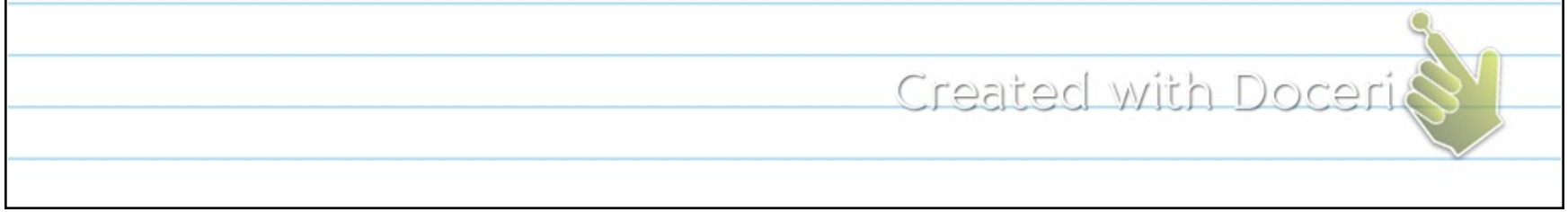
Unit 1

Lesson 6

Dilations and Similarity



Lesson 6 – Dilations and Similarity

- **Definitions:**

- When a line segment **passes through the center of dilation**, the line segment and its image lie on the same line.

- When a line segment **does not pass through the center of dilation**, the line segment and its image are parallel (∥).

- Dilations create figures that are always similar to one another.

- Two figures are similar (~) if they have the same shape but not necessarily the same size.

- The scale factor is the ratio of the lengths of the corresponding sides.

- Two figures are congruent (≅) if they are similar and _____.

2) How do we show pieces are $\cong$ map onto each other

How does $\angle B$ map to $\angle B'$

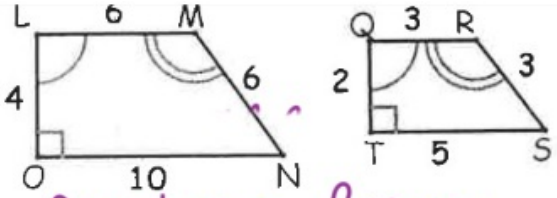
Translate right 3 up 4

$(x+3, y+4)$ $\langle 3, 4 \rangle$

➢ Two polygons are similar if:

1) Corresponding L's are ≅

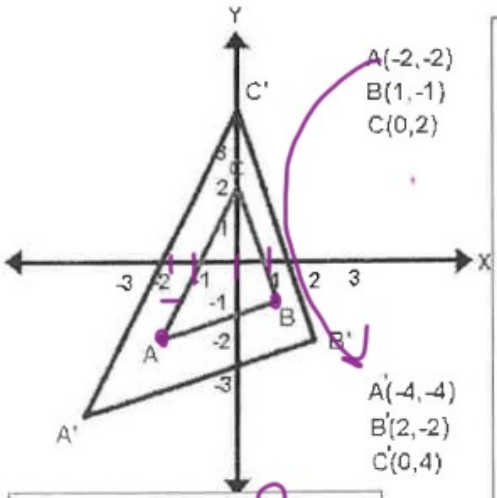
2) Corresponding sides are proportional



Analyze Primer

❖ **Examples: Using the dilated figures below, name the scale factor used and find the slopes of the segments listed.**

3 → 1



Scale Factor: 2

Slopes:

$\overline{AB}$ = y3

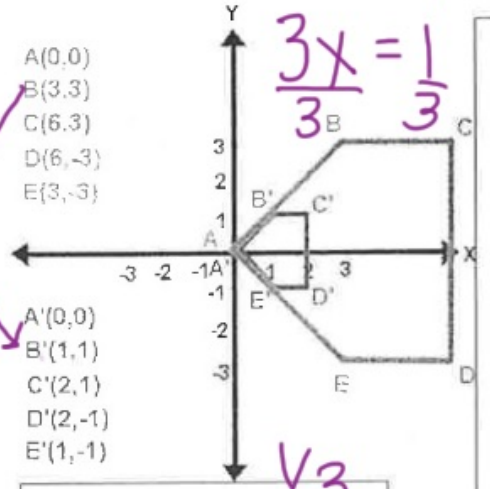
$\overline{A'B'}$ = y3

$\overline{AC}$ = 2

$\overline{A'C'}$ = 2

$\overline{BC}$ = -3

$\overline{B'C'}$ = -3



3x = 1

3B 3

Scale Factor: y3

Slopes:

$\overline{AB}$ =

$\overline{A'B'}$ =

$\overline{AE}$ =

$\overline{A'E'}$ =

$\overline{BC}$ =

$\overline{B'C'}$ =

Math 2 – Honors
Unit 1 – Geometric Transformations
Lesson 5 – Dilations HOMEWORK

Name_____
Date_____ Pd.

. Describe the transformation given by rule $(x, y) \rightarrow (3x, 3y)$. Is it an "Isometry"? Why or why not?

Dilation

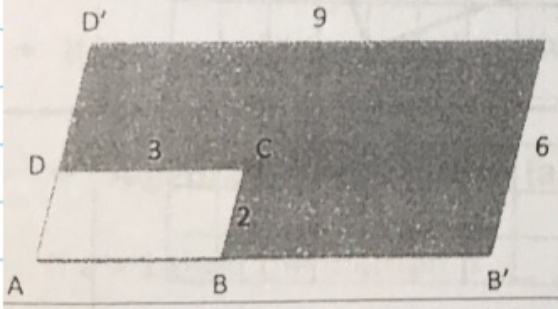
No

. Write an algebraic rule for the dilation:

A. by a factor of 3

B. by a factor of $\frac{1}{2}$. $(\frac{1}{2}x, \frac{1}{2}y)$

3. Find the scale factor of the dilation that maps ABCD to A'B'C'D'.

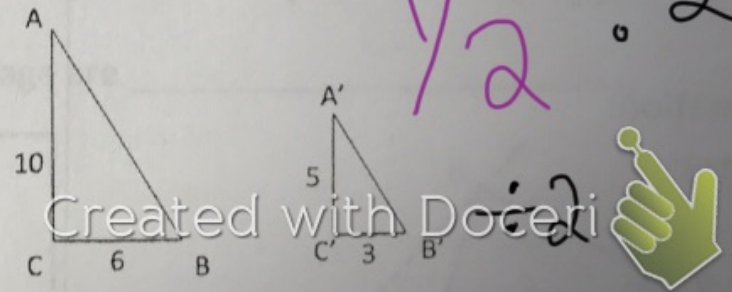


$3 \rightarrow 9$

$\frac{3x}{3} = \frac{9}{3}$

$x = 3$

4. Find the scale factor of the dilation that maps ABC to A'B'C'.



$\frac{1}{2}$ ÷ 2

÷ 2

Applications:

7. The package for a model airplane states the scale is $1\ cm : 63\ m$. The length of the model is $7.6\ cm$. What is the length of the actual airplane?

S → b ×63 $7.6 \times 63 =$ 478.8m

b → S ÷63

8. Another model airplane states the scale is $1\ in : 96\ ft$. The length of the real airplane is $432\ feet$. What is the length of the model?

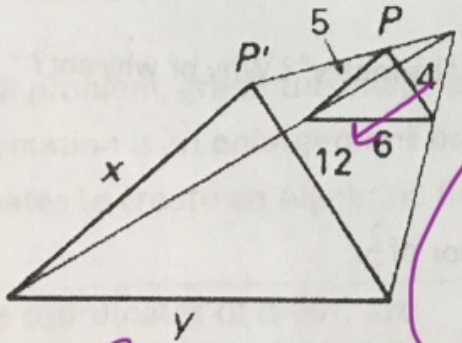
S → b ×96

4.5

b → S ÷96

Find the scale factor. Tell whether the dilation is an enlargement or a reduction. Then find the values of the variables.

9.



4 → 12

$\frac{4x}{4} = \frac{12}{4}$

$x = 3$

E

SF = 3

x = 15

y = 18

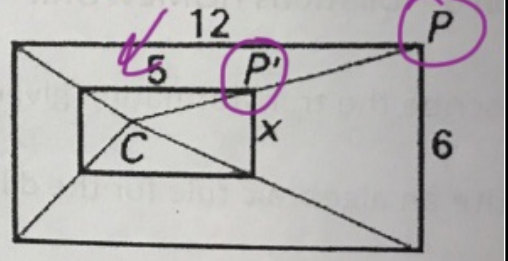
5 → x

6 → y

$5 \times 3 = 15$

$6 \times 3 = 18$

10.



6 → 5

SF = 5/12 / .416

x = 2.5

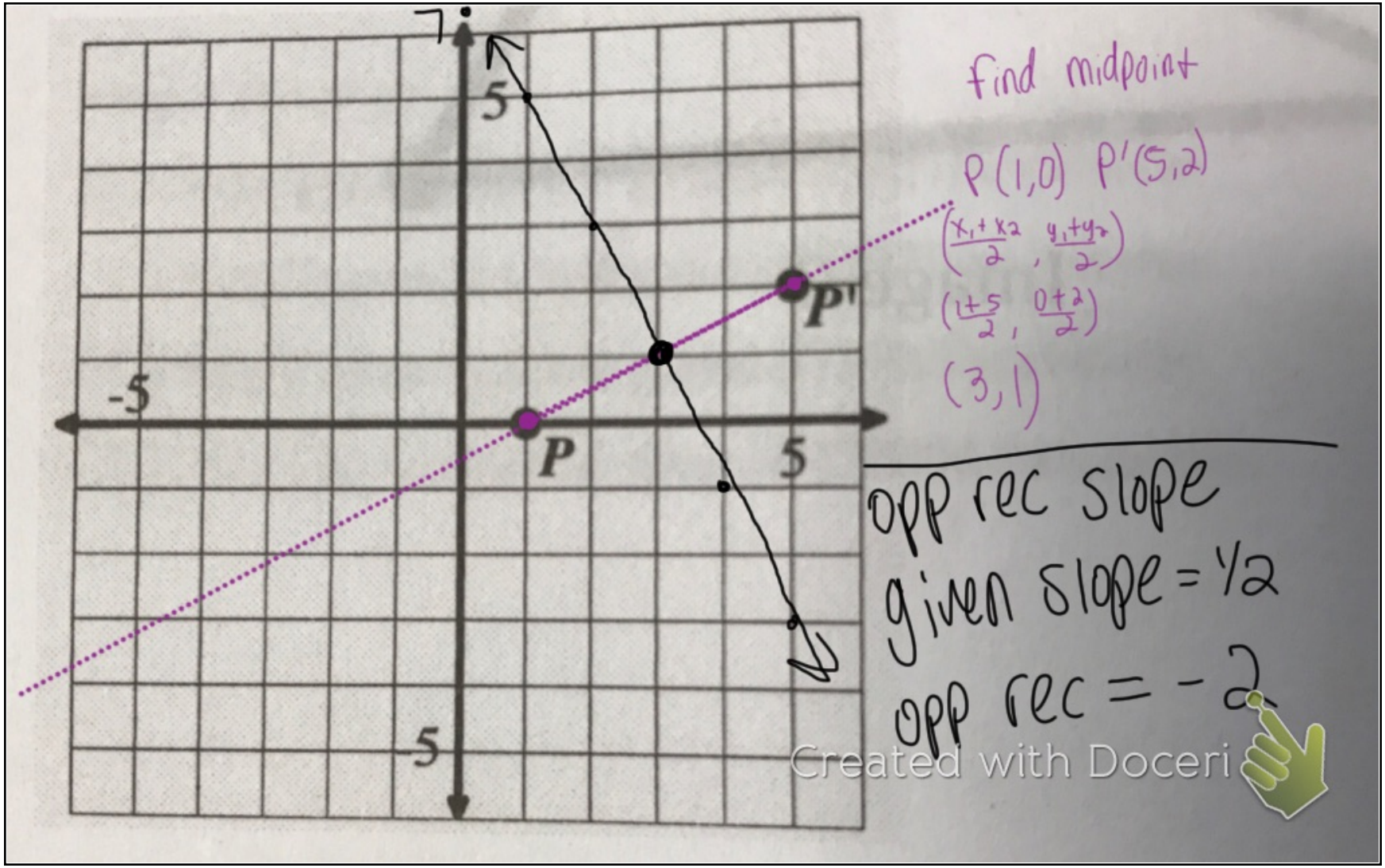
R

6 → x

$12 \rightarrow 5 \quad 6(5/12)$

$12x = 5$

$x = 5/12$


7
5
-5
5
5
P
P'
find midpoint
P(1,0) P'(5,2)
$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$
$\left(\frac{1+5}{2}, \frac{0+2}{2}\right)$
(3,1)
opp rec slope
given slope = 1/2
opp rec = -2
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$y = mx + b$

$y = -2x + b$

$y = -2x + 7$

Quiz