TODAY'S AGENDA: December 19th+

- Work on Khan Academy Mission:
- Complete Mission Foundation Skills
- Today's Objective: Whole-Group Lessons:
- Transformations - Dilations

- Standards:
- CCSS.MATH.CONTENT.HSG.CO.4:
- Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

- Continue With Your Mission Assignments

Types of Transformations

Rigid Transformations

1. Translation - move
2. Rotation – Spin + : counter-clockwise
   − : clockwise
3. Reflection – flip (mirror image, butterfly wing)
4. Dilation – Resize (bigger, smaller)
   ↳ Not Rigid

Dilations - Making Bigger or Smaller

- The scale factor is how many times bigger the image will be.

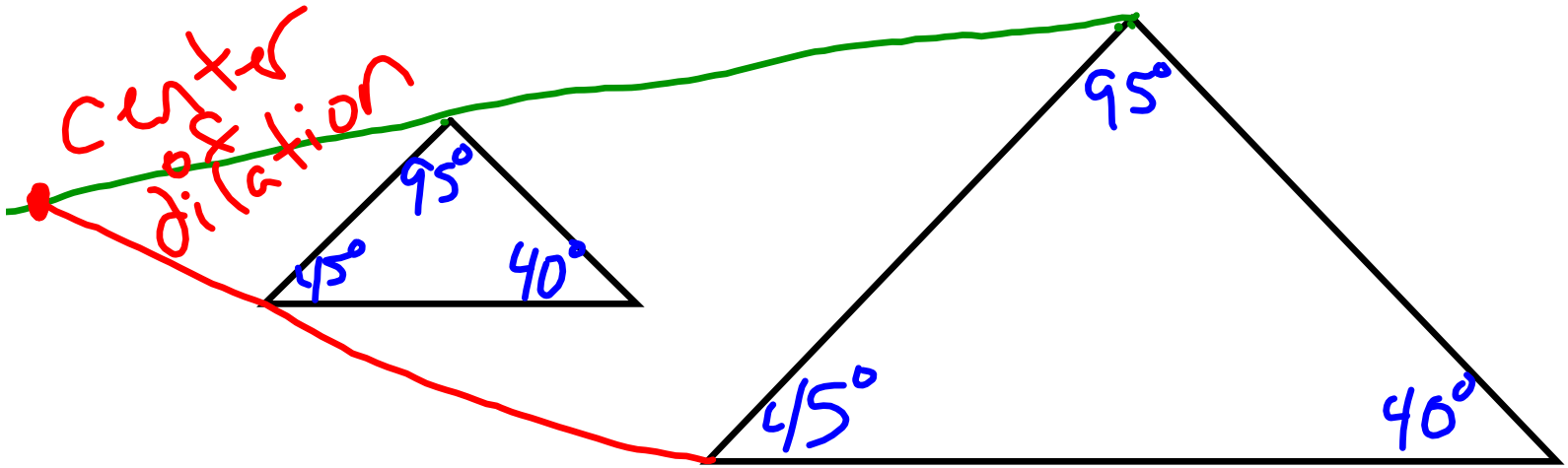
- If the scale factor is ***bigger than one*** (ex. 2, 3, 3/2), the ***image will be larger*** than the original.

- If the scale factor is ***between 0 and 1*** (a fraction less than one; ex. 1/2, 1/4), the ***image will be smaller*** than the original.

Dilations - Making Bigger or Smaller

- Dilations are ***NOT*** a ***RIGID TRANSFORMATION***; therefore:

  > Size may change.
  > But, ***angle measures stay the same!***
    – We call these ***similar*** triangles.

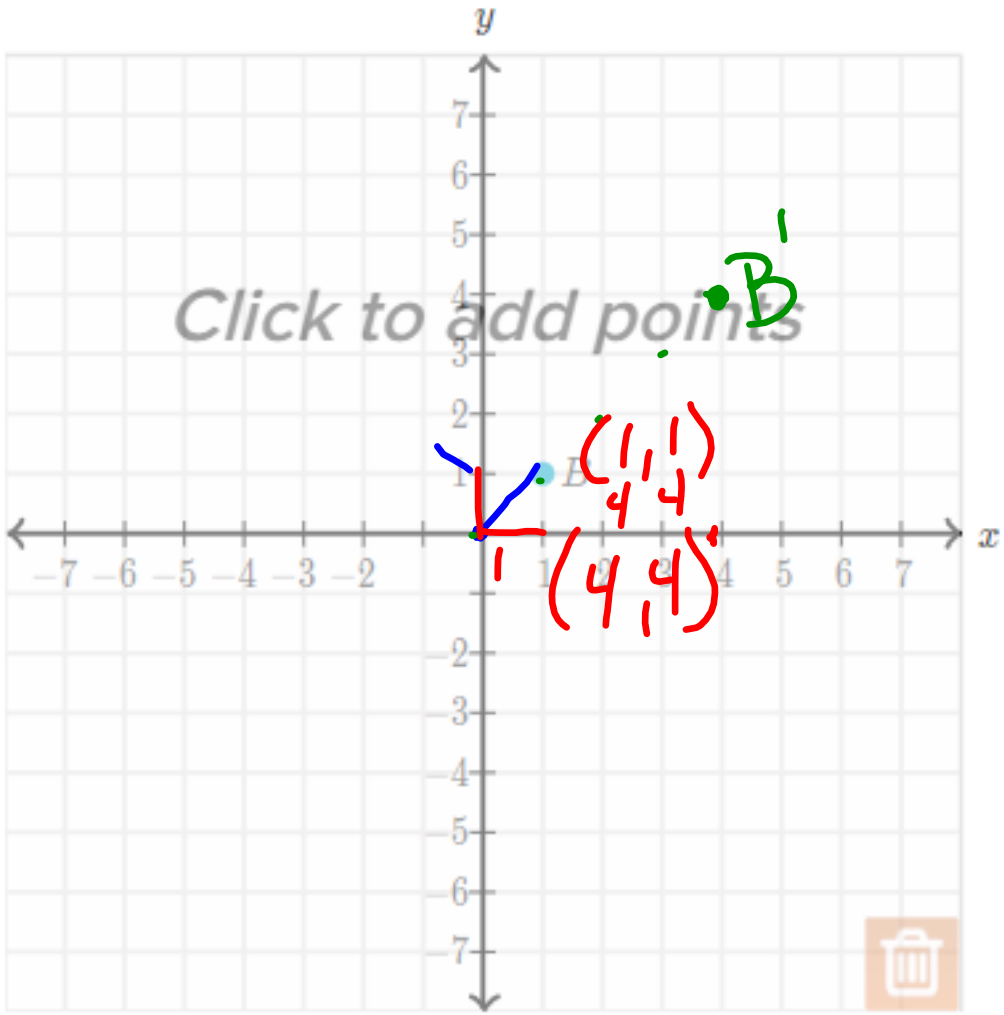


Dilations - Making Bigger or Smaller

- Similar to rotations, there is a point at which you dilate from.
- Measure the distance from the ***Center of Dilation*** to the given point. (Count the boxes!)
- ***Multiply*** that number by the ***Scale Factor***
- Plot the image that number of points from the ***Center of Dilation***

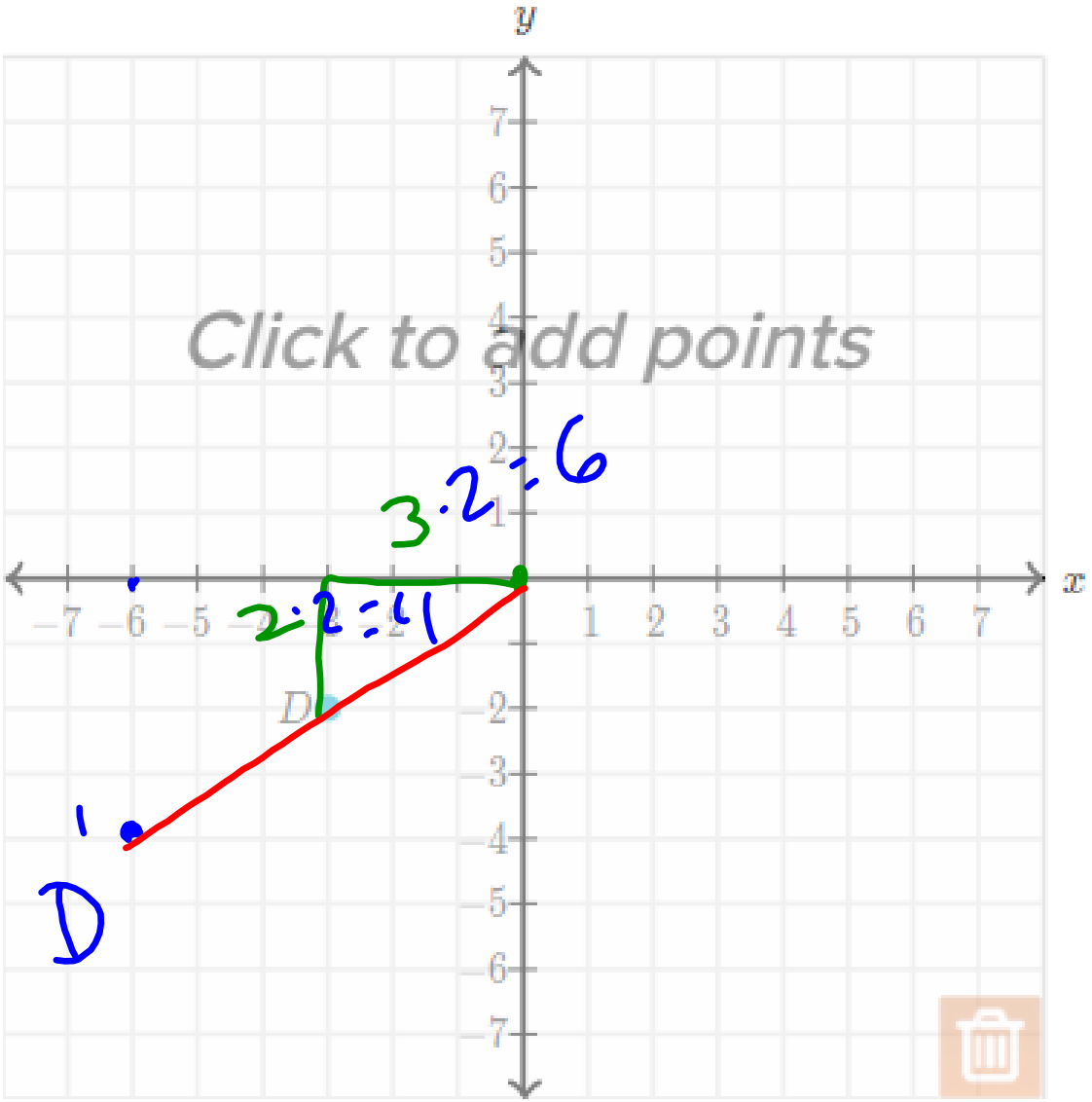
Dilate Points

Plot the image of point B under a dilation about the origin $(0, 0)$ with a scale factor of 4.



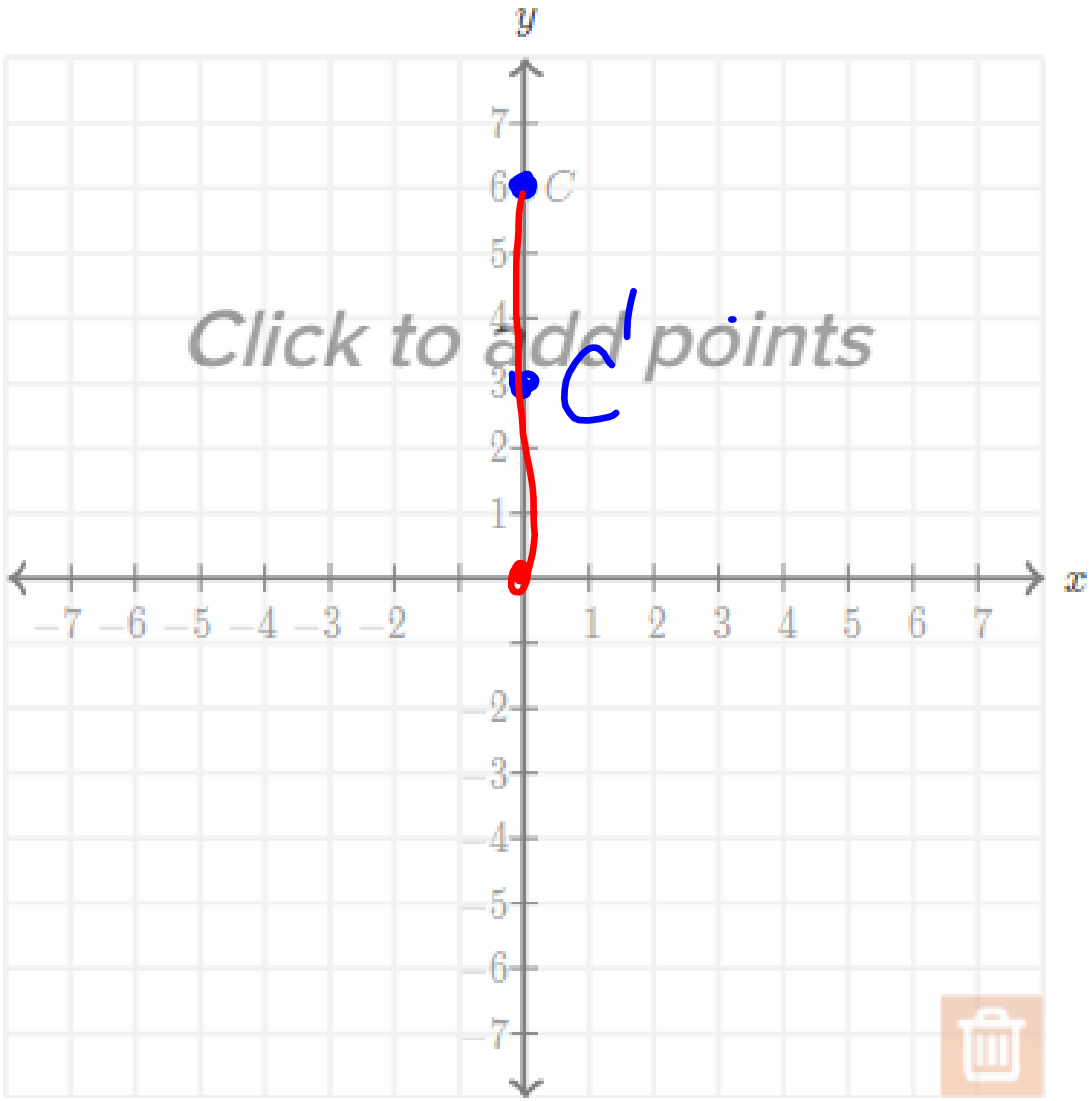
$1 \cdot 4 = 4$

Plot the image of point D under a dilation about the origin $(0, 0)$ with a scale factor of 2.

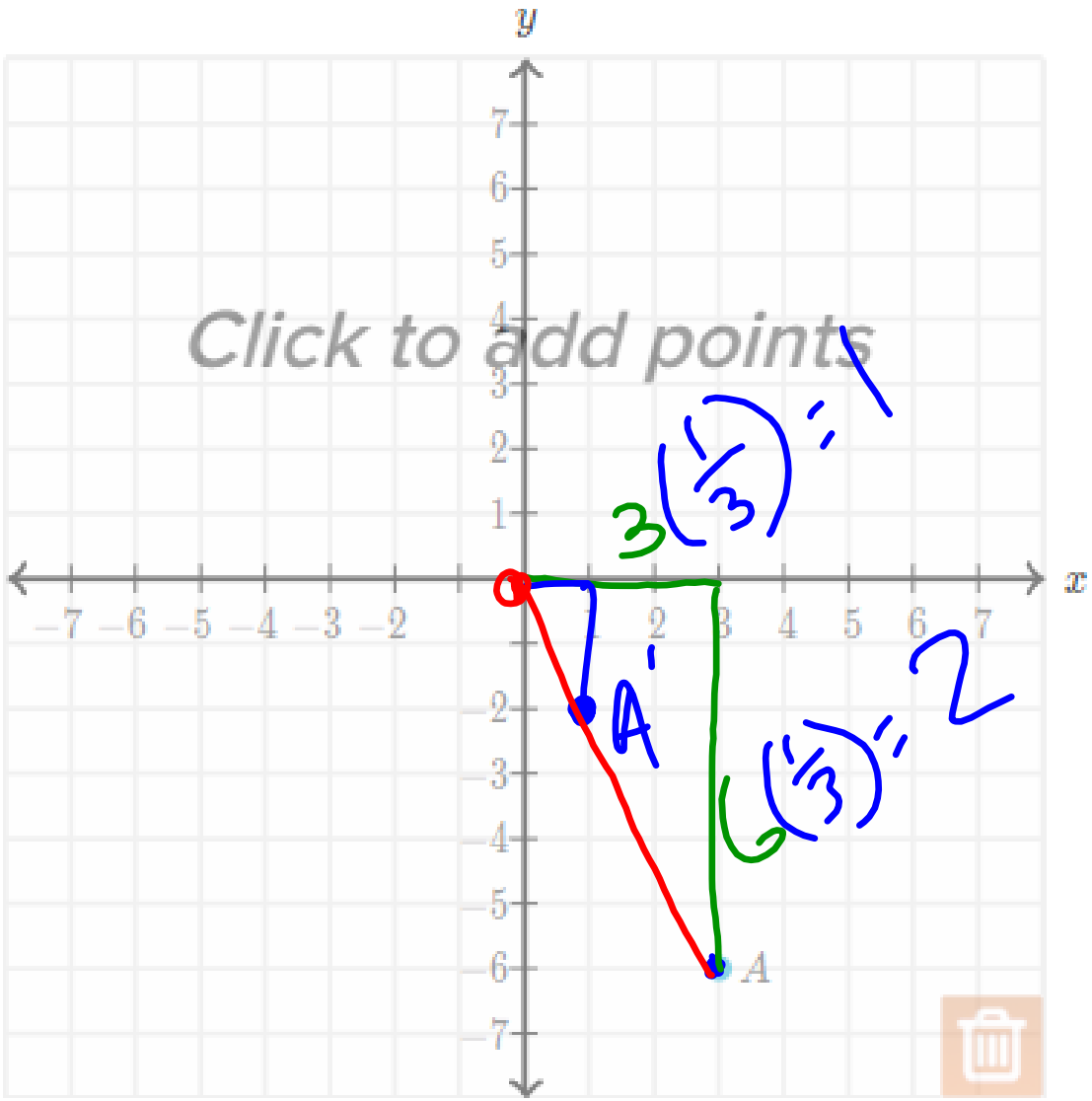


multiply by 2

Plot the image of point C under a dilation about the origin $(0, 0)$ with a scale factor of $\frac{1}{2}$.



Plot the image of point A under a dilation about the origin $(0, 0)$ with a scale factor of $\frac{1}{3}$.



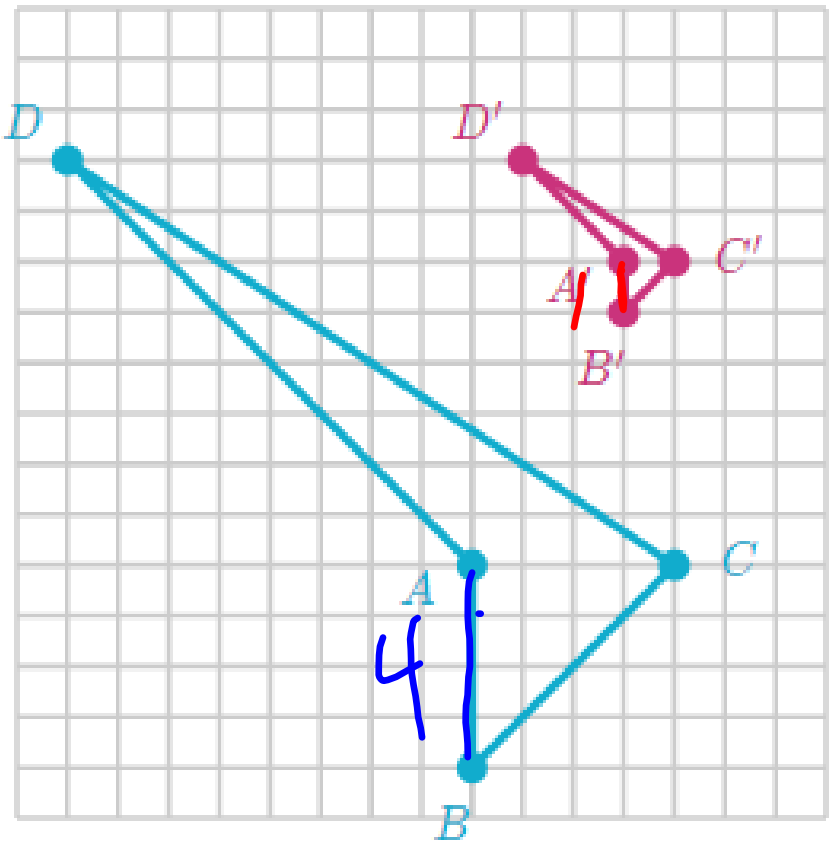
Dilations - Scale Factor

- To find the ***Scale Factor,*** if given a point and its image:

  > Measure the distance from the Center of Dilation to the original point and to the image.

Image Distance = Original Point Distance * Scale Factor

Quadrilateral $A'B'C'D'$ is the image of quadrilateral $ABCD$ under a dilation.



Start w/ Blue
End w/ Pink

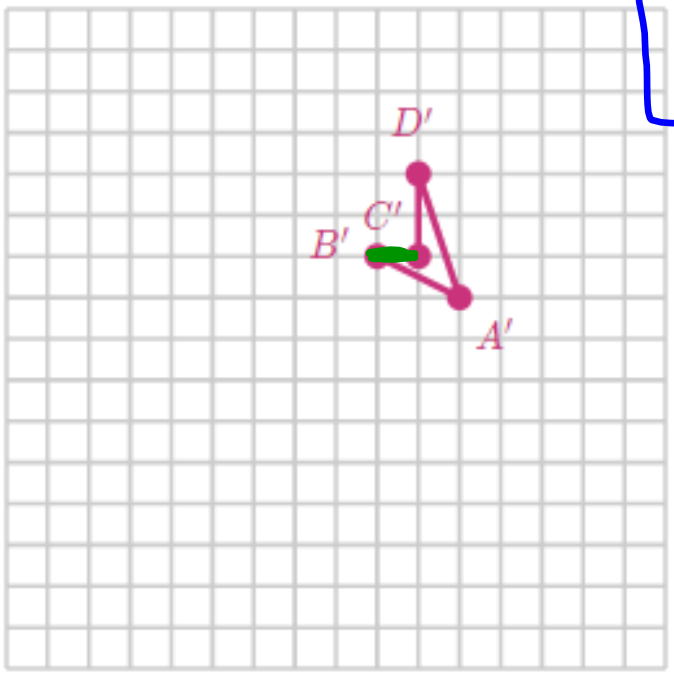
$4(x) = 1$

$4\left(\frac{1}{4}\right) = 1$

What is the scale factor of the dilation?

Dilations: scale factor

Quadrilateral $A'B'C'D'$ is the image of quadrilateral $ABCD$ under a dilation with a scale factor of $\frac{1}{3}$.



Orig. SF = Image

$x \cdot \frac{1}{3} = 1$

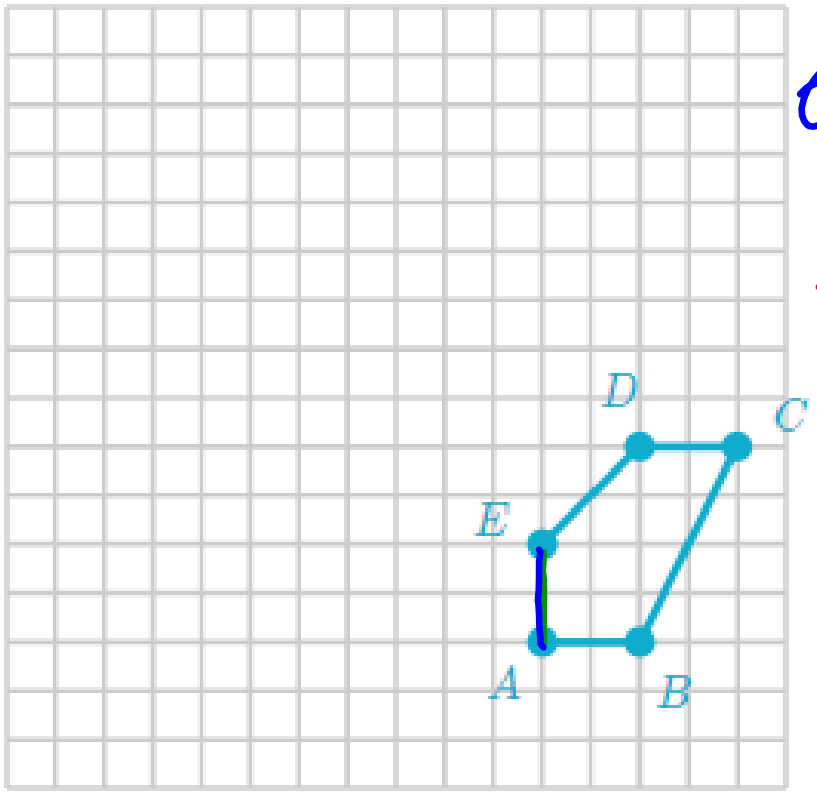
$\frac{1}{3}$

$x = 3$

What is the length of segment $\overline{CD}$?

units

Pentagon $A'B'C'D'E'$ is the image of pentagon $ABCDE$ under a dilation with a scale factor of $\frac{5}{2}$.



orig • SF = Image

$2 \left(\frac{5}{2}\right) = 5$

What is the length of segment $\overline{A'E'}$?

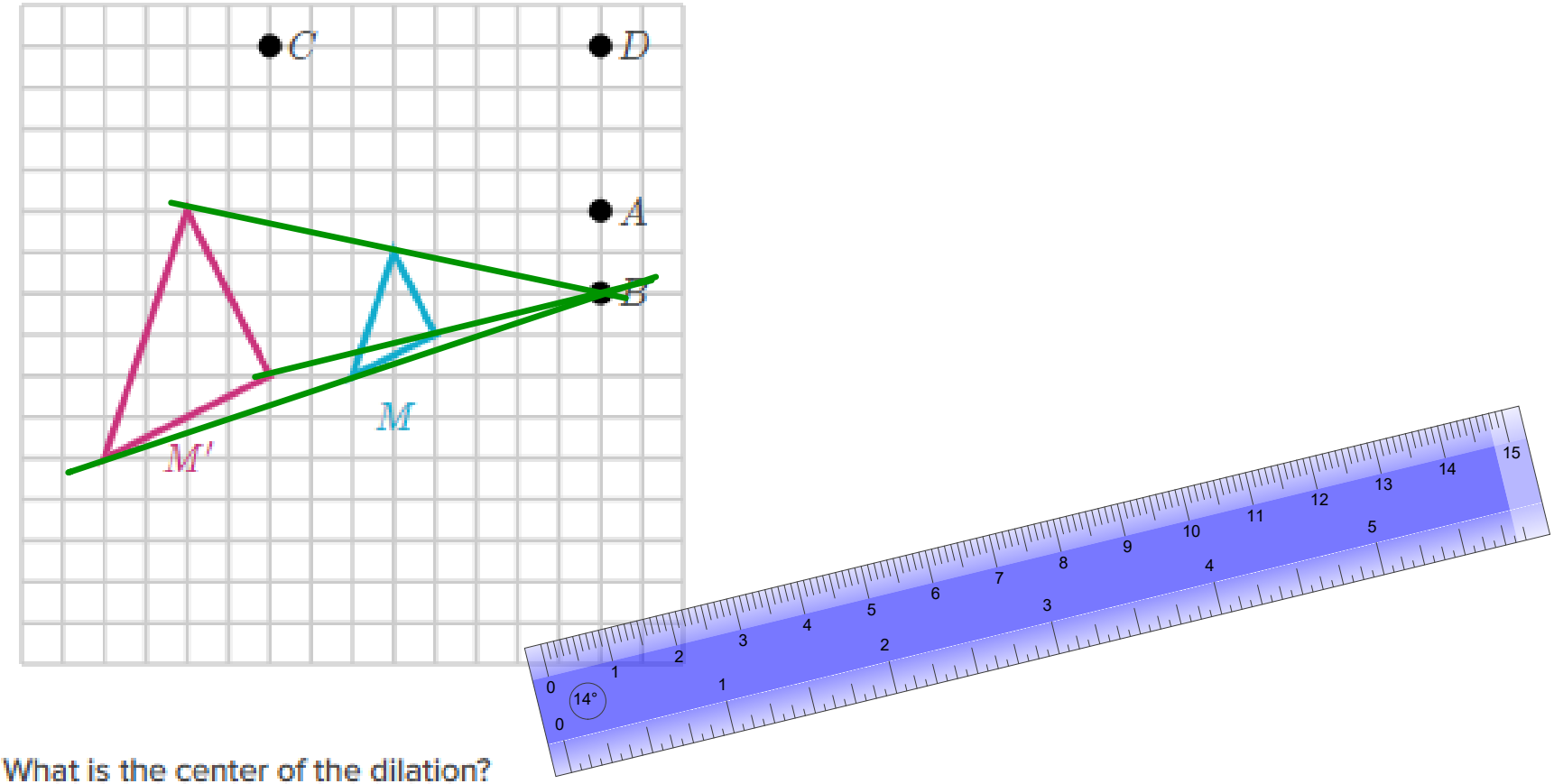
5 units

Dilations - Center

- To find the **Center of Dilation,** if given a point and its image:
  - Draw a line from a point in the image (Pink) to the corresponding point in the original image (Blue).

Dilations: center

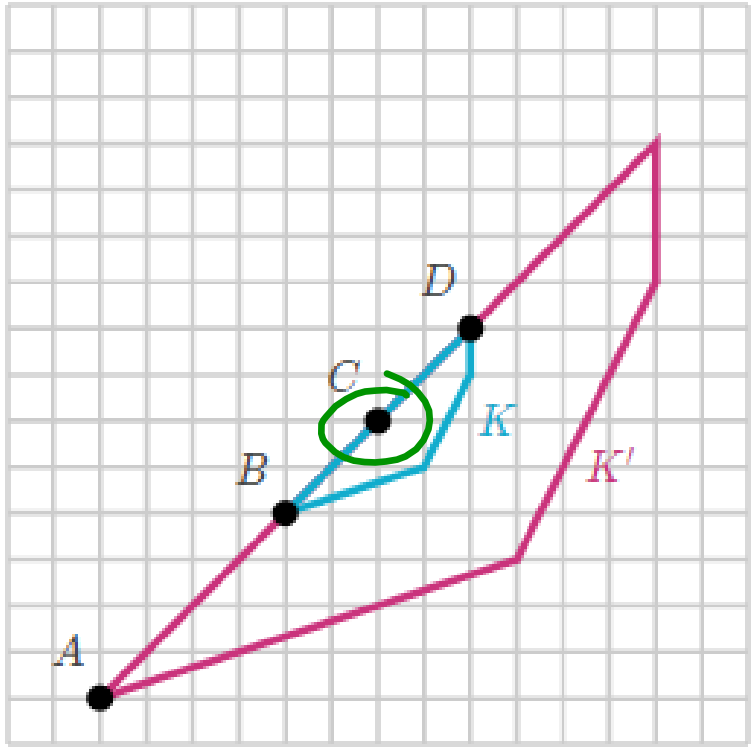
Triangle M' is the image of triangle M under a dilation.



What is the center of the dilation?

Dilations: center

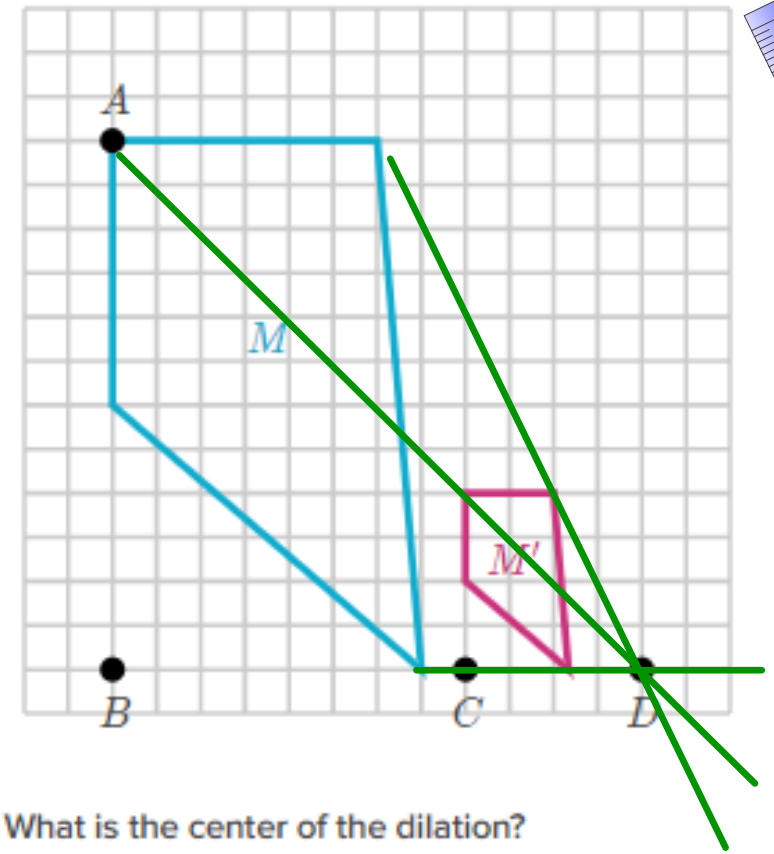
Quadrilateral K' is the image of quadrilateral K under a dilation.

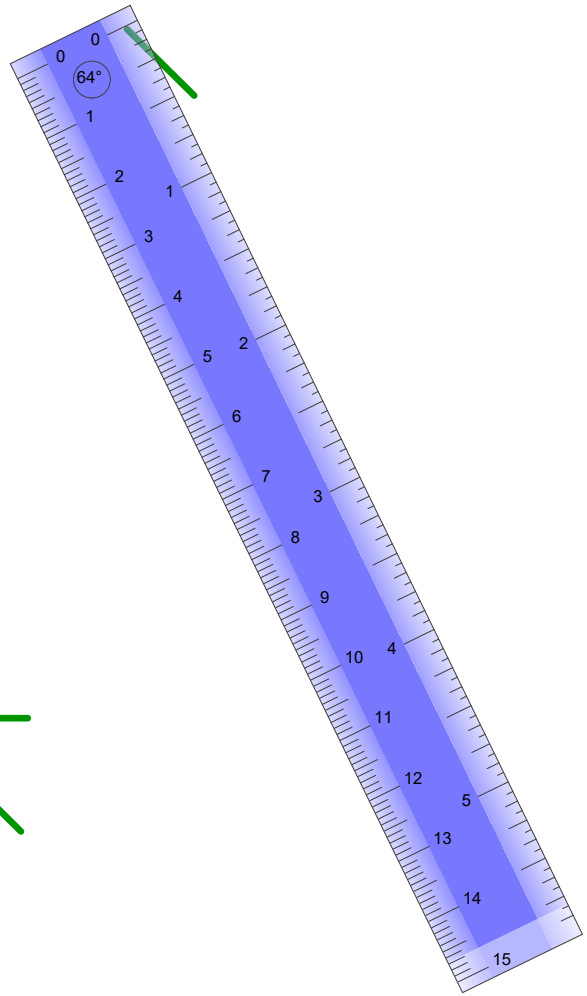


What is the center of the dilation?

Dilations: center

Quadrilateral M' is the image of quadrilateral M under a dilation.

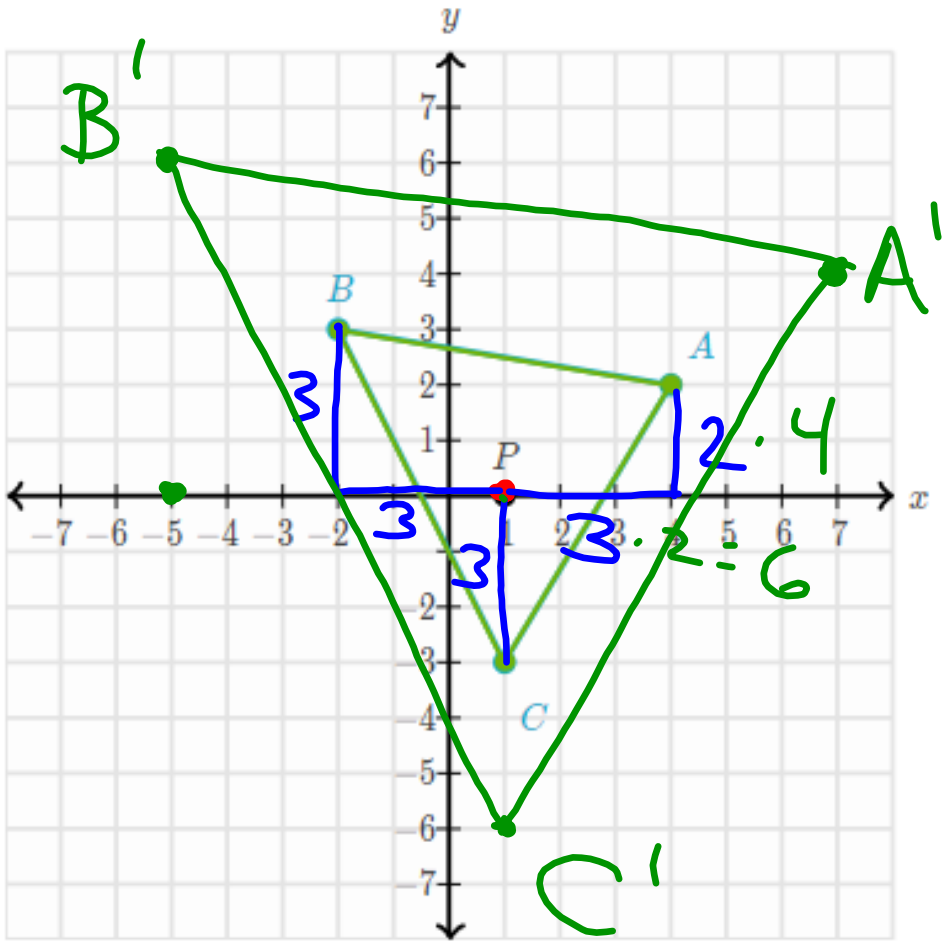




What is the center of the dilation?

Dilate triangles

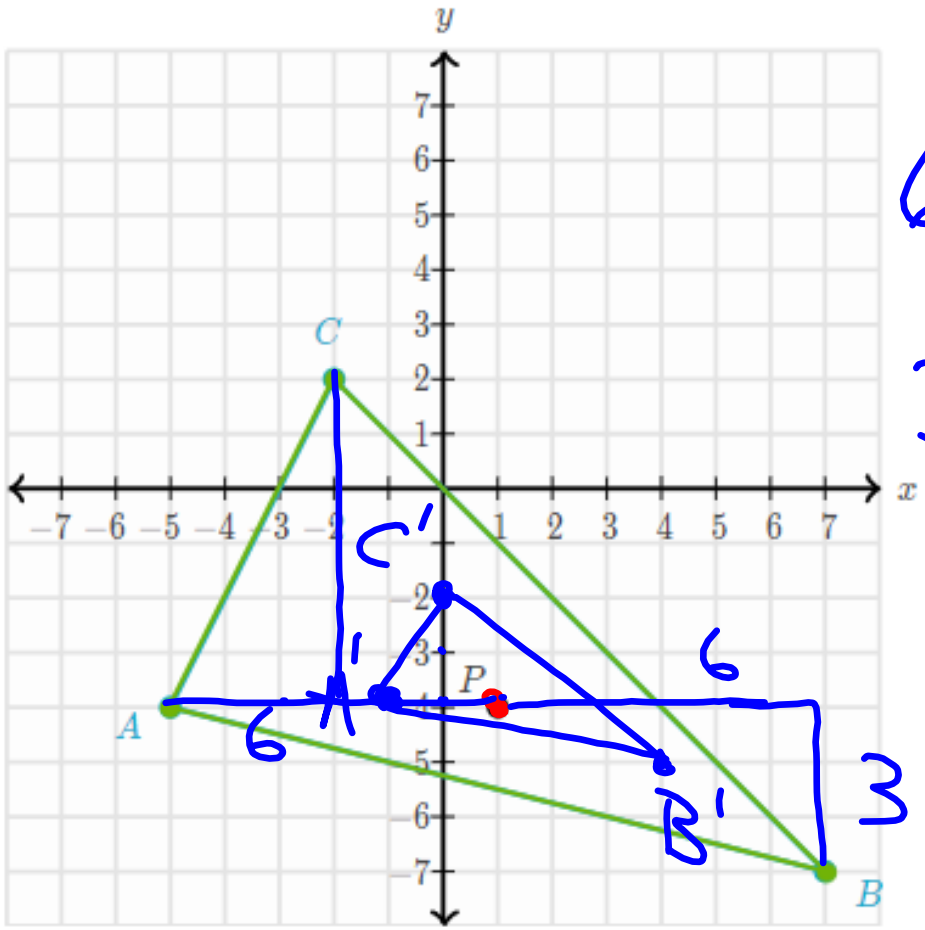
Draw the image of $\triangle ABC$ under a dilation whose center is P and scale factor is 2.



multiply

Dilate triangles

Draw the image of $\triangle ABC$ under a dilation whose center is P and scale factor is $\frac{1}{3}$.

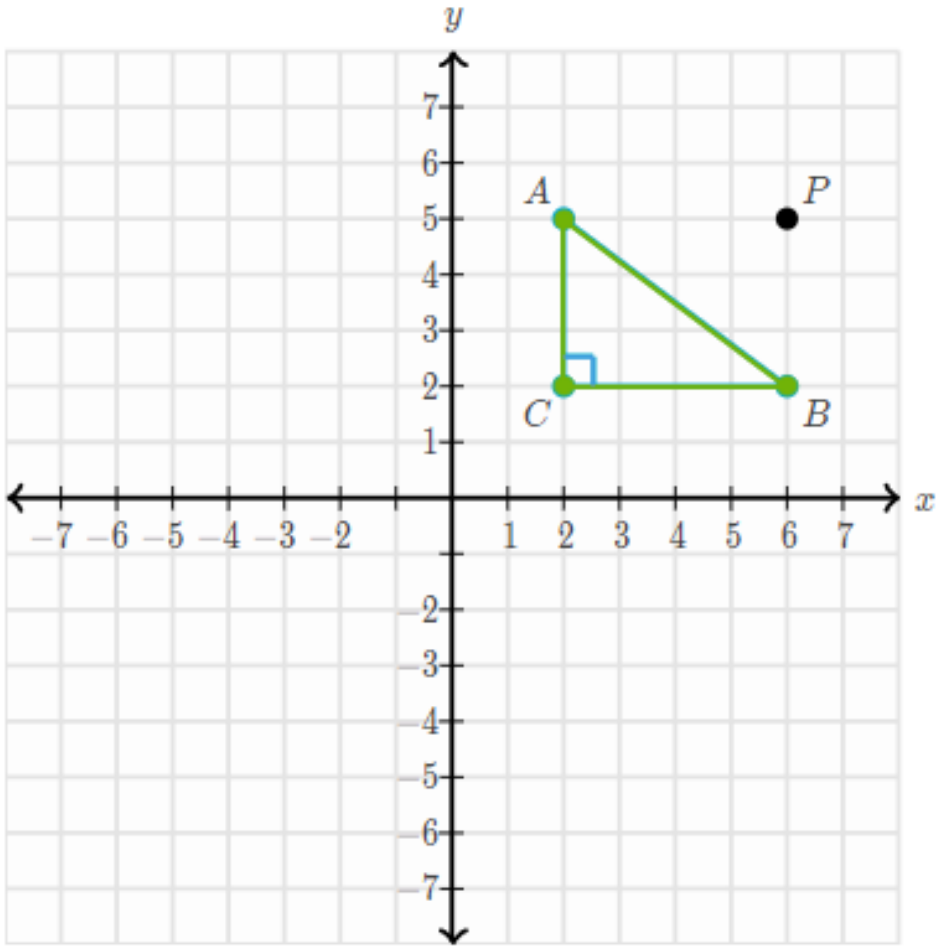


$6 \cdot \left(\frac{1}{3}\right) = 2$

$3\left(\frac{1}{3}\right) = 1$

Dilate triangles

Draw the image of $\triangle ABC$ under a dilation whose center is P and scale factor is 3.



Skills You Should Be Working on:

1. Identify Transformations
2. Translate Points
3. Determine Translations
4. Translate Shapes
5. Rotate Points
6. Determine Rotations
7. Rotate Shapes
8. Reflect Points
9. Determine Reflections
10. Determine Reflections (advanced)
11. Reflect Shapes
12. Find Measures Using Rigid Transformations
13. Rigid Transformations: Preserved Properties
14. Mapping Shapes
15. **Dilate Points**
16. **Dilations: Scale Factor**
17. **Dilations: Center**
18. **Dilate Triangles**
19. **Dilations and Properties**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