Geometry 7.6

Identify similarity transformations

Verify similarity after a transformation

corresp ∠s ≅

sides in prop.

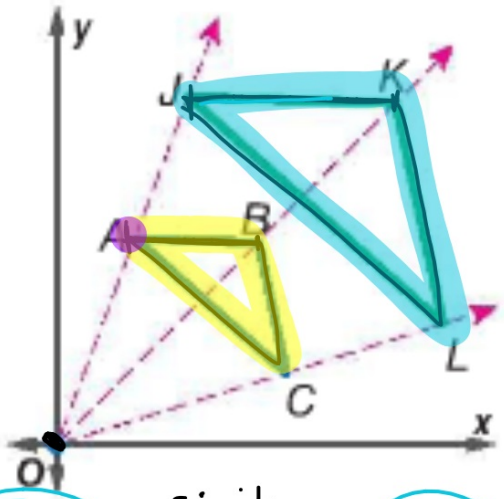
- SAS } As only
- SSS }
- preimage
- image
- dilation
- similarity transformaion
- center of dilation
- scale factor
- enlargement
- reduction

orig.

after

SF > 1

SF < 1



similar

△JKL is a dilation of △ABC.

Center of dilation: (0, 0)

Scale factor: $\frac{JK}{AB}$ $\frac{8}{5}$

5 : 8 8 : 5

$SF = \frac{8}{5}$ E

onding parts)

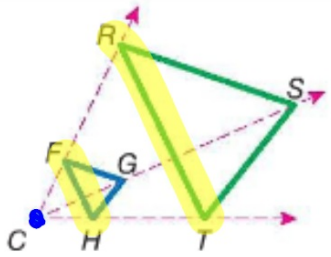
RT
FH

ConceptSummary Types of Dilations

A dilation with a scale factor greater than 1 produces an **enlargement**, or an image that is larger than the original figure.

Symbols If $k > 1$, the dilation is an enlargement.

Example $\triangle FGH$ is dilated by a scale factor of 3 to produce $\triangle RST$. Since $3 > 1$, $\triangle RST$ is an enlargement of $\triangle FGH$.

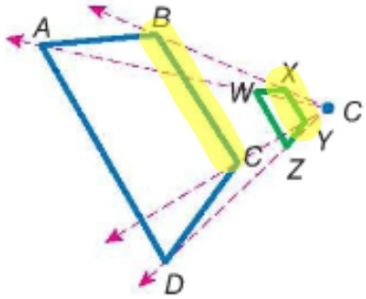


$k < 1$

A dilation with a scale factor between 0 and 1 produces a **reduction**, an image that is smaller than the original figure.

Symbols If $0 < k < 1$, the dilation is a reduction.

Example $ABCD$ is dilated by a scale factor of $\frac{1}{4}$ to produce $WXYZ$. Since $0 < \frac{1}{4} < 1$, $WXYZ$ is a reduction of $ABCD$.



$0 < k < 1$

What is SF=1?

Example 1 Identify a Dilation and Find Its Scale Factor

Determine whether the dilation from A to B is an *enlargement* or a *reduction*. Then find the scale factor of the dilation.

From A to B
E or R?
SF=?

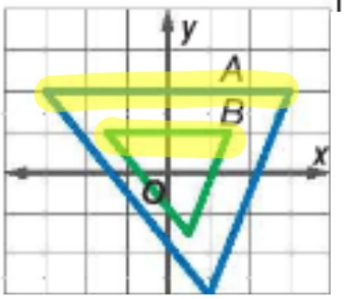
R

$\frac{6}{3}$ $\frac{3}{6}$

$\frac{2}{-1}$ $\frac{-1}{2}$

SF = $\frac{1}{2}$

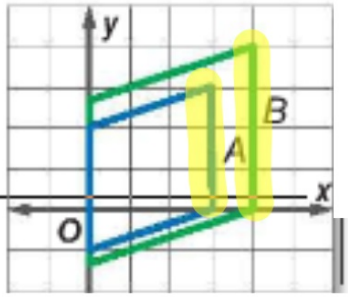
a.



E

$\frac{3}{4}$ $\frac{4}{3}$

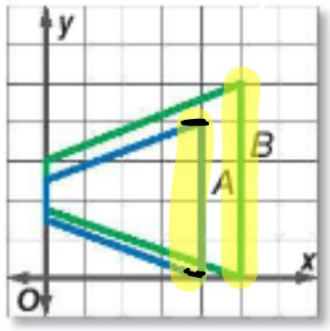
b.



from A to B

GuidedPractice

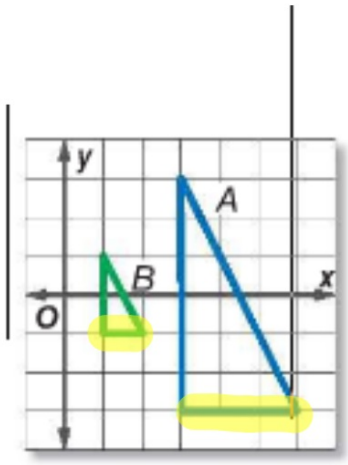
1A.



E

4/5 5/4

1B.



1/3 3/1

R

300%

Real-World Example 2 Find and Use a Scale Factor

COLLECTING Refer to the beginning of the lesson. By what percent should Adriana enlarge the ticket stub so that the dimensions of its image are 3 times that of her original? What will be the dimensions of the enlarged image?

(preimage)(SF)=image

SF = 3

19.2 cm × 15 cm

2. If the resulting ticket stub image was 1.5 centimeters wide by about 1.9 centimeters long instead, what percent did Adriana mistakenly use to dilate the original image? Explain your reasoning.

Example 3 Verify Similarity after a Dilation

Graph the original figure and its dilated image. Then verify that the dilation is a similarity transformation.

a. original: $A(-6, -3)$, $B(3, 3)$, $C(3, -3)$; image: $X(-4, -2)$, $Y(2, 2)$, $Z(2, -2)$

pre

Informally: Does it look like the same shape?
Formally: Are all corresponding sides proportional?

SAS (?) R

SSS (?)

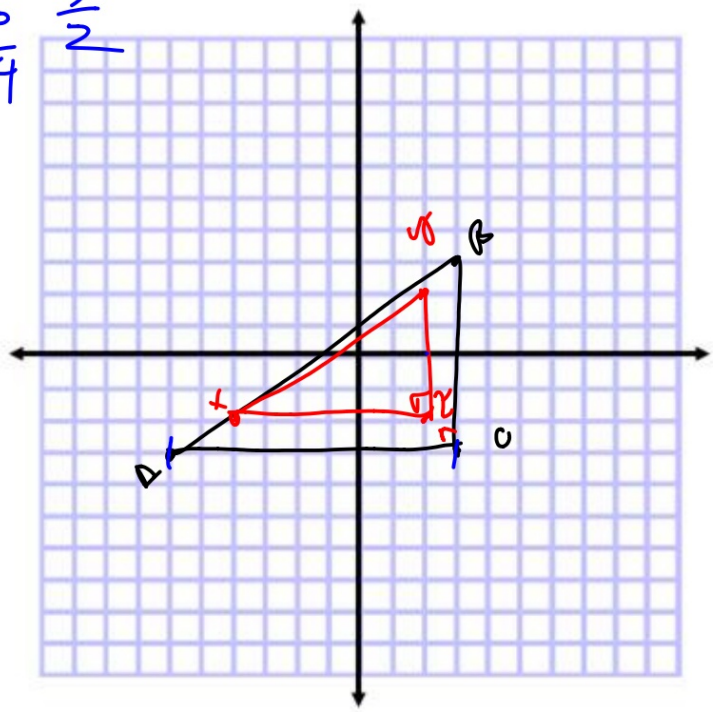
$\frac{6}{9}$ $\frac{6}{4}$ $\frac{3}{2}$

$\frac{2}{3}$

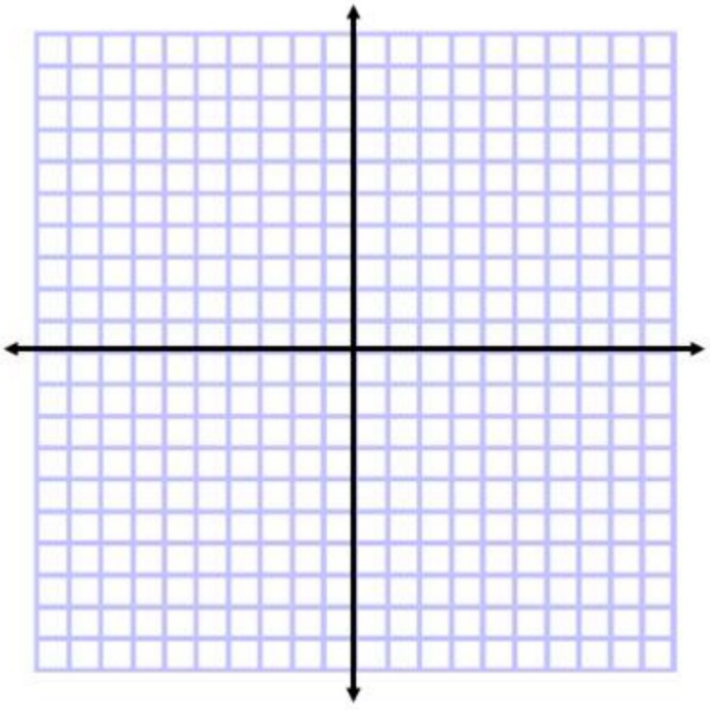
StudyTip

Center of Dilation

Unless otherwise stated, all dilations on the coordinate plane use the origin as their center of dilation.



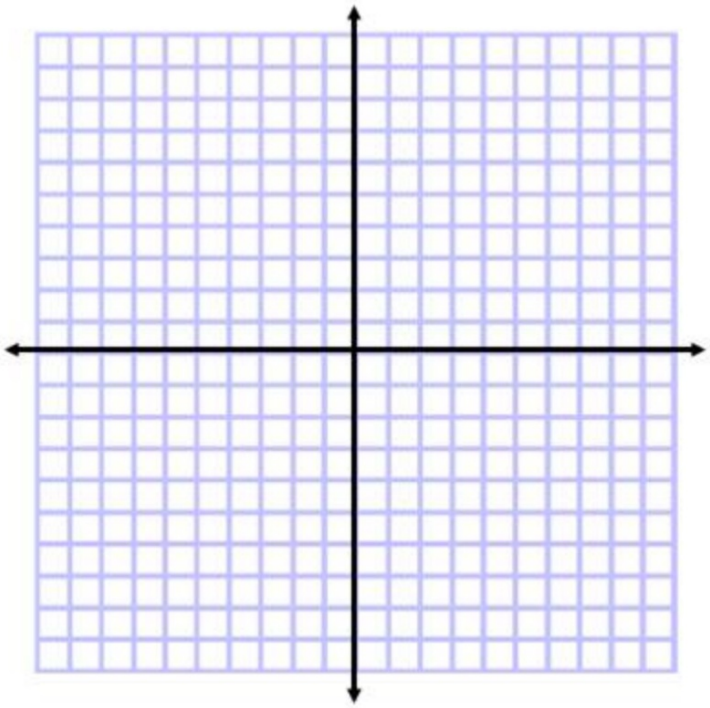
b. original: $J(-6, 4)$, $K(6, 8)$, $L(8, 2)$, $M(-4, -2)$;
image: $P(-3, 2)$, $Q(3, 4)$, $R(4, 1)$, $S(-2, -1)$



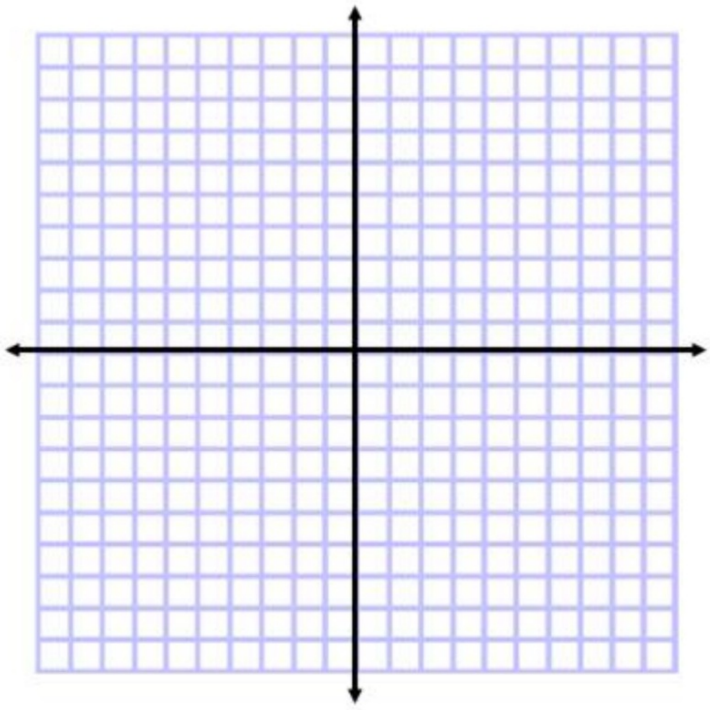
S S S
S A S

GuidedPractice

3A. original: $A(2, 3)$, $B(0, 1)$, $C(3, 0)$
image: $D(4, 6)$, $F(0, 2)$, $G(6, 0)$



3B. original: $H(0, 0)$, $J(6, 0)$, $K(6, 4)$, $L(0, 4)$
image: $W(0, 0)$, $X(3, 0)$, $Y(3, 2)$, $Z(0, 2)$



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