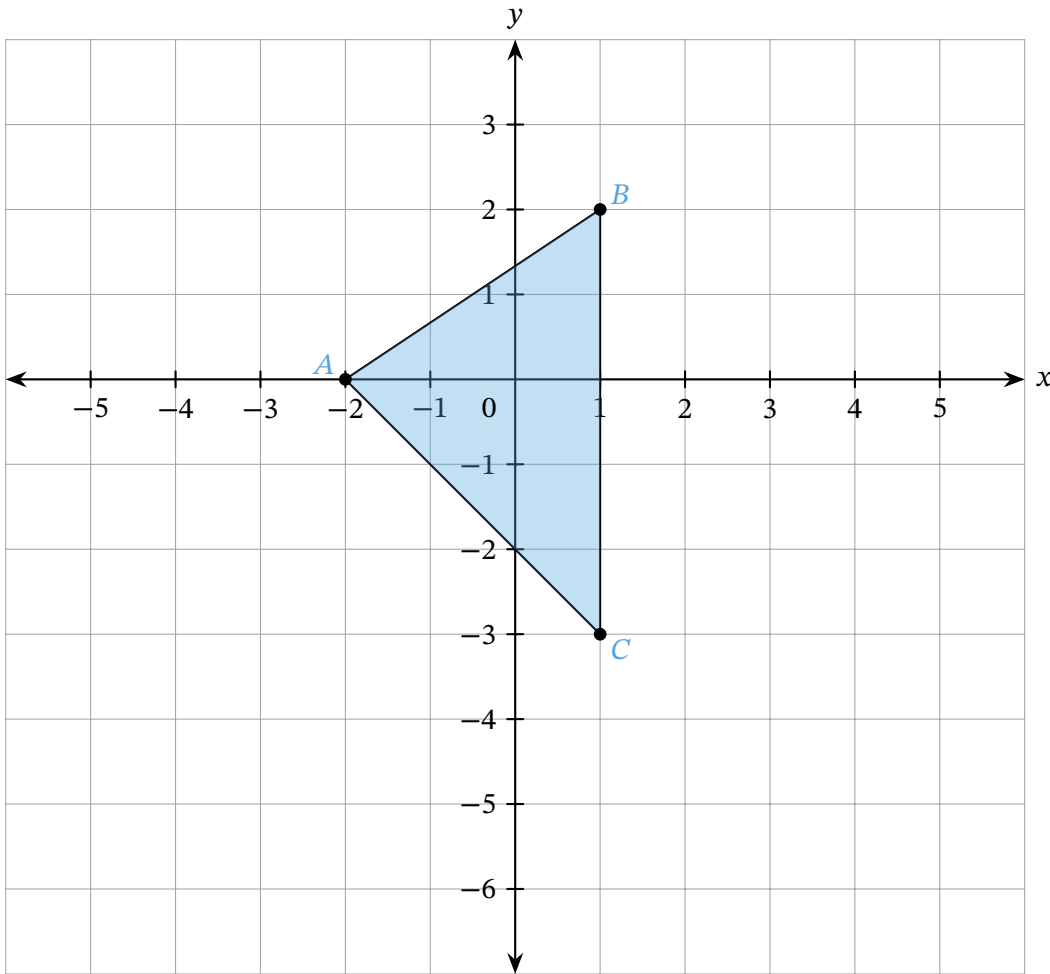


# Worksheet: Dilations on the Coordinate Plane

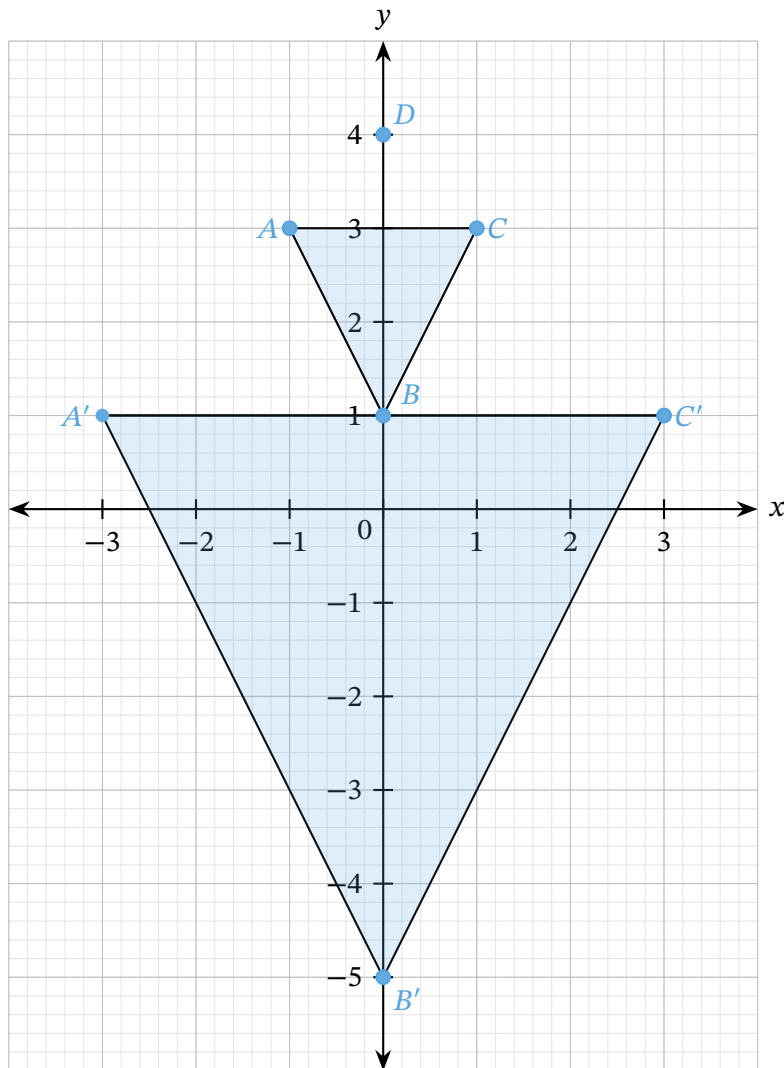


**Q1:** Dilate triangle  $ABC$  from the origin by a scale factor of 2, and state the coordinates of the image.



- A  $(-4, 0), (2, 4), (2, -6)$
- B  $(0, 4), (2, 1), (-3, 1)$
- C  $(0, -4), (4, 2), (-6, 2)$
- D  $(-4, 0), (2, 2), (2, -3)$
- E  $(-2, 0), (1, 2), (1, -3)$

**Q2:** Triangle  $ABC$  has been dilated from point  $D$  to triangle  $A'B'C'$  and, hence, the two triangles must be similar. What do you notice about the measures of the angles in both shapes?

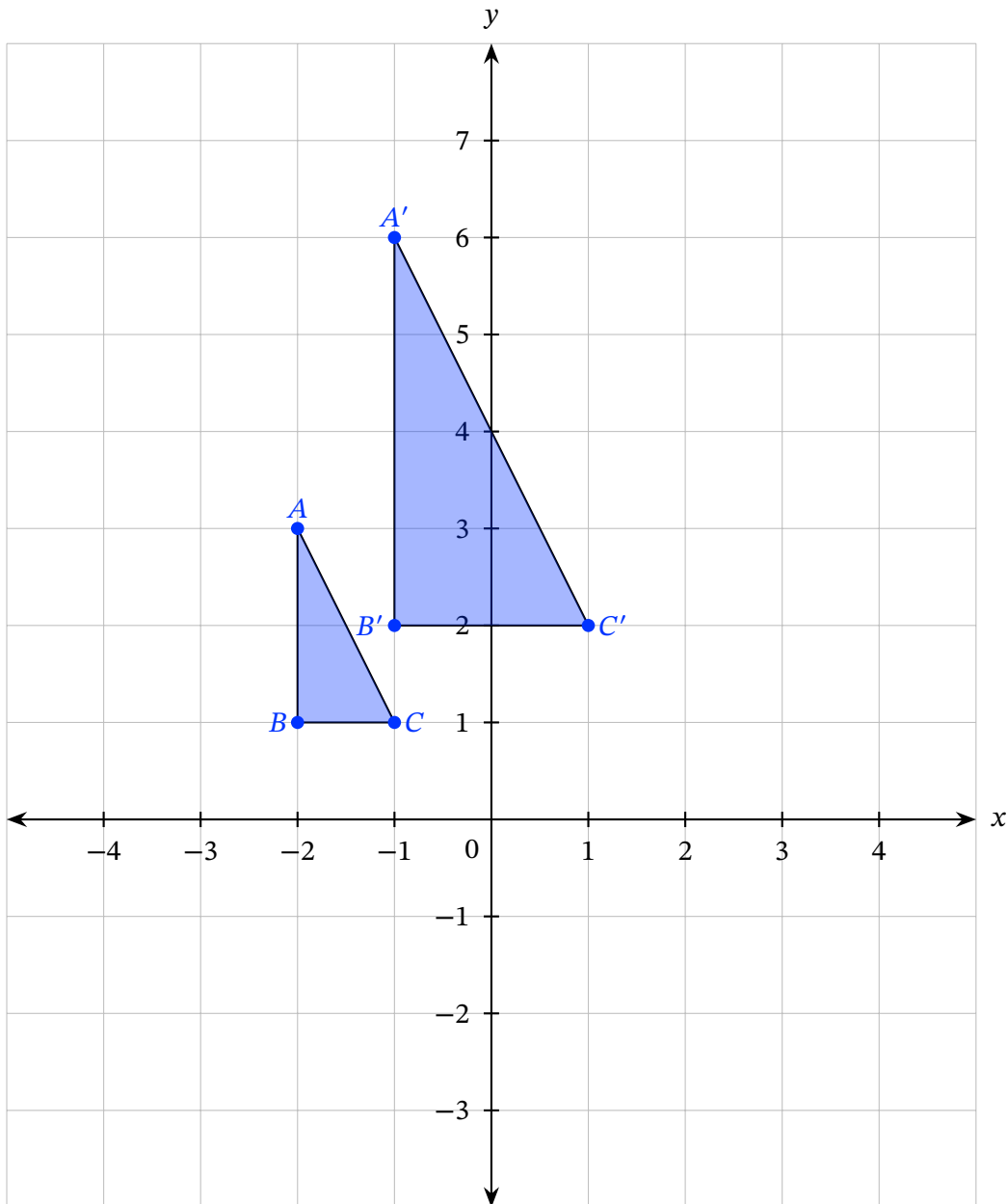


- A The measures tripled.
- B The measures doubled.
- C They are equal.
- D The measures were halved.
- E The measures were divided by three.

Q3: The figure shows two triangles:  $ABC$  and  $A'B'C'$ .



Question Video



► Describe the single transformation that would map  $ABC$  onto  $A'B'C'$ .

A a dilation from point  $(-2, 1)$  by a scale factor of 2

B a dilation from point  $(-1, 2)$  by a scale factor of 2

C a dilation from point  $(-3, 0)$  by a scale factor of 2

D a translation of one up and one right

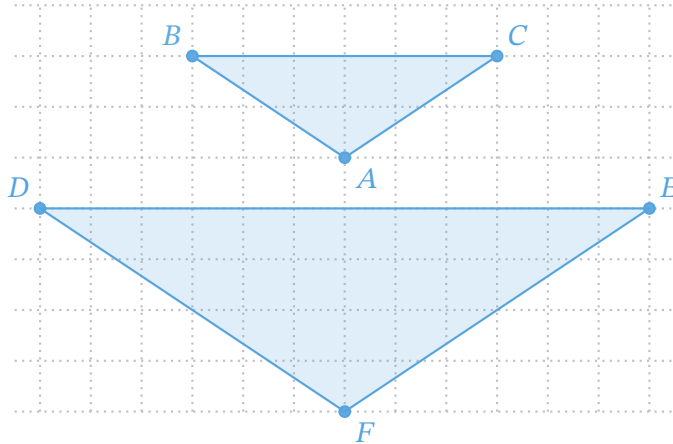
E a translation of one up and two right

► Hence, determine whether triangles  $ABC$  and  $A'B'C'$  are similar.

A They are not similar.

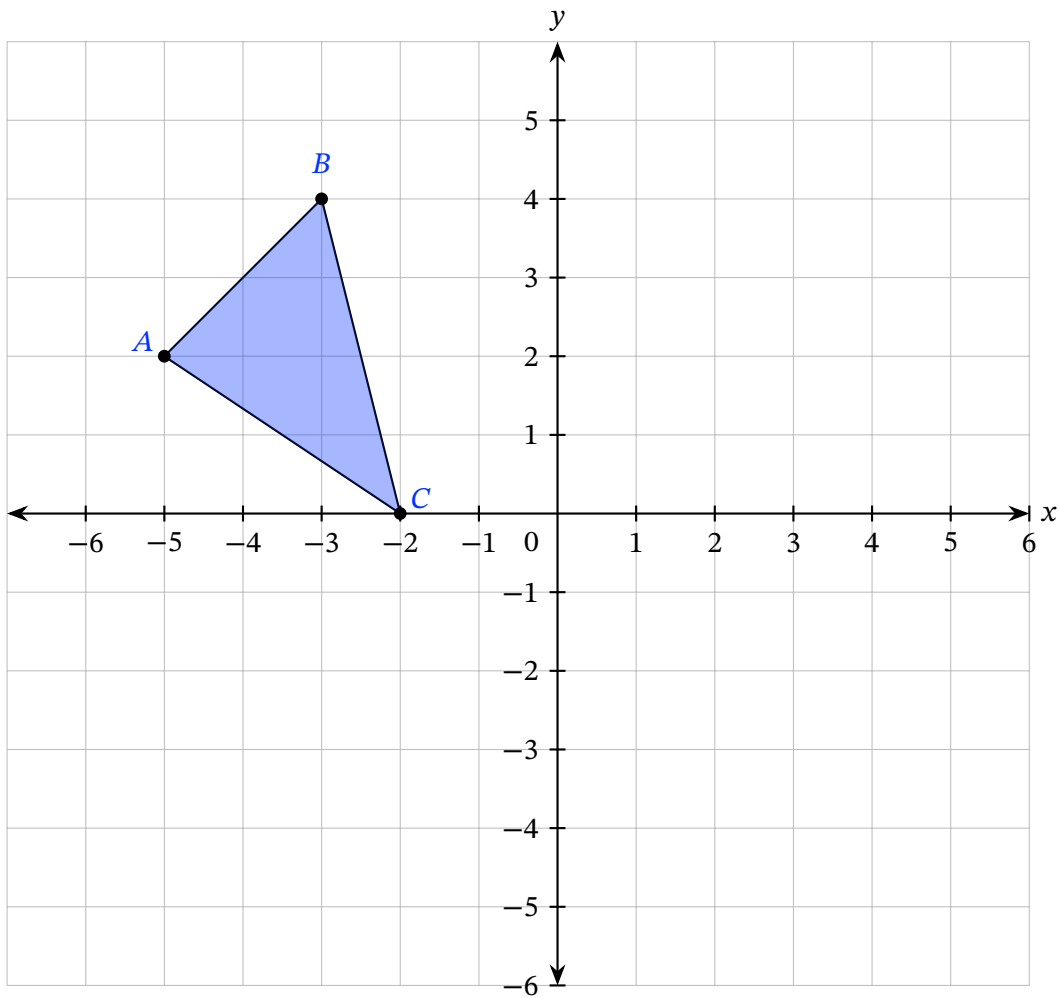
B They are similar.

**Q4:** Does a dilation exist that would map triangle  $ABC$  to triangle  $FDE$ ? If yes, state the scale factor.



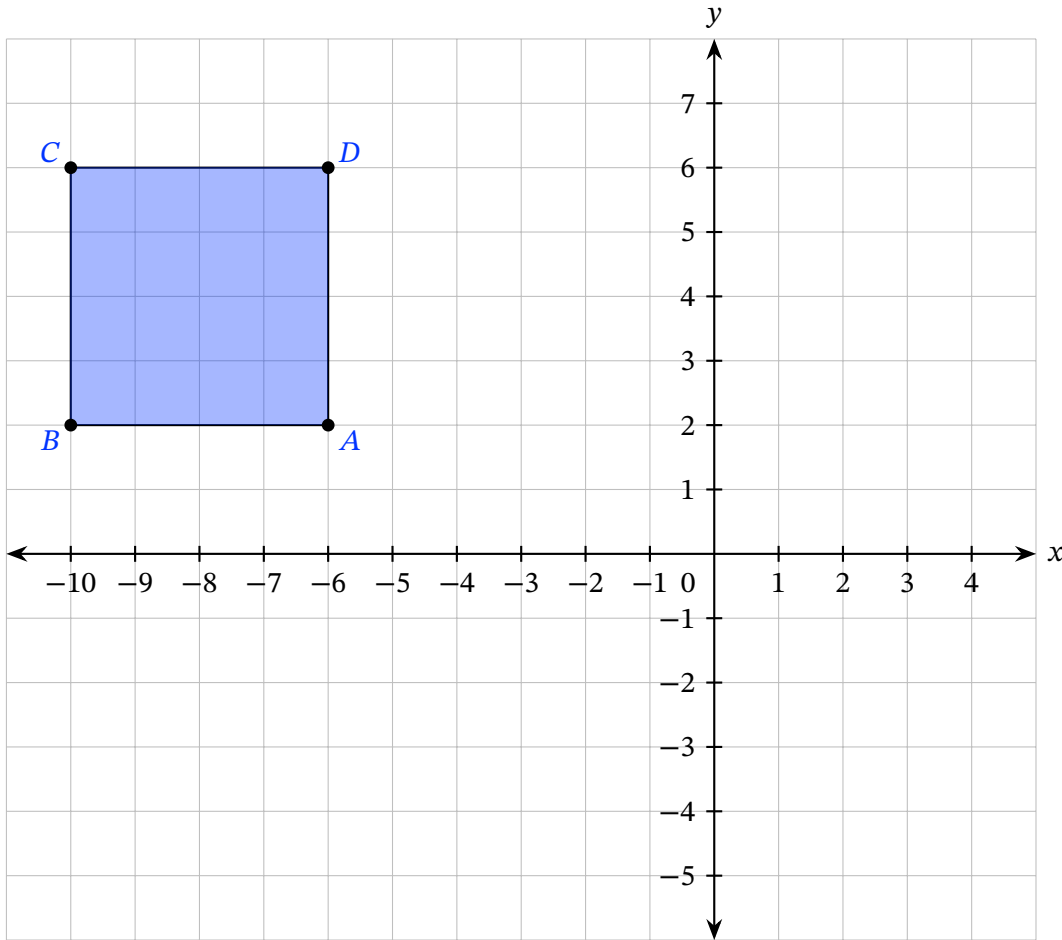
- A yes, a dilation by a scale factor of 3
- B No dilation exists.
- C yes, a dilation by a scale factor of 4
- D yes, a dilation by a scale factor of 6
- E yes, a dilation by a scale factor of 2

**Q5:** Dilate triangle  $ABC$  from the origin by a scale factor 2, and state the coordinates of the image.



- A  $(-10, 4), (-6, 8), (-4, 0)$
- B  $(4, -10), (8, -6), (0, -4)$
- C  $(-10, -4), (-6, -8), (-4, 0)$
- D  $(2, -5), (4, -3), (0, -2)$
- E  $(-5, 2), (-3, 4), (-2, 0)$

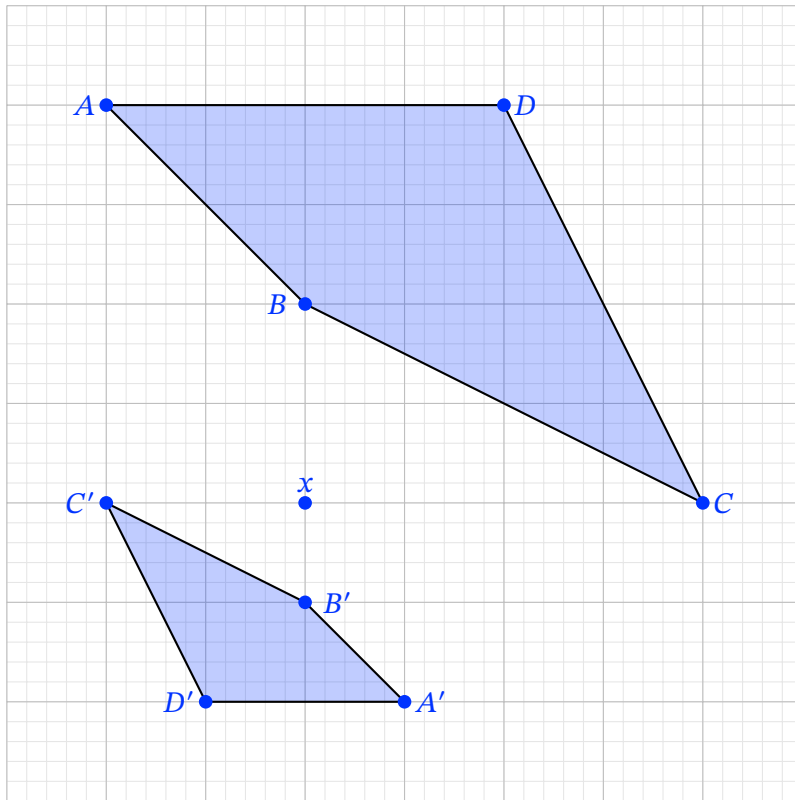
**Q6:** Dilate the square  $ABCD$  from the origin by a scale factor of  $\frac{1}{2}$ , and state the coordinates of the image.



- A  $(1, -3), (1, -5), (3, -5), (-3, 3)$
- B  $(-3, 2), (-5, 2), (-5, 6), (-3, 6)$
- C  $(-3, 1), (-5, 1), (-5, 3), (-3, 3)$
- D  $(-6, 2), (-10, 2), (-10, 6), (-6, 6)$
- E  $(-6, 1), (-10, 1), (-10, 3), (-6, 3)$

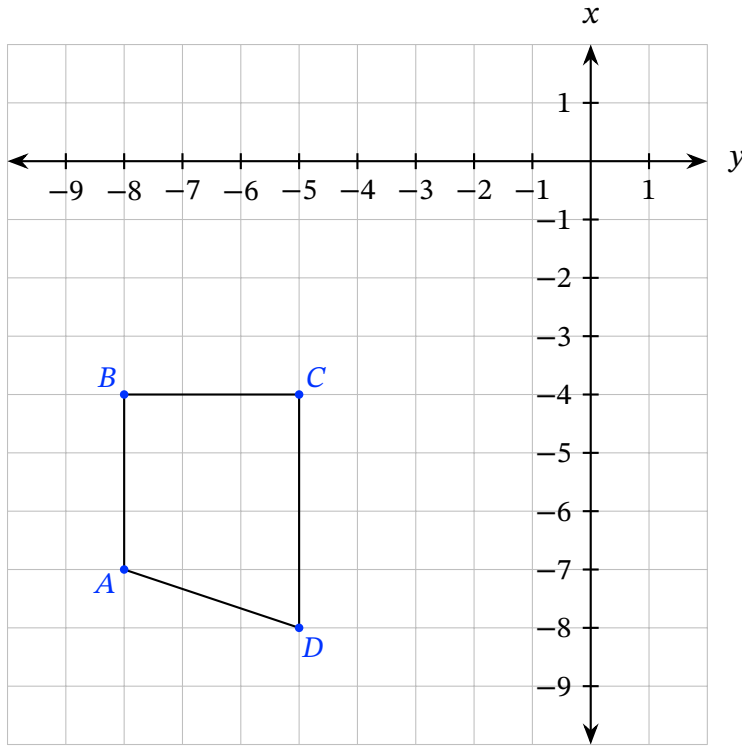


**Q7:** The quadrilateral  $ABCD$  in the given figure has been dilated from the center point  $x$  to the quadrilateral  $A'B'C'D'$ . What is the scale factor of the dilation?



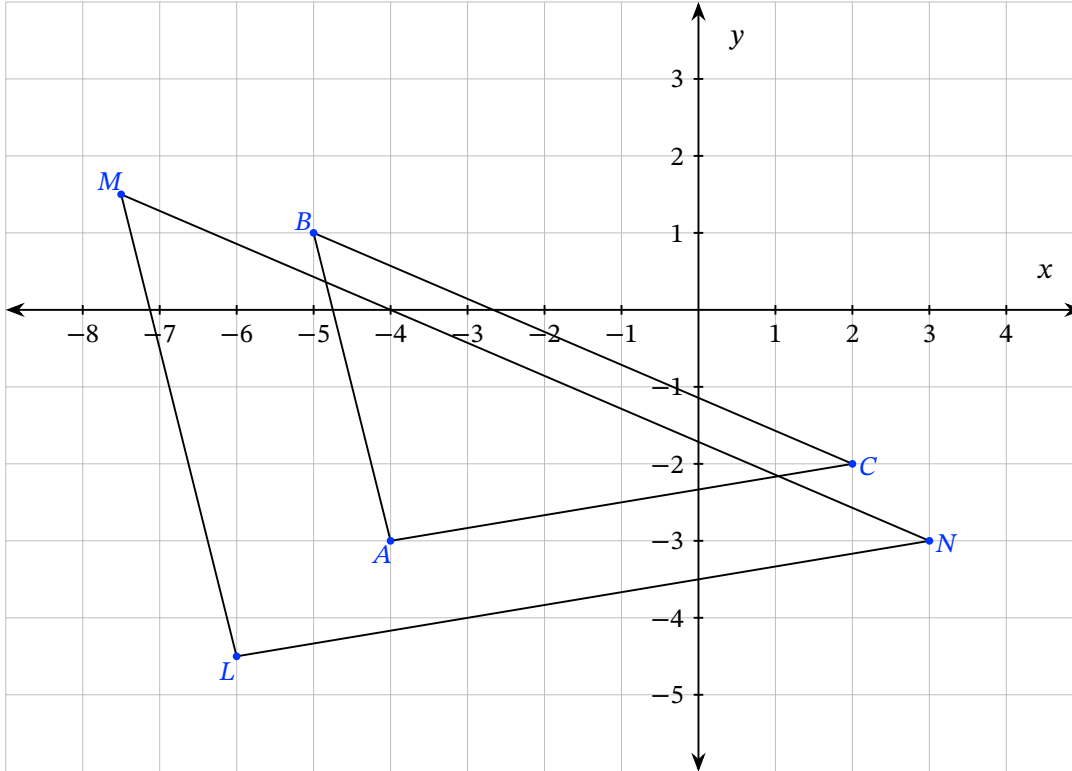
- A 2
- B -2
- C  $\frac{1}{2}$
- D 1
- E  $-\frac{1}{2}$

**Q8:** Find the images of the vertices of the quadrilateral  $ABCD$  after a dilation with center  $C$  by a scale factor of  $\frac{9}{10}$ .



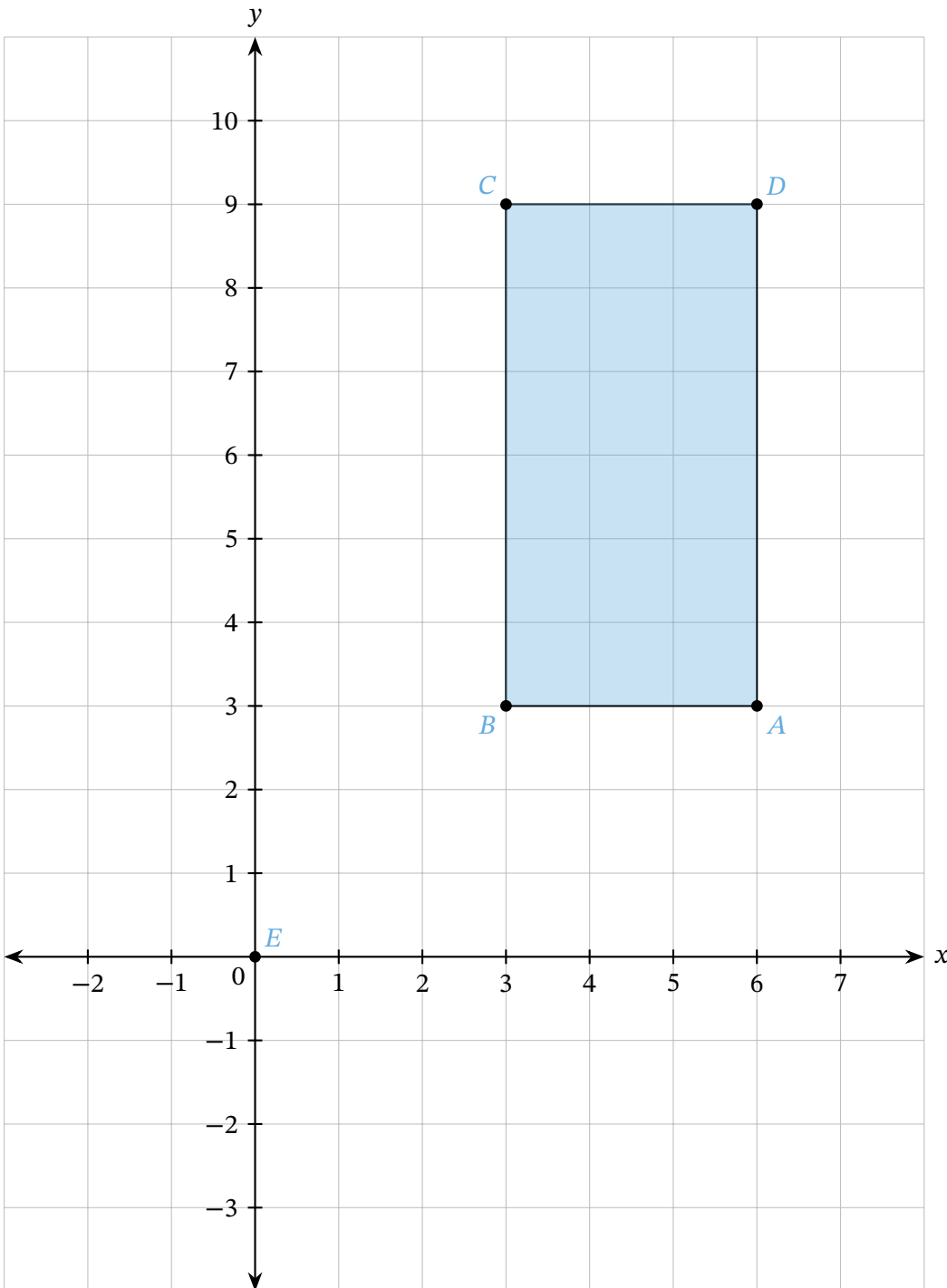
- A  $A' \left( -\frac{77}{10}, -\frac{67}{10} \right), B' \left( -\frac{77}{10}, -4 \right), C' (-5, -4), D' \left( -5, -\frac{38}{5} \right)$
- B  $A' \left( \frac{27}{10}, \frac{27}{10} \right), B' \left( \frac{27}{10}, -4 \right), C' (-5, -4), D' \left( -5, \frac{18}{5} \right)$
- C  $A' \left( -\frac{36}{5}, -\frac{63}{10} \right), B' \left( -\frac{36}{5}, -\frac{18}{5} \right), C' \left( -\frac{9}{2}, -\frac{18}{5} \right), D' \left( -\frac{9}{2}, -\frac{36}{5} \right)$
- D  $A' \left( -\frac{36}{5}, -\frac{63}{10} \right), B' \left( -\frac{36}{5}, -\frac{18}{5} \right), C' (-5, -4), D' \left( -\frac{9}{2}, -\frac{36}{5} \right)$
- E  $A' \left( -\frac{23}{10}, -\frac{13}{10} \right), B' \left( -\frac{23}{10}, -4 \right), C' \left( -\frac{9}{2}, -\frac{18}{5} \right), D' \left( -5, -\frac{2}{5} \right)$

**Q9:** Triangle  $LMN$  is transformed into triangle  $ABC$  using a dilation centered on the origin. What is the scale factor?



- A  $\frac{1}{3}$
- B 3
- C  $\frac{3}{2}$
- D  $\frac{2}{3}$
- E  $\frac{1}{2}$

**Q10:** Dilate the rectangle  $ABCD$  from the origin by a scale factor of  $\frac{1}{3}$ , and state the coordinates of the image.



A (2, 1), (1, 1), (1, 3), (2, 3)

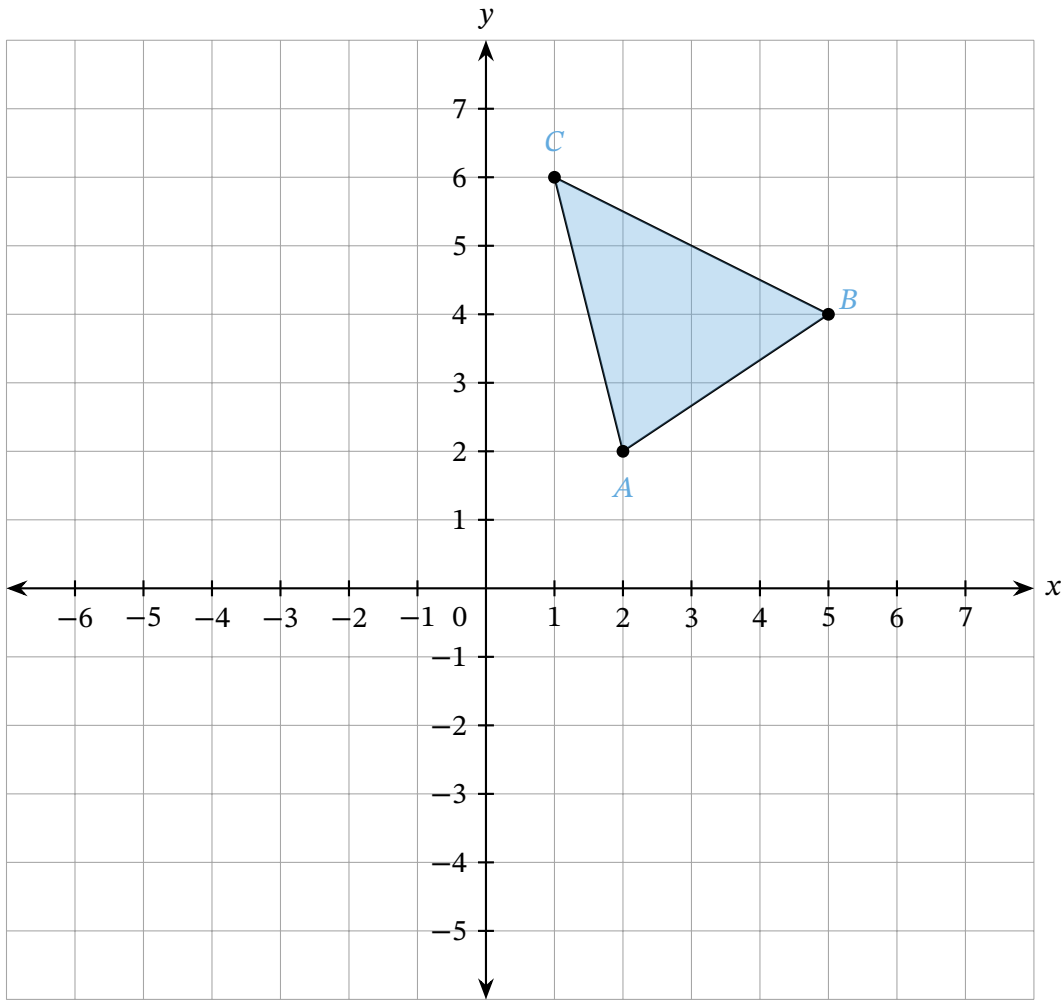
B (6, 1), (3, 1), (3, 3), (6, 3)

C (6, 3), (3, 3), (3, 9), (6, 9)

12

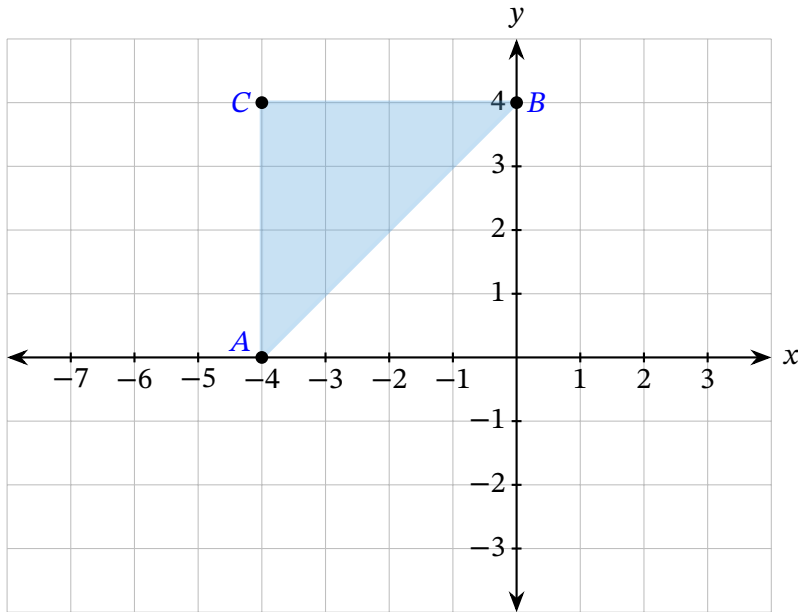
D (1, 2), (1, 1), (3, 1), (3, 2)

**Q11:** Dilate triangle  $ABC$  from the point  $(5, 6)$  by a scale factor of 2, and state the coordinates of the image.



- A  $(2, 3), (5, 4), (1, 6)$
- B  $(-2, -1), (2, 5), (6, -3)$
- C  $(-1, -2), (5, 2), (-3, 6)$
- D  $(4, 6), (10, 8), (2, 12)$
- E  $(4, 30), (10, 4), (2, 6)$

**Q12:** Dilate triangle  $ABC$  from the origin by a scale factor of  $-\frac{1}{2}$ , and state the coordinates of the image.



A  $(-4, 0), (0, -2), (-4, -2)$

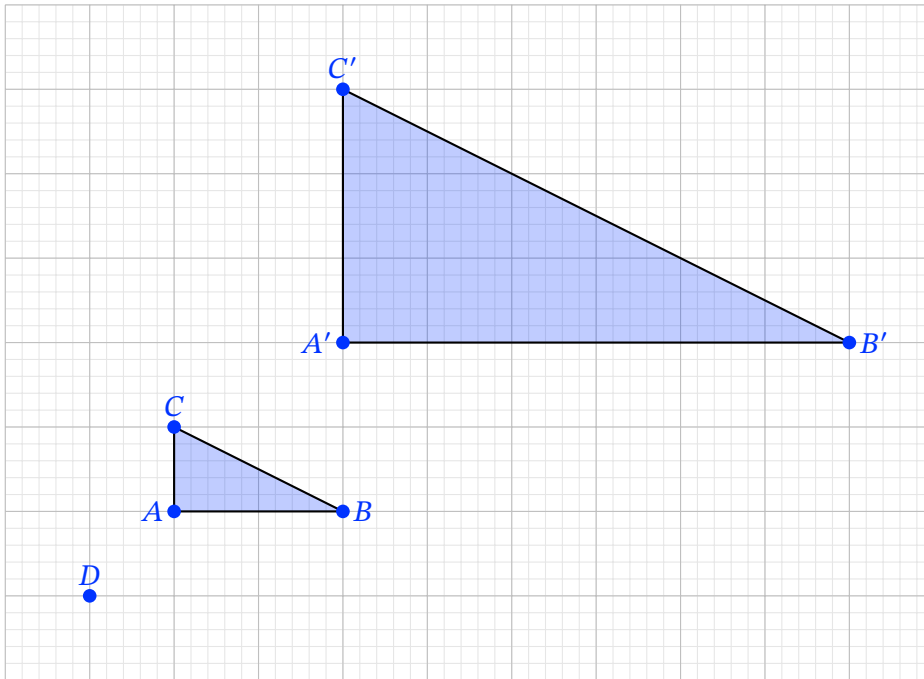
B  $(2, 0), (0, 4), (2, 4)$

C  $(2, 0), (0, -2), (2, -2)$

D  $(-4, 0), (0, 4), (-4, 4)$

E  $(0, 2), (-2, 0), (-2, 2)$

**Q13:** The triangle  $ABC$  in the given figure has been dilated from the center point  $D$  to the triangle  $A'B'C'$ . What is the scale factor of the dilation?



- A  $-\frac{1}{3}$
- B 4
- C 3
- D  $-3$
- E  $\frac{1}{3}$

**Q14:** Points  $(-2, 1)$ ,  $(5, 8)$ ,  $(1, -4)$ , and  $(-6, -8)$  are the vertices of a polygon.

List their images after a dilation with scale factor  $\frac{1}{2}$ .

A  $\left(-\frac{3}{2}, \frac{3}{2}\right), \left(\frac{11}{2}, \frac{17}{2}\right), \left(\frac{1}{2}, -4\right), (-3, -8)$

B  $(-1, 1), \left(\frac{5}{2}, 8\right), \left(\frac{1}{2}, -4\right), (-3, -8)$

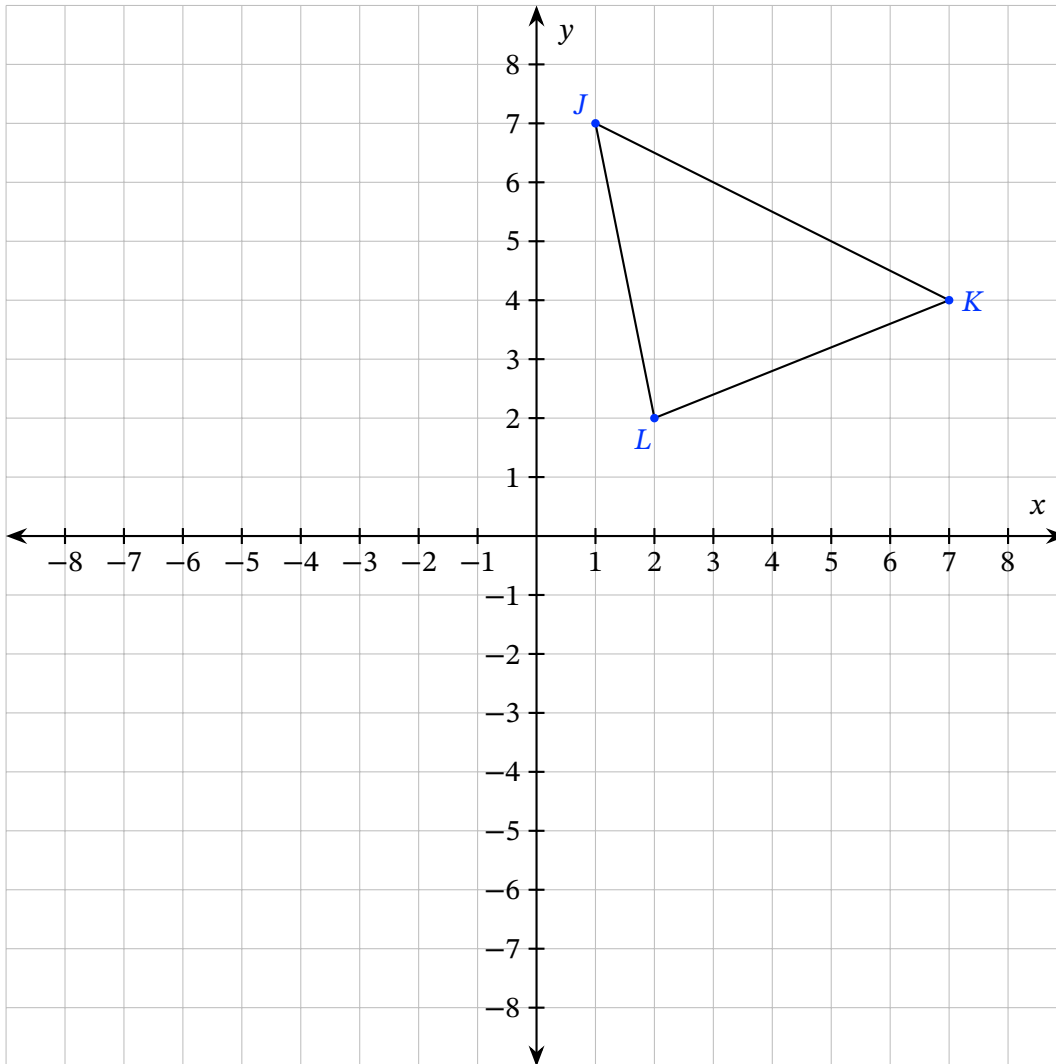
C  $(-1, 1), \left(\frac{5}{2}, 8\right), \left(\frac{1}{2}, -2\right), (-3, -4)$

D  $\left(-\frac{3}{2}, \frac{3}{2}\right), \left(\frac{11}{2}, \frac{17}{2}\right), \left(\frac{3}{2}, -\frac{7}{2}\right), \left(-\frac{11}{2}, -\frac{15}{2}\right)$

E  $\left(-1, \frac{1}{2}\right), \left(\frac{5}{2}, 4\right), \left(\frac{1}{2}, -2\right), (-3, -4)$

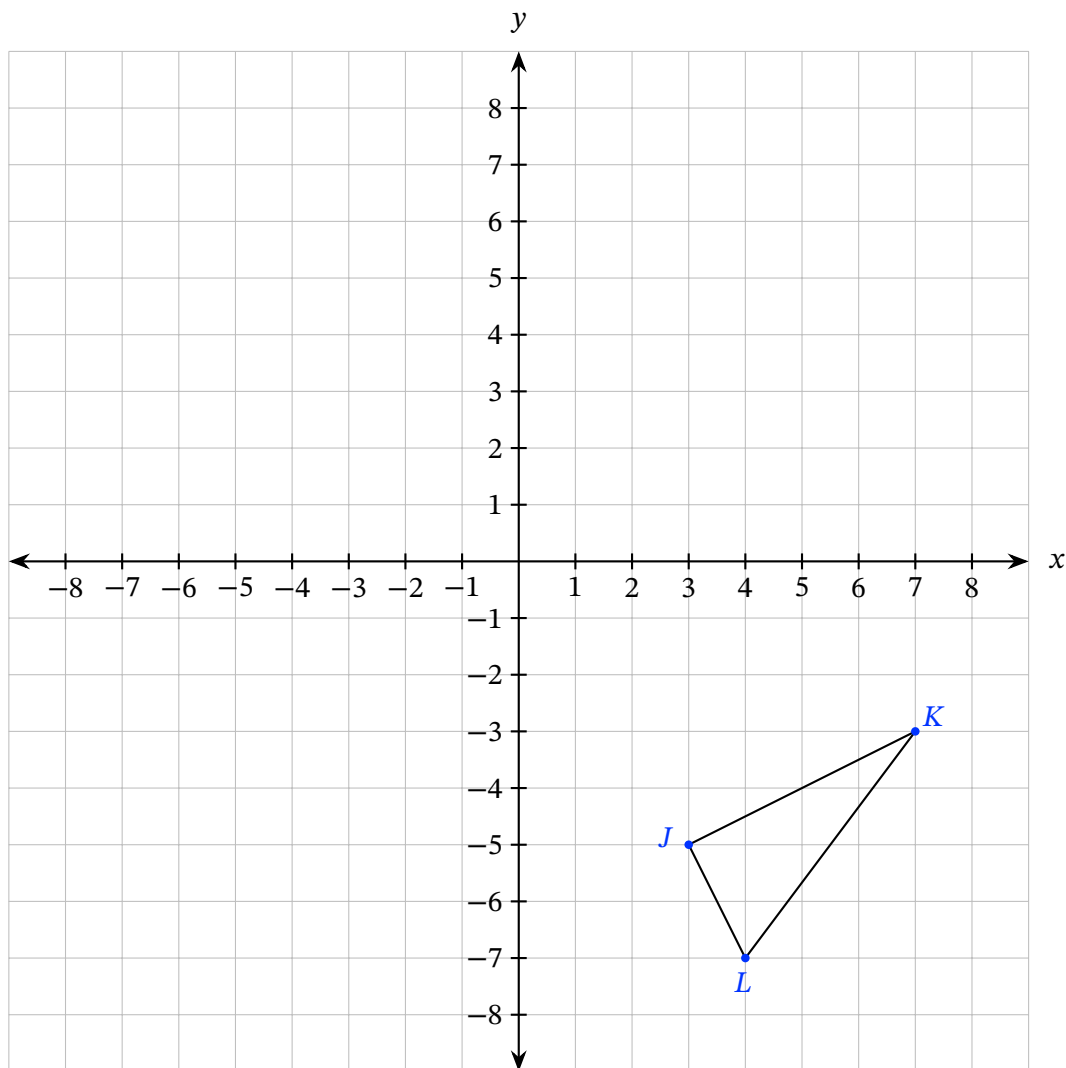


**Q15:** Determine the images of the vertices of  $\triangle JKL$  after a dilation with a scale factor of 3.



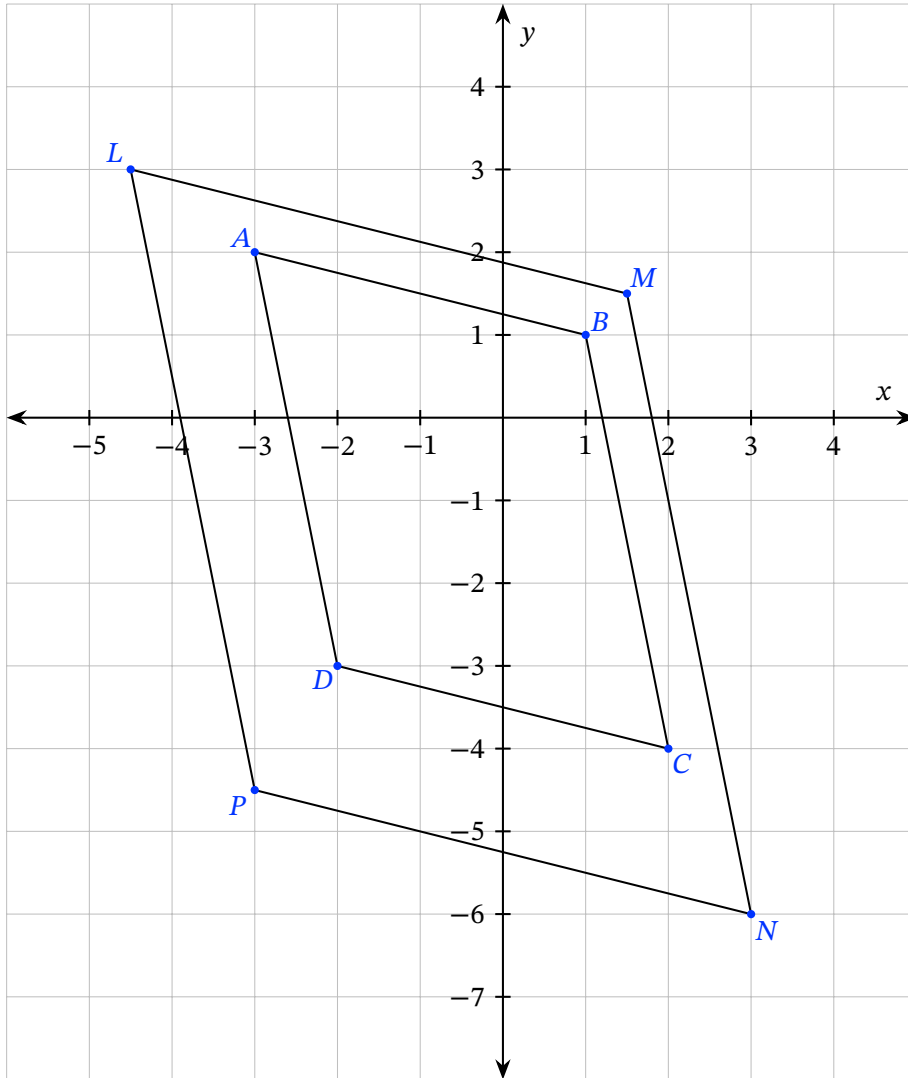
- A  $J'(3, 21), K'(21, 12), L'(5, 5)$
- B  $J'(21, 3), K'(12, 21), L'(6, 6)$
- C  $J'(3, 21), K'(21, 12), L'(6, 6)$
- D  $J'(4, 10), K'(21, 12), L'(6, 6)$
- E  $J'(4, 10), K'(10, 7), L'(5, 5)$

**Q16:** List the vertices of  $\triangle JKL$  after a dilation with scale factor  $\frac{3}{4}$ .



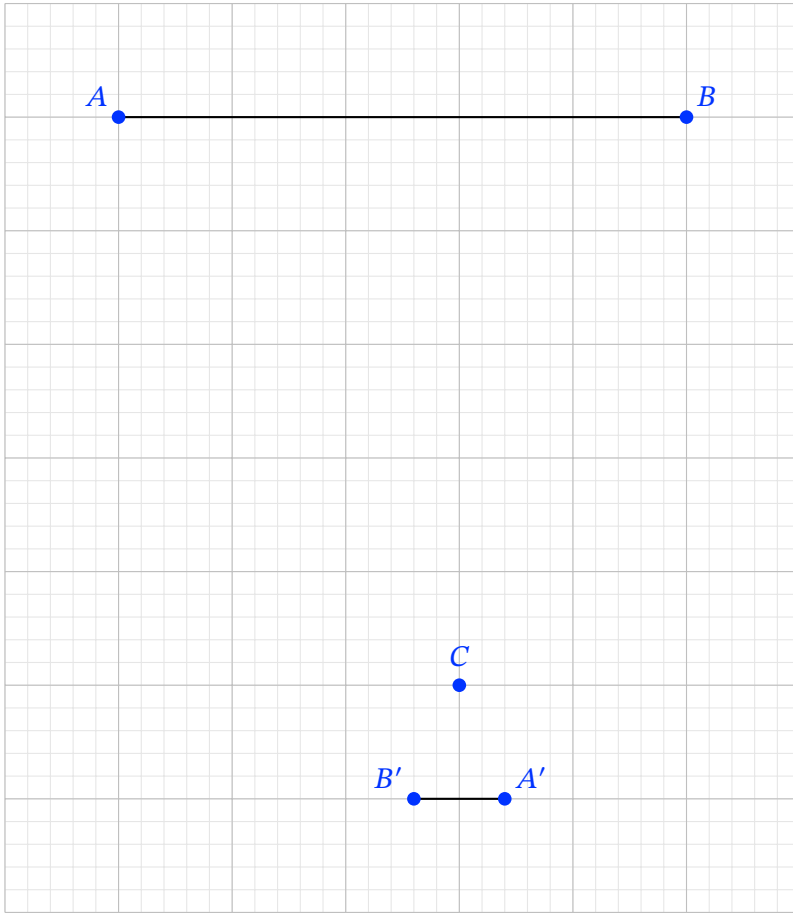
- A  $J' \left( \frac{15}{4}, -\frac{17}{4} \right), K' \left( \frac{31}{4}, -\frac{9}{4} \right), L' \left( \frac{19}{4}, -\frac{25}{4} \right)$
- B  $J' \left( -\frac{15}{4}, \frac{9}{4} \right), K' \left( -\frac{9}{4}, \frac{21}{4} \right), L' \left( -\frac{21}{4}, 3 \right)$
- C  $J' \left( \frac{15}{4}, -\frac{17}{4} \right), K' \left( \frac{21}{4}, -\frac{9}{4} \right), L' \left( 3, -\frac{21}{4} \right)$
- D  $J' \left( \frac{9}{4}, -\frac{15}{4} \right), K' \left( \frac{21}{4}, -\frac{9}{4} \right), L' \left( \frac{19}{4}, -\frac{25}{4} \right)$
- E  $J' \left( \frac{9}{4}, -\frac{15}{4} \right), K' \left( \frac{21}{4}, -\frac{9}{4} \right), L' \left( 3, -\frac{21}{4} \right)$

**Q17:** Quadrilateral  $LMNP$  is transformed to  $ABCD$  using a dilation. What is the scale factor?



- A  $\frac{1}{2}$
- B  $\frac{1}{3}$
- C  $\frac{2}{3}$
- D 2
- E  $\frac{3}{2}$

**Q18:**  $\overline{AB}$  has been dilated from the point  $C$  to the image  $\overline{A'B'}$  as seen in the figure. What is the scale factor of the dilation?



- A  $\frac{1}{5}$
- B  $-5$
- C  $-\frac{1}{5}$
- D  $5$
- E  $-\frac{1}{6}$

**Q19:** What is the image of the point with coordinates  $(x, y)$  under a dilation, centered at the origin, with scale factor  $k$ ?

- A  $(x + k, y + k)$
- B  $(x \cdot k, y \cdot k)$
- C  $(x \cdot k, y + k)$
- D  $(x + k, y \cdot k)$
- E  $\left(\frac{x}{k}, \frac{y}{k}\right)$

**Q20:** Describe the geometric transformation that occurs when numbers in the complex plane are mapped to their product with  $5\left(\cos \frac{\pi}{2} + i \sin \frac{\pi}{2}\right)$ .

- A a dilation with center the origin and scale factor  $\frac{5}{2}$  combined with a rotation by an angle of  $\frac{\pi}{2}$  counterclockwise about the origin
- B a dilation with center the origin and scale factor 5 combined with a rotation by an angle of  $\frac{\pi}{2}$  counterclockwise about the origin
- C a dilation with center the origin and scale factor  $\frac{1}{5}$  combined with a rotation by an angle of  $\frac{\pi}{2}$  clockwise about the origin
- D a dilation with center the origin and scale factor 5 combined with a rotation by an angle of  $\frac{\pi}{2}$  clockwise about the origin
- E a dilation with center the origin and scale factor  $\frac{1}{5}$  combined with a rotation by an angle of  $\frac{\pi}{2}$  counterclockwise about the origin