Aim(s):
✓ SWBAT practice dilating figures on a coordinate grid

Do Now
Directions: Complete the following questions.

Determine if the following scale factor would create an enlargement, reduction, or isometric (congruent) figure.

1) 3.5 enlargement
2) 2/5 reduction
3) 0.6 reduction
4) 1 isometry
5) 4/3 enlargement
6) 5/8 reduction

Given the point and its image, determine the scale factor.

7) A(3,6) A'(4.5, 9)
   \[
   \frac{9 - 3}{6 - 3} = \frac{6}{3} \cdot \frac{3}{2}
   \]

8) G'(3,6) G(1.5,3)
   \[
   \frac{3 - 1.5}{6 - 3} = \frac{1.5}{3} \cdot \frac{1}{2}
   \]

9) B(2.5) B'(1,2.5)
   \[
   \frac{1 - 2.5}{2 - 1} = \frac{-1.5}{1} \cdot \frac{1}{2}
   \]

10) The sides of one right triangle are 6, 8, and 10. The sides of another right triangle are 10, 24, and 26. Determine if the triangles are similar. If so, what is the ratio of corresponding sides?

   \[
   \frac{6}{10} = \frac{10}{24} = \frac{10}{26} = \frac{1}{\frac{5}{3}}
   \]
   \[
   \frac{8}{24} = \frac{2}{3}
   \]
   \[
   \frac{16}{26} = \frac{2}{3}
   \]

   Not similar!
Dilation Activity 1: King Tut

1. Use the graph paper vertically. Put the origin in the center.

2. Plot and label these points.
   \[ A = (1, 5) \quad B = (7, -2) \quad C = (4, -3) \quad D = (-4, -3) \quad E = (-1, -2) \]

3. Make solid lines \( \overline{AB}, \overline{AC}, \overline{BC}, \overline{CD} \) and \( \overline{AD} \)

4. Make dashed lines \( \overline{AE}, \overline{DE} \) and \( \overline{EB} \)

5. Dilate each coordinate of A, B, C, D, E by a scale factor of 2 to get new points A', B', C', D' and E'. *Remember* \( (x, y) \rightarrow (2x, 2y) \)
   
   Rewrite as points: \( A' = (2, 10) \quad B' = (14, -4) \quad C' = (8, -6) \quad D' = (-8, -6) \quad E' = (-2, -4) \)

6. Plot and label A', B', C', D' and E' on the same graph in a different color.

7. Make solid lines: \( \overline{A'B'}, \overline{A'C'}, \overline{B'C'}, \overline{C'D'} \) and \( \overline{A'D'} \)

8. Make dashed lines: \( \overline{A'E'}, \overline{D'E'} \) and \( \overline{E'B'} \)

9. How do the two graphs compare?

These are similar figures.

10. What did the scale factor of 2 do to the original image?

    Made each side 2x as long.


    Yes, each side is 2x as long.


    Yes, the ratio is 2:1.
Activity 1 (King Tut)
1. Use the graph paper horizontally. Put the origin the lower left-hand corner.


3. Make solid lines AB, AD, AH, BE, EF, EH, DG, FG and GH

4. Make dashed lines BC, CF and CD

5. Dilate each coordinate of A, B, C, D, E, F, G and H by a scale factor of $\frac{1}{2}$ to get new points A', B', C', D', E', F', G' and H'. Remember $(x, y) = (\frac{1}{2}x, \frac{1}{2}y)$

Rewrite as points: A' = (6, 6) B' = (6, 10) C' = (10, 10) D' = (10, 6)
E' = (8, 12) F' = (12, 12) G' = (12, 8) and H' = (8, 8)


7. Make solid lines $\overline{A'B'}$, $\overline{A'D'}$, $\overline{A'H'}$, $\overline{B'E'}$, $\overline{E'F'}$, $\overline{E'H'}$, $\overline{D'G'}$, $\overline{F'G'}$ and $\overline{G'H'}$

8. Make dashed lines $\overline{B'C'}$, $\overline{C'F'}$ and $\overline{C'D'}$

9. Using your new coordinates of A', B', C', D', E', F', G' and H' from #5 dilate each coordinate with a scale factor of $\frac{1}{2}$ to get new points A'', B'', C'', D'', E'', F'', G'' and H'' Remember $(x, y) = (\frac{1}{2}x, \frac{1}{2}y)$

A'' = (3, 3) B'' = (3, 5) C'' = (5, 5) D'' = (5, 3)
E'' = (4, 6) F'' = (6, 6) G'' = (6, 4) and H'' = (4, 4)

10. Plot points A'', B'', C'', D'', E'', F'', G'' and F'' in a different color.

11. Make solid lines $\overline{A''B''}$, $\overline{A''D''}$, $\overline{A''H''}$, $\overline{B''E''}$, $\overline{E''F''}$, $\overline{E''H''}$, $\overline{D''G''}$, $\overline{F''G''}$ and $\overline{G''H''}$

12. Make dashed lines $\overline{B''C''}$, $\overline{C''F''}$ and $\overline{C''D''}$
Activity 2: The Incredible Shrinking Cube
13. Describe the size and location of the three cubes.

Each cube got smaller & closer to the origin.


These are proportional, each is \( \frac{1}{2} \) side length of the previous.

15. Are they similar? Explain.

These are similar each is a ratio of \( 1 : \frac{1}{2} \) or \( 1 : \frac{1}{4} \)
Create Your Own Dilation

1. Set up an x-axis and y-axis on your graph paper
2. Draw a design on your graph paper. (minimum 5 points)
3. Make a list of the ordered pairs necessary to create your design. Be sure to include directions that indicate where it is necessary to lift the pencil and where it is necessary to connect each point to the next one in the order that you have them listed.

4. Dilate your points with a reduction, locate and label (show your work). Your scale factor is _______

5. Dilate your points with an enlargement, locate and label (show your work). Your scale factor is ______

6. Color your design.