HOMOTHETY

A DEFINITIONS

A.1 FINDING THE IMAGE OF A POINT

Ex 1: Find the coordinates of the image of point M under a homothety with center O and scale factor k = 2.



Answer:

















Ex 3: Find the coordinates of the image of point M under a homothety with center O and scale factor k = 3.



















• M'(6,3)

Ex 4: Find the coordinates of the image of point M under a Ex 5: Find the coordinates of the image of point M under a homothety with center O and scale factor k = -1.











• M'(1,1)

homothety with center O and scale factor k = -2.







M'(3, 3)



Answer:

• \overrightarrow{OM} :













• M'(3,3)

A.2 FINDING THE SCALE FACTOR

Ex 6: The point M' is the image of the point M by homothety of center O and scale factor k.



• $\overrightarrow{OM'}$:





Ex 7: The point M' is the image of point M under a homothety with center O and scale factor k.

• \overrightarrow{OM} :







Find the scale factor.

k = 2



0

 $2 \quad 3 \quad 4 \quad 5$





Ex 8: The point M' is the image of point M under a homothety with center O and scale factor k.



Find the scale factor.

Answer:

k = 2



Ex 9: The point M' is the image of point M under a homothety with center O and scale factor k.

x

7

6





Find the scale factor.

k = 3





Ex 10: The point M' is the image of point M under a homothety with center O and scale factor k.



k = -1

Find the scale factor.



Ex 11: The point M' is the image of point M under a homothety with center O and scale factor k.

1

x

 $\overline{7}$





k = -2

Find the scale factor.



Answer:



- $\overrightarrow{OM'} = -2\overrightarrow{OM}$
- k = -2

A.3 FINDING THE CENTER

0

Ex 12: The figure A' is the image of figure A under a homothety with center O and scale factor k = 2.

 $\mathbf{2}$

3

4



Find the coordinates of the center O. O(1, 2)

Answer:



Ex 13: The figure A' is the image of figure A under a homothety with center O and scale factor k = 3.



O(1, 1)

Find the coordinates of the center O.

Answer:



x

7

5

6

Ex 14: The figure A' is the image of figure A under a homothety with center O and scale factor k = -1.



Find the coordinates of the center O.

Answer:



Ex 15: The figure A' is the image of figure A under a homothety with center O and scale factor k = -1.





A.4 FINDING THE SCALE FACTOR

Ex 16: The figure A' is the image of figure A under a homothety with center O and scale factor k.



Find the scale factor.

k = 3



Ex 17: The figure A' is the image of figure A under a homothety with center O and scale factor k.





Find the scale factor.

$$k = 2$$

Answer:







Find the scale factor.

k = -1



Ex 19: The figure A' is the image of figure A under a homothety with center O and scale factor k.



Find the scale factor.

k = -2

Answer:





Ex 21: Draw the figure A', the image of figure A under a homothety with center ${\cal O}$ and scale factor k=3 .



A.5 DRAWING IMAGES FIGURES

Ex 20: Draw the figure A', the image of figure A under a homothety with center O and scale factor k = 2.



Answer:

1. Draw the image vertices: For each vertex, scale its distance from center O by the factor k = 2. Place the new points on the grid.



lines in the same order as the original figure.

Answer:

1. Draw the image vertices: For each vertex, scale its distance from center O by the factor k = 3. Place the new points on the grid.



2. Draw the image figure: Connect the image vertices with lines in the same order as the original figure.



2. Draw the image figure: Connect the image vertices with Ex 22: Draw the figure A', the image of figure A under a homothety with center O and scale factor k = -2.





Answer:

1. Draw the image vertices: For each vertex, scale its distance from center O by the factor k = -2. Place the new points on the grid.



2. **Draw the image figure**: Connect the image vertices with lines in the same order as the original figure.



Ex 23: Draw the figure A', the image of figure A under a homothety with center O and scale factor k = -1.



1. Draw the image vertices: For each vertex, scale its distance from center O by the factor k = -1. Place the new points on the grid.



2. Draw the image figure: Connect the image vertices with lines in the same order as the original figure.



A.6 FINDING AN UNKNOWN LENGTH

Ex 24: The figure A' is the image of figure A under a homothety with center O and scale factor k = 2.



 $x = \boxed{2}$

Find x.

Answer:



x = 2

Ex 25: The figure A' is the image of figure A under a homothety with center O and scale factor k = -1.





Find x, y, z.

$$x = 4, y = 8, z = 10$$

Answer:



Find x.

$$x = 2$$

Answer:



x = 2

Ex 26: The figure A' is the image of figure A under a homothety x = 4, y = 8, z = 10 with center O and scale factor k = 3.



Find x.

$$x = 15$$

Answer:



x = 15

Ex 27: The figure A' is the image of figure A under a homothety with center O and scale factor k = -2.



