

Unit 3 – Similar Figures and Dilations***Target 1: Use proportions to identify lengths of corresponding parts in similar figures.******Target 2: Perform and identify dilations.******Target 3: Use scale factor and similarity to determine unknown lengths in polygons and circles.******a. Use ratios of lengths to determine unknown corresponding parts.******b. Use ratios of perimeter, and area to determine unknown corresponding parts.******Target 4: Perform compositions of figures to determine the coordinates and location of the image.***YouTube Playlist:
<https://goo.gl/RTrTCR>

Date	Target	Assignment	Done!
M 9-26	3.1	3.1 Worksheet	
T 9-27	3.2	3.2 Worksheet	
W 9-28	3.1-3.2	3.1-3.2 Review Worksheet	
R 9-29	Quiz	Quiz 3.1-3.2	
F 9-30	Project	Cartoon Enlargement Project	
M 10-3	3.3a	3.3a Day 1 Worksheet	
T 10-4	3.3a	3.3a Day 2 Worksheet	
W 10-5	3.3b	3.3b Day 1 Worksheet	
R 10-6	3.3b	3.3b Day 2 Worksheet	
F 10-7	3.4	3.4 Worksheet	
M 10-10		COLUMBUS DAY – NO SCHOOL	
T 10-11	3.3-3.4	3.3-3.4 Review Worksheet	
W 10-12	Quiz	Quiz 3.3-3.4	
R 10-13	Rev	Unit 3 Review	
F 10-14	Test	Unit 3 Test	

3.1 – Similar Figures

Target 1 – Use proportions to identify lengths of corresponding parts in similar figures

Vocabulary

Similar Polygons: change of _____ or _____ of a figure)

Linear Scale Factor: _____ of the _____ of _____ sides.

Annotate Here

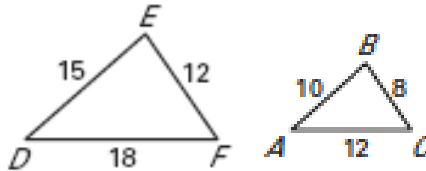
(location, size)

(ratio, lengths, corresponding)

Example 1: Use similarity statements

In the diagram, $\triangle ABC \sim \triangle DEF$.

- List all pairs of congruent angles



- Check that the ratios of corresponding side lengths are equal.

Ratio 1:

Ratio 2:

Ratio 3:

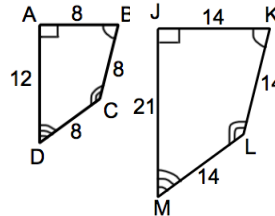
Are all three ratios equal?

- Write the ratios of the corresponding side lengths in a statement of proportionality.

Example 2: Find the linear scale factor

Determine whether the polygons are similar. If they are, write the similarity statement and find the scale factor of ABCD to JKLM.

- Identify pairs of congruent angles
(Write congruent statements for all pairs)



- Show that corresponding side lengths are proportional.

Ratio 1:

Ratio 2:

Ratio 3:

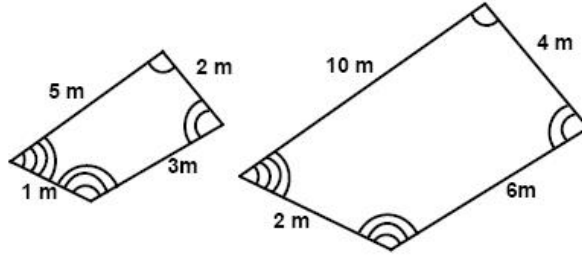
Ratio 4:

Are all four ratios equal?

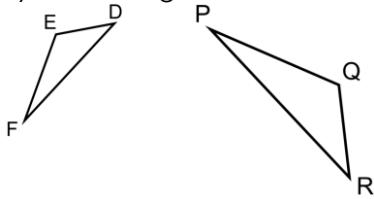
Linear Scale Factor:

YOU TRY NOW!

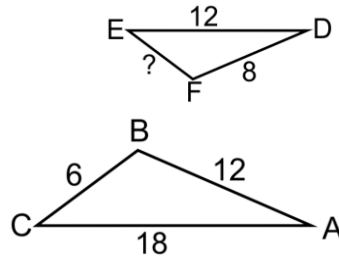
a) The two figures below are similar. What is the linear scale factor?



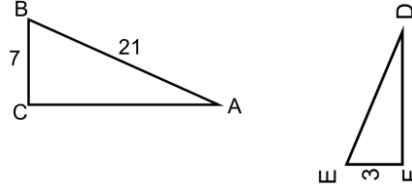
b) The triangles are similar: $\triangle DEF \sim \triangle RQP$. Which angles are congruent?



c) What is the length of FE? The triangles are similar.



d) $\triangle ABC \sim \triangle DEF$. What is the length of ED?



e) **HONORS ONLY** $\triangle STU \sim \triangle FED$ and $ST = x + 2$, $UT = x^2 - x - 14$, $FE = 1$, and $DE = 2$. Find the measure of ST

f) **HONORS ONLY** The lengths of the sides of a triangle have a ratio 1:2:3. If the perimeter of the triangle is 60 yards, what is the length of the smallest side?

Annotate Here

3.2 - Dilations

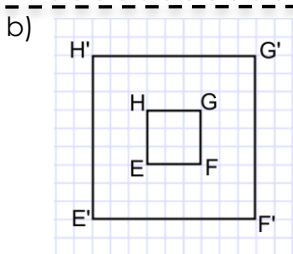
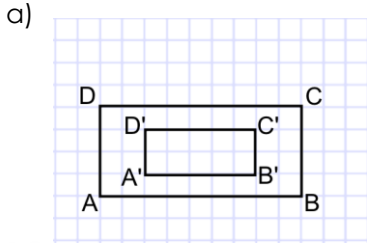
Target 2 - Perform and identify dilations

Vocabulary

Dilation: a transformation where the _____ or _____ of a figure occurs, where the sides are _____ or _____ proportionally about a center. Dilations do not change the _____ of the _____.

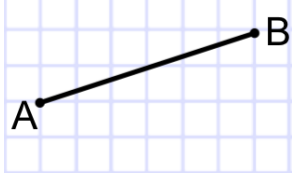
Example 1: Identify dilations

Determine whether the dilation is a *reduction (shrink)* or an *enlargement (expand)*. Find the scale factor of the dilation.



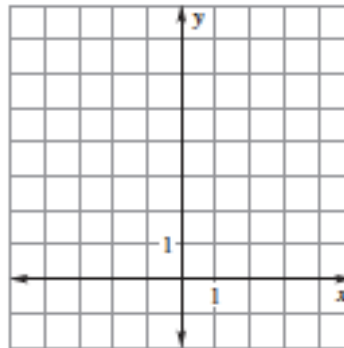
Example 2: Perform a dilation

Dilate \overline{AB} by a scale factor of $\frac{2}{3}$.



Example 3: Use scalar multiplication in a dilation

The vertices of triangle ABC are A (-3, 0), B (0, 6), C (3, 6). Use scalar multiplication to find A'B'C' after a dilation with is center at the origin and a scale factor of $\frac{1}{3}$. Graph ABC and its image.



Annotate Here

(shrinking, expanding, shrink, expand, measures, angles)

Linear Scale Factor

Look at distance from _____ to _____

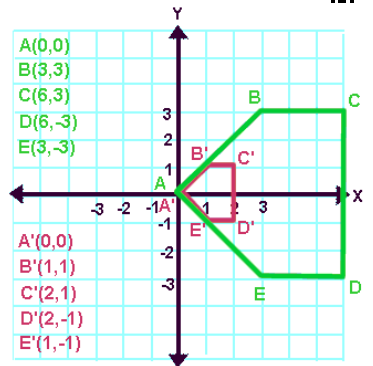
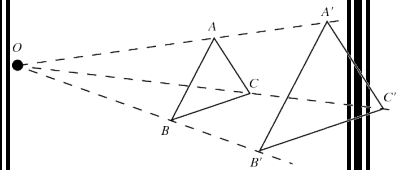
$$\frac{\text{Prime Distance}}{\text{PreImage Distance}} =$$

If k

< 1, then image is a _____

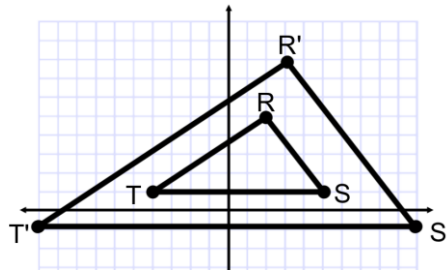
If k

> 1, then image is an _____



YOU TRY NOW!

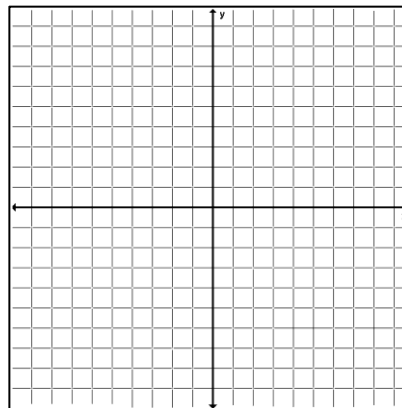
a) **HONORS ONLY** Find the center of dilation of the two similar triangles below.



b) $\triangle ABC$ is dilated to form triangle $\triangle A'B'C'$. If $\frac{AB}{A'B'} = 7$, what is $\frac{B'C'}{BC}$?

c) The vertices of $\triangle ABC$ is $A(-7, 8)$, $B(7, -5)$, $C(8, 10)$. Find the vertices of the dilated image with scale factor of $\frac{1}{2}$. The center of the dilation is the origin.

d) **HONORS ONLY** The vertices of $\triangle ABC$ is $A(-3, 4)$, $B(3, -2)$, $C(2, 3)$. Find the vertices of the dilated image with scale factor of 2. The center of the dilation is $(0, 1)$.



Annotate Here

QUESTIONS OR REFLECTION

What concepts were important to take away from this target?

- 1.
- 2.
- 3.

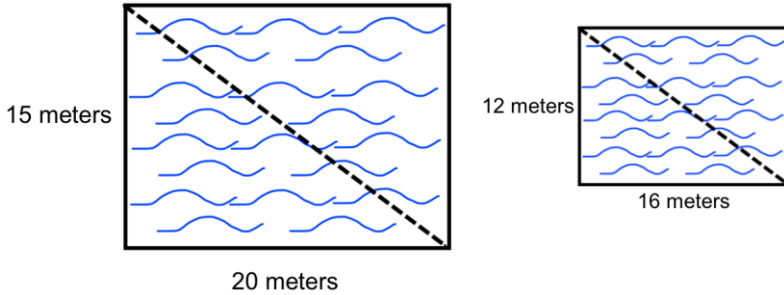
Questions?

- 1.
- 2.
- 3.

3.3a – Use Scale Factor & Similarity to Determine Unknown Lengths in Polygons & Circles
Target 3 – Use ratios of lengths, perimeter & area to determine unknown corresponding parts

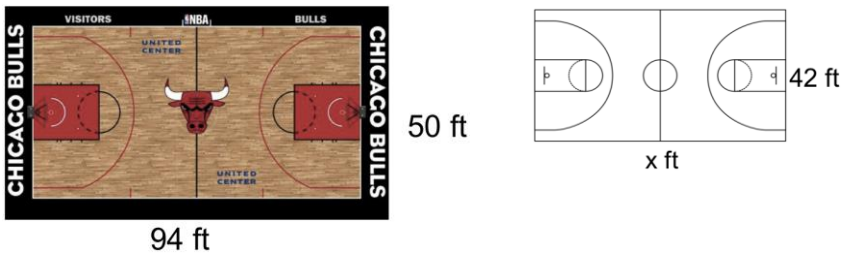
Example 1: Use similar polygons to find lengths of unknown corresponding parts

The two rectangular swimming pools are similar. How far is it diagonall across each pool?



Example 2: Use similar polygons to find lengths of unknwn corresponding parts

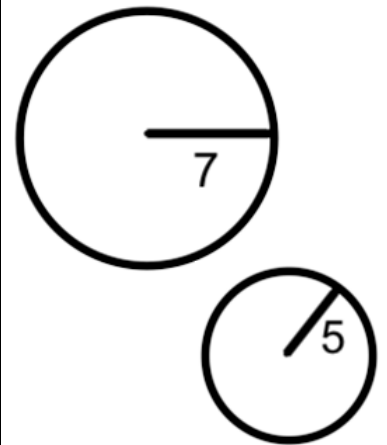
A high school wants to build a basketball court that is similar to an NBA basketball court, which is 94 feet long and 50 feet wide. Unfortunately, the high school has room for a court that is 42 feet wide. How long should the court be, to the nearest foot?



Annotate Here

FUN FACT!

All circles are similar! All angles are congruent because circles have a 360° angle. All lengths are proportional because radii and circumferences are proportional!



The scale factor is

$$\frac{7}{5} \text{ or } \frac{5}{7}$$

QUESTIONS OR REFLECTION

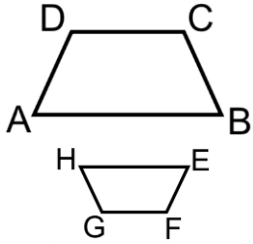
Write down at least 2 questions from this page to ask the next day.

1)

2)

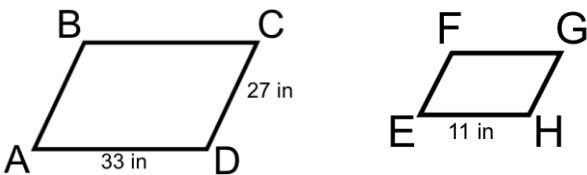
YOU TRY NOW!

- a) Given the similar trapezoids ABCD and EHGF below, identify the side that is proportional to \overline{BC} .



- b) The vertex of B of an octagon is located at $(24, -16)$. The octagon is dilated by a factor of 0.25, with the center of dilation at the origin. What are the coordinates of B' ?

- c) Parallelograms ABCD and EFGH are similar. What is the length of \overline{GH} ?



QUESTIONS OR REFLECTION

Write down at most 2 questions that you can ask the next day. BE SPECIFIC.

1)

2)

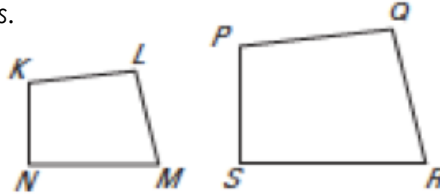
Annotate Here

3.3b – Use Scale Factor & Similarity to Determine Unknown Corresponding Parts
Target 3 – Use ratios of lengths, perimeter, & area to determine unknown corresponding parts

PERIMETERS OF SIMILAR POLYGONS

If two polygons are similar, then the ratio of their perimeters is equal to the ratios of their corresponding side lengths.

If $KLMN \sim PQRS$, then



$$\frac{KL + LM + MN + NK}{PQ + QR + RS + SP} =$$

Example 1: Find the perimeter of similar figures

A larger cement court is being poured for a basketball hoop in place of a smaller one. The court will be 20 feet wide and 25 feet long. The old court was similar in shape, but only 16 feet wide.

Find the scale factor of the new court to the old court.

Find the ratio of the perimeters of the new court to the old court.

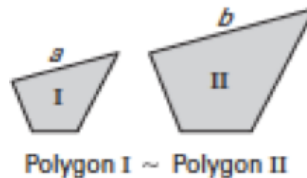
Annotate Here

Areas of Similar Polygons

If two polygons are similar with the lengths of corresponding sides in the ratio $a : b$, then the ratio of their areas is _____: _____.

Scale Factor:

$$\frac{\text{Side Length of Polygon 1}}{\text{Side Length of Polygon 2}} =$$

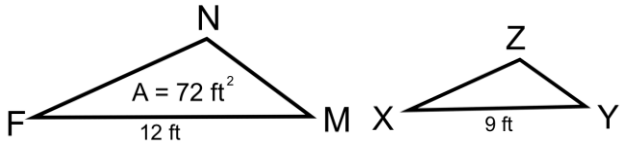


Ratio of Perimeters:

Ratio of the Areas:

Example 2: Find the area of similar figures

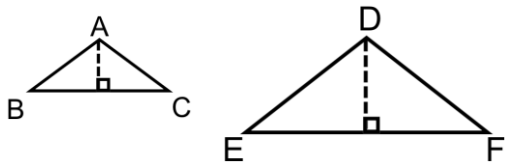
What is the area of triangle XYZ? $\triangle FMN \sim \triangle XYZ$.



YOU TRY NOW!

a) $\triangle ABC \sim \triangle DEF$. $AB = 3$ inches, $DE = 6$ inches, and the area of $\triangle ABC$ is 72 square inches. What is the area of $\triangle DEF$?

b) $\triangle ABC \sim \triangle DEF$. Both triangles are also isosceles triangles. $AB = 5$ inches, $EF = 21$ inches, and the altitude (height) of $\triangle ABC = 4$. The altitudes bisect (divides EF into two congruent parts) the bottom sides of the triangles. Calculate the altitude of $\triangle DEF$.



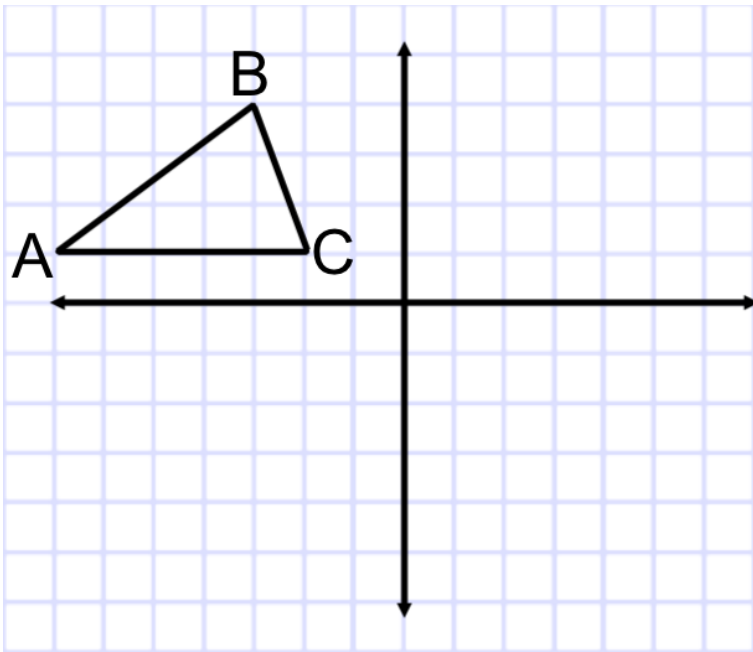
Annotate Here

3.4 – Similarity and Transformations

Target 4 – Perform compositions of figures to determine the coordinates and location of the image

Example 1: Perform the composition

The vertices of a triangle ABC is shown below. The triangle is translated 5 units to the right creating image A'B'C'. Then, the image is reflected across the x-axis. Finally, the triangle is dilated by a factor of 1.5. What are the final coordinates of triangle A'''B'''C'''?

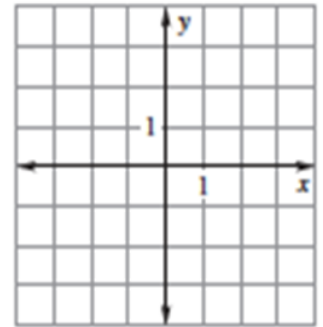


Coordinates after each transformation

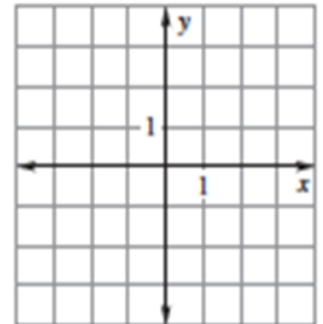
ΔABC	$\Delta A'B'C'$	$\Delta A''B''C''$	$\Delta A'''B'''C'''$
A(,)	A'(,)	A''(,)	A'''(,)
B(,)	B'(,)	B''(,)	B'''(,)
C(,)	C'(,)	C''(,)	C'''(,)

Annotate Here

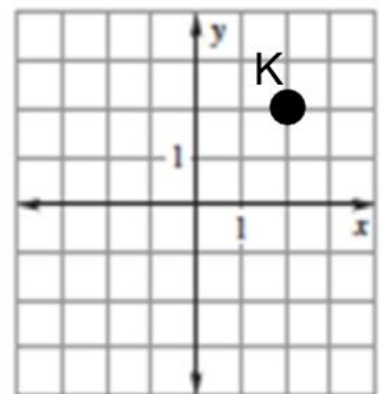
Graph $y = 2$



Graph $x = -1$

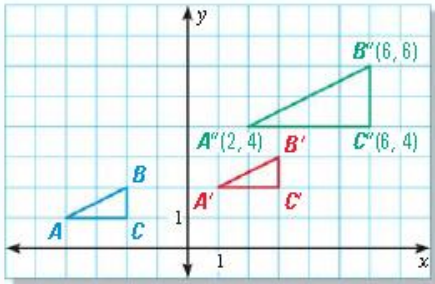


Rotate K 270 degrees CCW direction



YOU TRY NOW!

1. Describe the composition of transformations. Give the exact translation, reflection or rotation using proper notation.

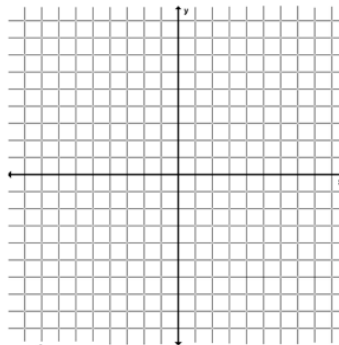


Transformation 1:
Transformation 2:

2. The endpoints of \overline{CD} are C (-2, 3) and D (0, -2). Graph the image of \overline{CD} after the composition.

Dilate by a scale factor of 3 centered at (-1, 0)
Rotation: 90° clockwise about (-1, 1)

C' D'
C'' D''



Annotate Here

SUMMARY

In your own words, describe what a composition is.