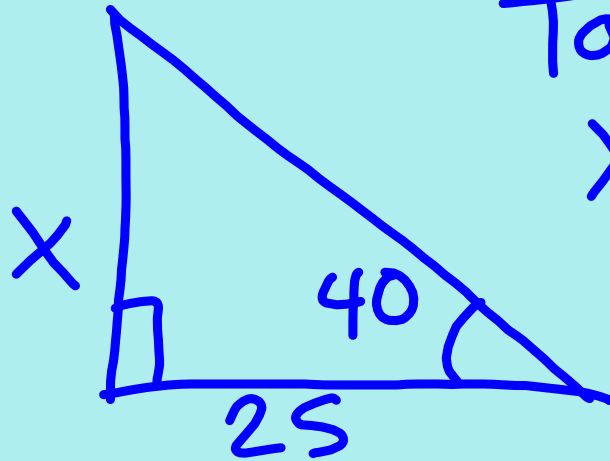# 3/2/20 - Warm Up Problem

You look up at a 40 degree angle of elevation to see your cat stuck in a tree. The tree is 25 feet away from you. How tall is the tree?
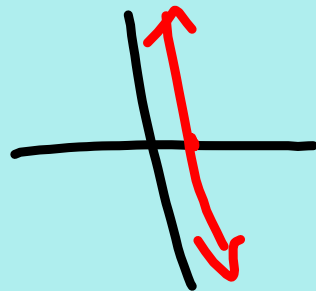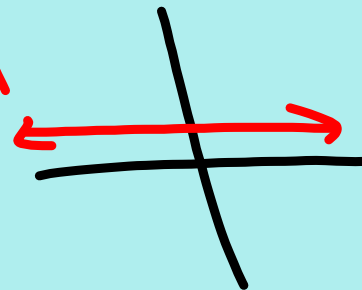
$$Tan(40) = \frac{X}{25}$$

$$X = 25 \cdot Tan(40)$$

$$X = 21 ft$$

$$X = 1$$
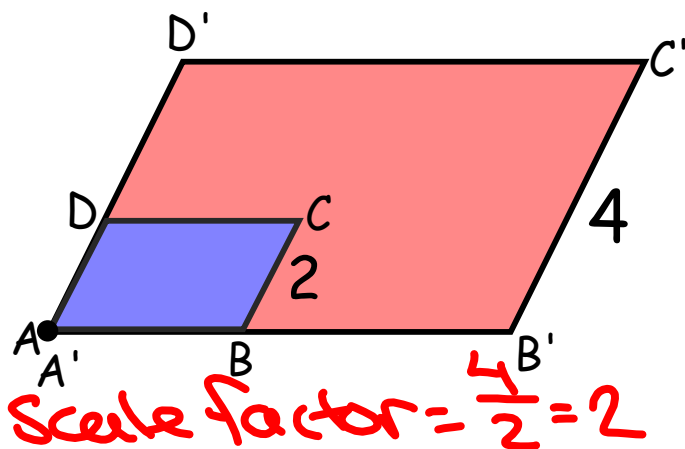
$$Y = 1$$

Concept 22 - Dilations

Goals: find scale factors of dilations and draw dilations

Dilation: a transformation that increases or decreases the size of a figure - NOT A RIGID MOTION

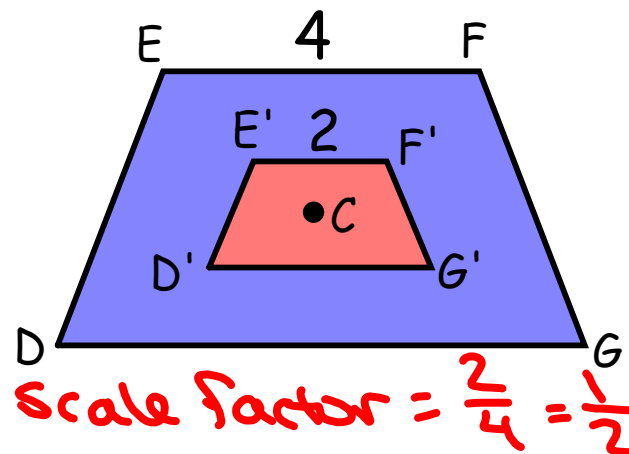$$\text{SCALE FACTOR} = \frac{\text{dilated measure}}{\text{original measure}}$$

ENLARGEMENT:
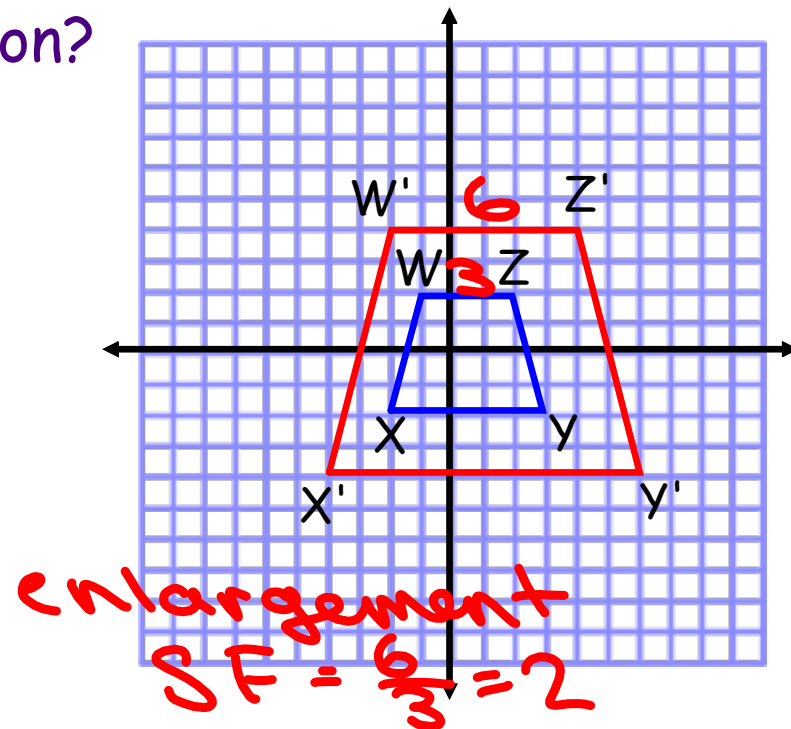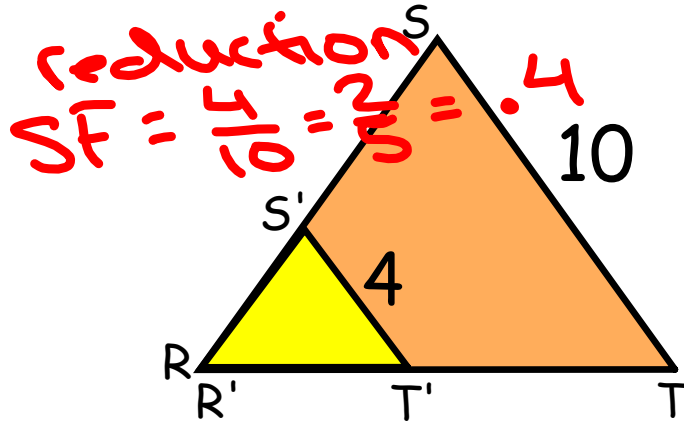
-increases in size

-scale factor is
 greater than 1

REDUCTION:

- decreases in size

-scale factor is
 between 0 and 1

Scale factor = $\frac{4}{2}$ = 2

Scale factor = $\frac{2}{4}$ = $\frac{1}{2}$

Find the scale factor of each dilation.

Is it an enlargement or reduction?

Scale Factor = $\dfrac{\text{dilated measure}}{\text{original measure}}$

reduction

$SF = \dfrac{4}{10} = \dfrac{2}{5} = .4$

10

4

S

S'

R

R'

T'

T

W' 6 Z'

W 3 Z

X y

X' Y'

enlargement

$SF = \dfrac{6}{3} = 2$

Function Notation for Dilations

$$D_{(n,C)}(A) = A'$$

means Point A has been dilated by scale factor **n** and center at **C**

2 ~~center~~
2 scale factor

Properties of Dilations

1) The center of the dilation (point C) does not move. (C = C')

2) For any other point R, the distance from the center = original distance multiplied by the scale factor.
(CR' = n ● CR)

3) Dilations do not change angle measures.
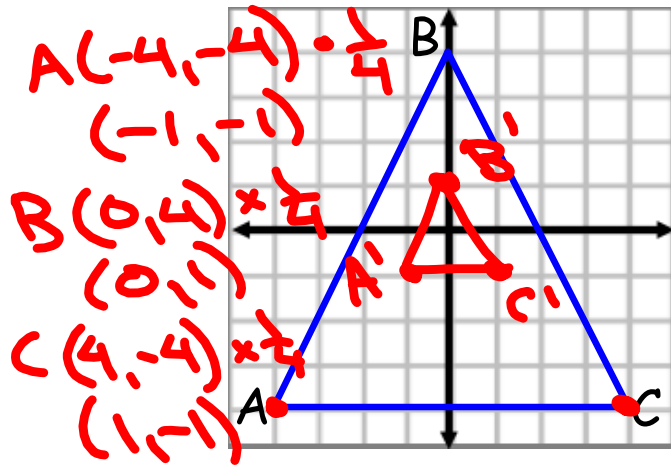

$CR' = n \cdot CR$
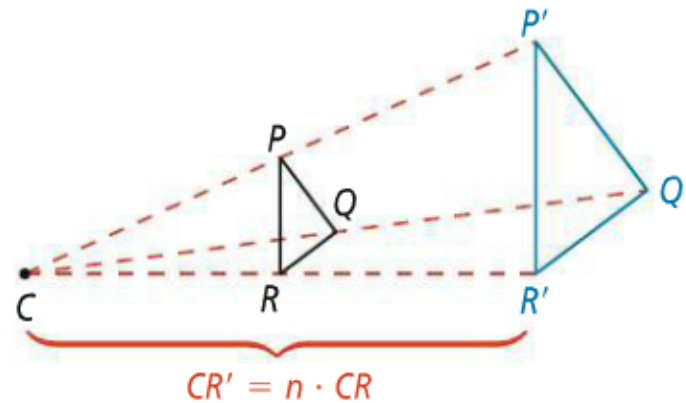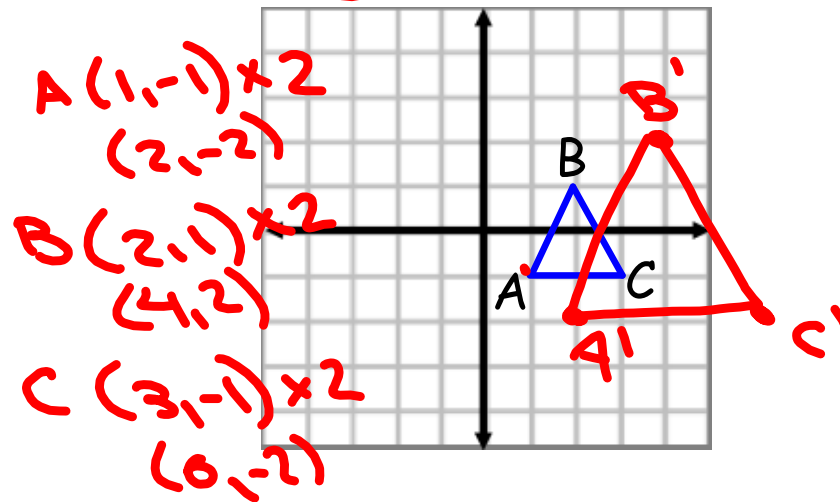
DILATIONS IN THE COORDINATE PLANE

- the origin is the center of the dilation in the coordinate plane

$D_{(n, 0)}(x,y) \rightarrow (nx, ny)$ ✱ multiply each point by the scale factor
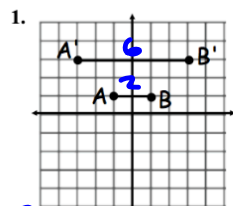
$D_{(1/4, 0)}(\triangle ABC)$

$A(-4,-4) \cdot \frac{1}{4}$
$(-1,-1)$
$B(0,4) \times \frac{1}{4}$
$(0,1)$
$C(4,-4) \times \frac{1}{4}$
$(1,-1)$

$D_{(2, 0)}(\triangle ABC)$
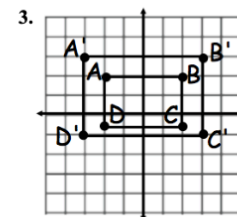
$A(1,-1) \times 2$
$(2,-2)$
$B(2,1) \times 2$
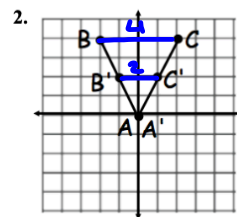$(4,2)$
$C(3,-1) \times 2$
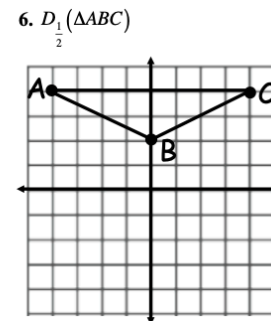$(0,-2)$

Assignment:

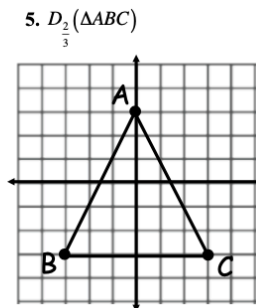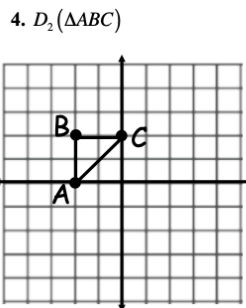Concept 22 Worksheet (front)

Determine whether the dilation is an enlargement or a reduction. Then, find its scale factor.

1.

2.

3.

enlargement

$SF = \frac{6}{2} = 3$

Draw the image of each figure according to the given rule.

4. $D_2(\triangle ABC)$

5. $D_{\frac{2}{3}}(\triangle ABC)$

6. $D_{\frac{1}{2}}(\triangle ABC)$

$\triangle ABC$ has vertices $A(-2, 2)$, $B(2, 0)$, and $C(1, -2)$. Draw the image formed by each composition of transformations.

7. $(R_{y\text{-axis}} \circ D_2)(\triangle ABC)$

8. $(T_{<2,-2>} \circ D_{0.5})(\triangle ABC)$

9. $(r_{(90°, o)} \circ D_{1.5})(\triangle ABC)$

$A(2,2) \times 2 = (-4,4)$

$B(2,0) \times 2 = (4,0)$

$C(1,-2) \times 2 = (2,-4)$