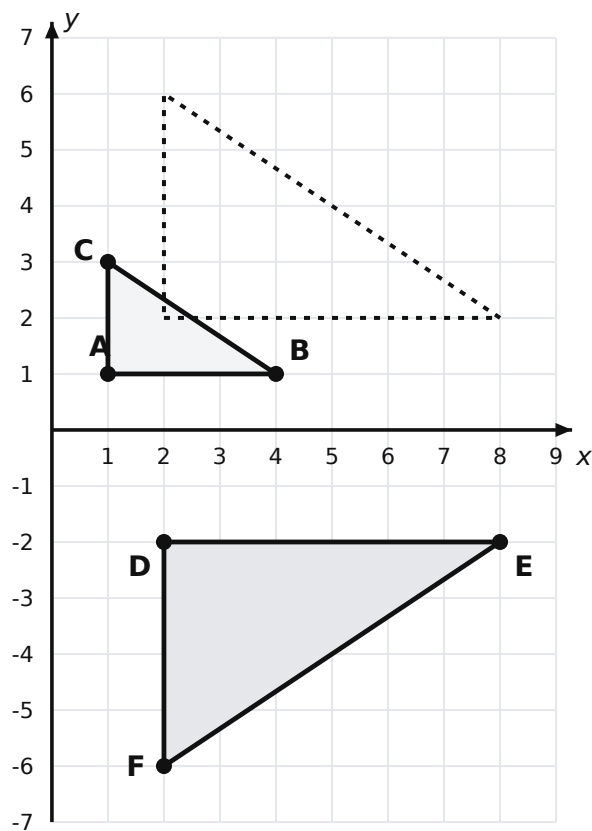
Scoring: 1 point each; 0 points if the origin was used as the center.

Question 6: Describe a similarity transformation (3 points)

- $AB = 4 - 1 = 3$ and $DE = 8 - 2 = 6$, so $k = \frac{6}{3} = 2$.
- Dilate about the origin with $k = 2$, then reflect across the x-axis.
- $C(1,3) \rightarrow (2,6) \rightarrow (2,-6) = F$.

$k = 2$; dilation then reflection across the x-axis; C maps to F(2, -6). Reflection first and dilation second also works.

Scoring: 1 point for $k = 2$; 1 point for a dilation of 2 plus a reflection across the x-axis; 1 point for tracking C through both steps to F.



ABC is dilated by 2 (dashed), then reflected across the x-axis to DEF.

Question 7: AA similarity and a missing side (3 points)

- $m\angle C = 180^\circ - 48^\circ - 67^\circ = 65^\circ$ and $m\angle D = 180^\circ - 67^\circ - 65^\circ = 48^\circ$.
- All three angle pairs match (48° , 67° , 65°), so the triangles are similar by AA:
 $\triangle ABC \sim \triangle DEF$.
- $\frac{DE}{AB} = \frac{9}{6} = 1.5$, so $EF = 1.5 \cdot BC = 1.5 \cdot 4.9 = 7.35$ cm.

C = 65 degrees, D = 48 degrees; similar by AA, $\triangle ABC \sim \triangle DEF$; EF = 7.35 cm.

Scoring: 1 point for both angles; 1 point for AA and a correctly ordered statement; 1 point for the ratio 1.5 and EF = 7.35 cm.

Question 8: Poster dilation (2 points)

- $k = \frac{30}{5} = 6$, so the height is $6 \cdot 7 = 42$ in.
- No. A dilation multiplies both dimensions by the same factor. Width gives 6, but $\frac{40}{7} \approx 5.7 \neq 6$, so the poster is distorted.

k = 6 and height 42 in.; the 30 by 40 poster is not a dilation.

Scoring: 1 point for $k = 6$ and 42 in.; 1 point for the correct conclusion with a comparison of the two ratios.

Question 9: Perimeter after a dilation (1 point)

Original perimeter: $5+12+13=30$ cm. Image perimeter: $\frac{2}{5}\cdot 30=12$ cm (sides 2, 4.8 and 5.2).

12 cm

Scoring: 1 point for 12 cm; a correct method with an arithmetic slip earns no point.

Total
20 points