Module 7b: Dilations About the Origin

Math Practice(s):

-Make sense of problems & persevere in solving them.

-Use appropriate tools strategically.

Learning Target(s):

-Understand that dilations increase or decrease the size of a figure by a scale factor multiple.

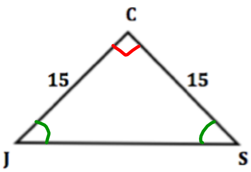
Homework:

HW#10: 7b #1-3

Warm-up

1. In each figure below, $\angle C$ is a right angle. Determine the length of the unknown side(s) in each of the right triangles below.

A.



Pythagorean Thm

Trig. Table (45-45-90)

$15^2 + 15^2 = JS^2$

$225 + 225 = JS^2$

$\sqrt{JS^2} = \sqrt{450}$

$\sqrt{225 \cdot 2}$

$\boxed{JS = 15\sqrt{2} \text{ units}}$

$\sin 45° = \frac{15}{JS}$

$\frac{1}{\sqrt{2}} = \frac{15}{JS}$

$\boxed{JS = 15\sqrt{2} \text{ units}}$

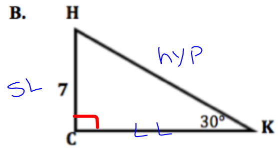
$5\sqrt{18}$

$5\sqrt{9} \cdot \sqrt{2}$

$5 \cdot 3 \cdot \sqrt{2}$

$15\sqrt{2}$

B.



Special Rt $\triangle$ relationships

Trig Ratios (sin & tan)

hyp = 2 SL LL = SL$\sqrt{3}$

HK = 2·7 CK = 7·$\sqrt{3}$

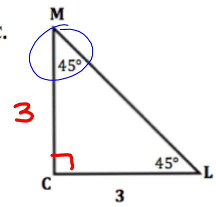
$\boxed{HK = 14 \text{ units}}$ $\boxed{CK = 7\sqrt{3} \text{ units}}$

$\sin 30 = \frac{7}{HK}$ $\tan 30° = \frac{7}{CK}$

$HK = \frac{7}{\sin 30°}$ $CK = \frac{7}{\tan 30°}$

$\boxed{HK = 14 \text{ units}}$ $\boxed{CK = 12.1 \text{ units}}$

C.



Trig. Table

Trig. Ratios

Pythagorean Thm

$\sin 45° = \frac{3}{ML}$ $\tan 45° = \frac{3}{MC}$

$\frac{\sqrt{2}}{2} = \frac{3}{ML}$ $\frac{1}{1} = \frac{3}{MC}$

$\frac{ML\cancel{\sqrt{2}}}{\cancel{\sqrt{2}}} = \frac{6}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$ $\boxed{MC = 3 \text{ units}}$

$ML = \frac{6\sqrt{2}}{2}$

$\boxed{ML = 3\sqrt{2} \text{ units}}$

$\sin 45° = \frac{3}{ML}$ $\tan 45° = \frac{3}{MC}$

$ML = \frac{3}{\sin 45°}$ $MC = \frac{3}{\tan 45°}$

$\boxed{ML = 4.2 \text{ units}}$ $\boxed{MC = 3 \text{ units}}$

$3^2 + 3^2 = ML^2$

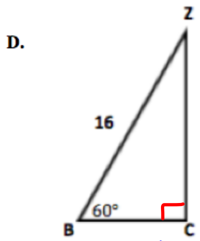
$9 + 9 = ML^2$

$\sqrt{ML^2} = \sqrt{18}$

$\sqrt{9 \cdot 2}$

$\boxed{ML = 3\sqrt{2} \text{ units}}$

D.



Trig Table

Trig Ratios

$\sin 60° = \frac{CZ}{16}$ $\cos 60° = \frac{BC}{16}$

$\frac{\sqrt{3}}{2} = \frac{CZ}{16}$ $\frac{1}{2} = \frac{BC}{16}$

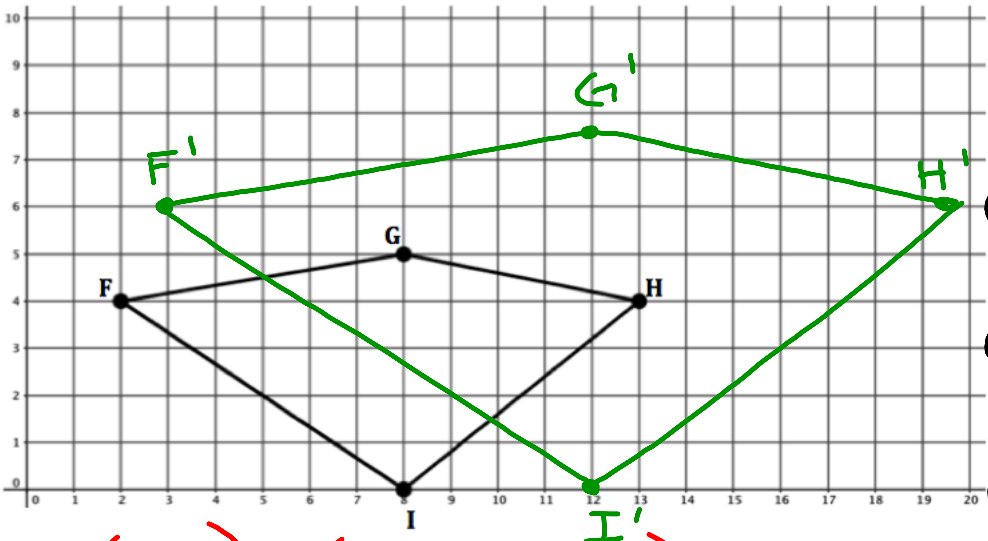
$\frac{\cancel{2} \cdot CZ}{\cancel{2}} = \frac{16\sqrt{3}}{2}$ $\frac{\cancel{2} \cdot BC}{\cancel{2}} = \frac{16}{2}$

$\boxed{CZ = 8\sqrt{3} \text{ units}}$ $\boxed{BC = 8 \text{ units}}$

$\sin 60° = \frac{CZ}{16}$ $\cos 60° = \frac{BC}{16}$

$\boxed{CZ = 13.9 \text{ units}}$ $\boxed{BC = 8 \text{ units}}$

Example 1: Draw the image of FGHI under a dilation about the origin with a scale factor of 1.5.

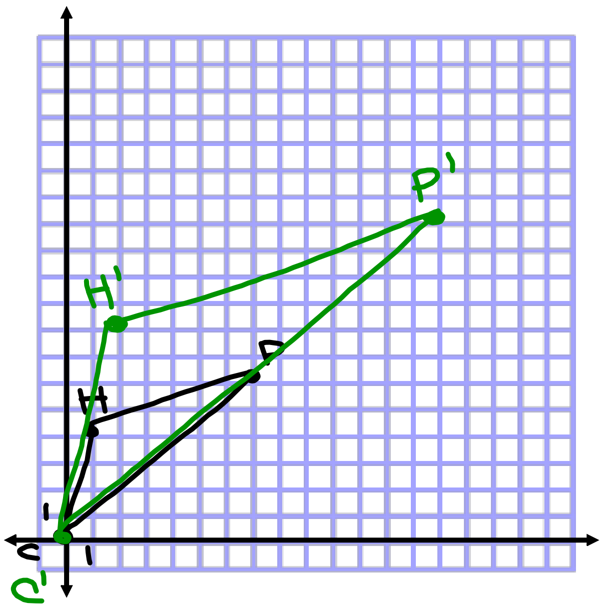


F (2,4)	F' (3,6)
G (8,5)	G' (12,7.5)
H (13,4)	H' (19.5,6)
I (8,0)	I' (12,0)

$D(x,y) = (1.5x, 1.5y)$

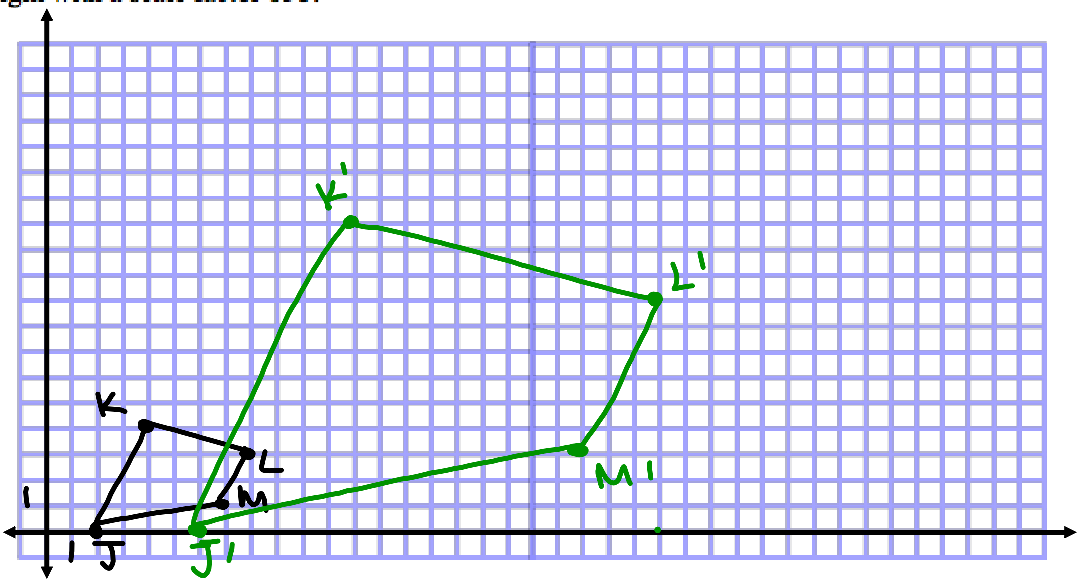
Example 2: ΔCHP has the following vertices: C (0, 0), H (1, 4), P (7, 6). Dilate ΔCHP about the origin with a scale factor of 2.

C'(0,0) H'(2,8) P'(14,12)



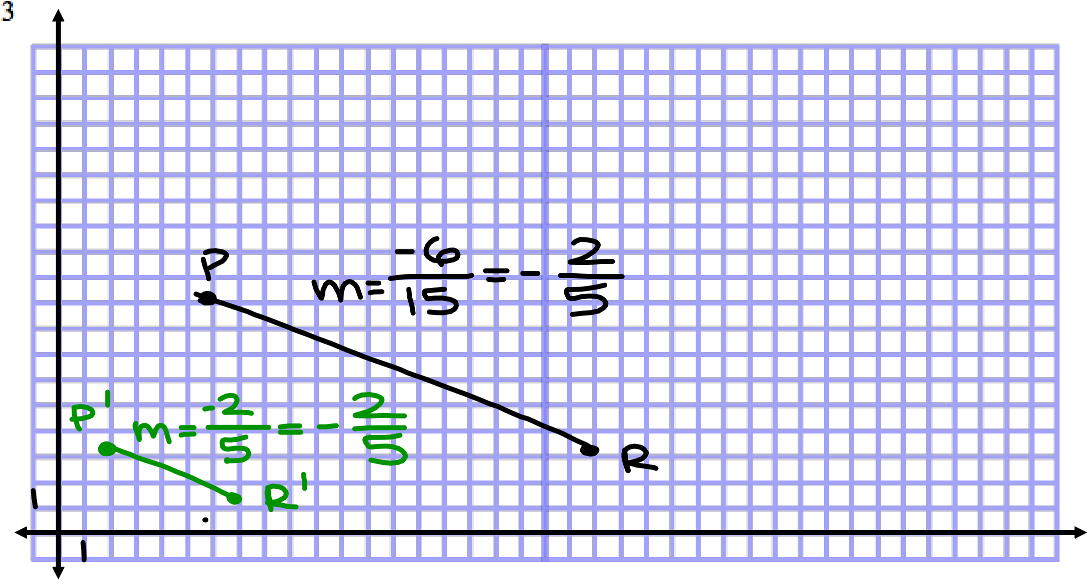
Example 3: Quadrilateral *JKLM* has the following vertices: J (2, 0), K (4, 4), L (8, 3), M (7, 1). Dilate *JKLM* about the origin with a scale factor of 3.

J'(6,0)
K' (12,12)
L'(24,9)
M'(21,3)



Example 4: $\overline{PR}$ has the following endpoints: P (6, 9), R (21, 3). Dilate $\overline{PR}$ about the origin with a scale factor of $\frac{1}{3}$.

P'(2,3)
R'(7,1)



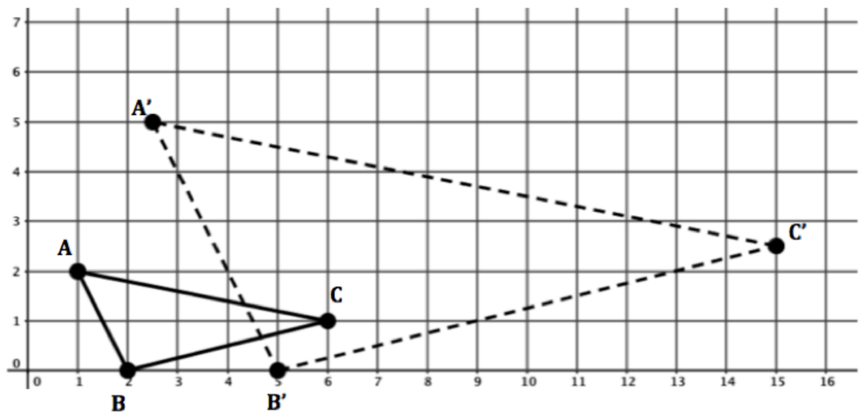
Example 5: In the coordinate plane below, ΔABC was dilated about the origin to create ΔA'B'C'. Determine the scale factor of the dilation about the origin of ΔA'B'C' from ΔABC.

A (1,2) A' (2.5,5)

B (2,0) B' (5,0)

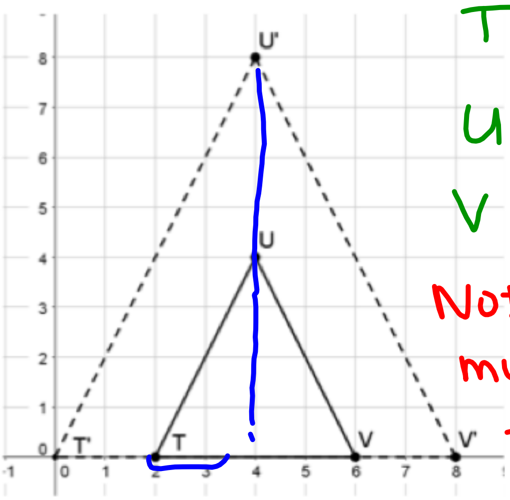
C (6,1) C' (15,2.5)

$\frac{5}{2} = 2.5$



Scale Factor = 2.5

Example 6: In the coordinate plane below, determine if ΔT'U'V' is a dilation about the origin of ΔTUV. If it is, write a statement about the dilation and its scale factor. If it is not, explain why.



T (2,0) T'(0,0)

U (4,4) U'(4,8) $\frac{8}{4} = 2$

V (6,0) V'(8,0) $\frac{4}{4} = 1$

Not a dilation, no constant multiple from pre-image to image.

* Dilation about (4,0) scale factor of 2.

Nov 27-11:13 AM