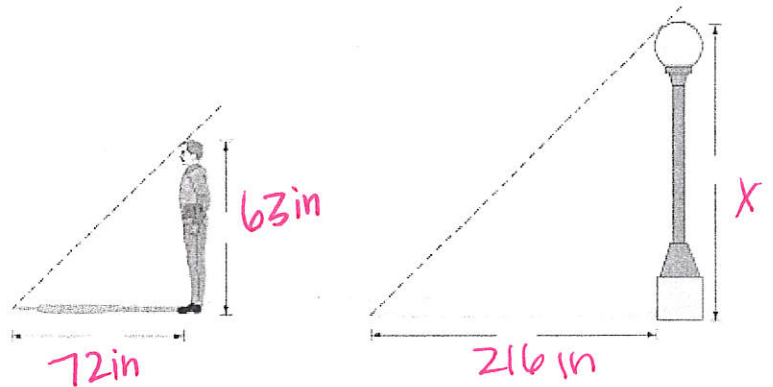


### Unit 10 Similarity Review: Transformations, Dilations, and Rotations

1. A person 63 inches tall casts a 72 inch shadow. At the same time of day, a lamppost casts a 216 inch shadow. What is the height of the lamppost?

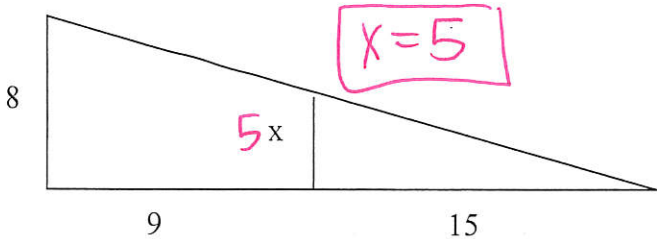
$$\frac{63}{72} = \frac{x}{216}$$

$$109 \text{ in}$$

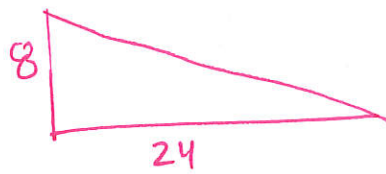


2. These triangles are similar. Solve for x

$$\frac{8}{24} = \frac{x}{15}$$



$$x = 5$$



Solve the following proportions

3.  $\frac{3}{x-4} = \frac{7}{x+4}$

$$7(x-4) = 3(x+4)$$

$$7x - 28 = 3x + 12$$

$$4x = 40$$

$$x = 10$$

4.  $\frac{6x}{24} = \frac{27}{9}$

$$54x = 648$$

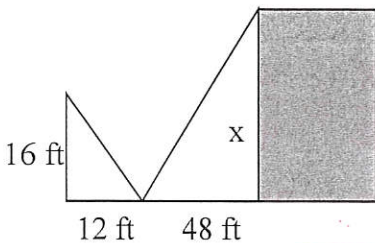
$$x = 12$$

5.  $\frac{20}{10} = \frac{18}{x}$

$$20x = 180$$

$$x = 9$$

6. Use the triangles to find the height of the building



$$\frac{16}{12} = \frac{x}{48}$$

$$x = 64 \text{ ft}$$

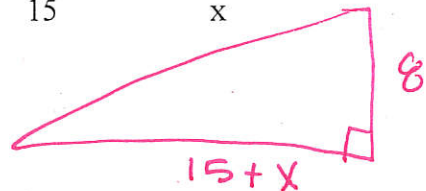
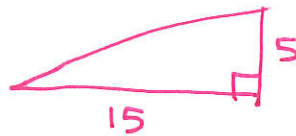
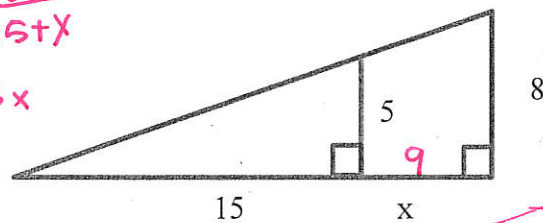
7. Find x in the figure below.

$$\frac{5}{15} = \frac{8}{15+x}$$

$$120 = 75 + 5x$$

$$45 = 5x$$

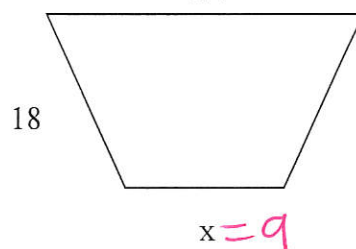
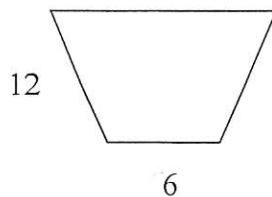
$$x = 9$$



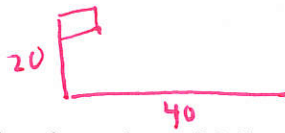
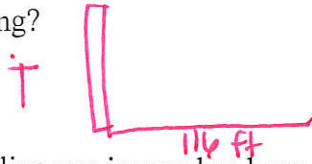
8. The following quadrilaterals are similar find x.

$$\frac{12}{6} = \frac{18}{x}$$

$$x = 9$$



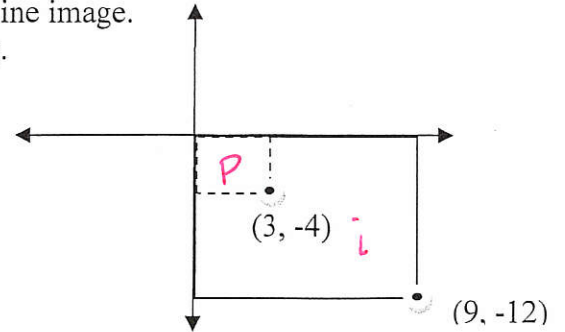
9. A building casts a shadow of 116 feet. A 20 foot flag pole near the building casts a shadow of 40 feet. How tall is the building?



$$\frac{T}{116} = \frac{20}{40}$$

$$T = 58 \text{ ft}$$

10. The dashed-line pre-image has been transformed to form the solid-line image. What is the scale factor of the dilation? Explain your reasoning.



$$K = \frac{i}{p} = \frac{9}{3} = 3$$

or  $\frac{-12}{-4} = 3$

$$K = 3$$

11. Find the scale factor of dilation given  $B(6, 10)$ ,  $B'(9, 15)$ .

$$K = \frac{i}{p} \quad \frac{9}{6} \text{ or } \frac{15}{10} = \frac{3}{2}$$

$$K = \frac{3}{2} \text{ or } 1.5$$

12. Find the image of  $Q(4, 9)$  after it is transformed by the dilation  $k = 3$

$$4 \times 3 = 12 \quad 9 \times 3 = 27 \quad Q'(12, 27)$$

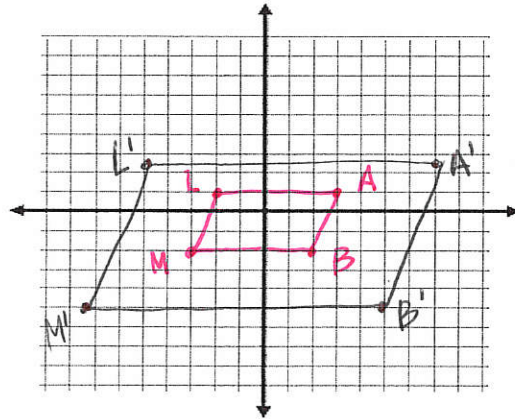
13. The Quadrilateral LAMB has vertices  $(-2, 1)$ ,  $(3, 1)$ ,  $(-3, -2)$ ,  $(2, -2)$ . Draw a dilation with a scale factor of 2.5 and a center at  $(0, 0)$

$$L'(-5, 2.5)$$

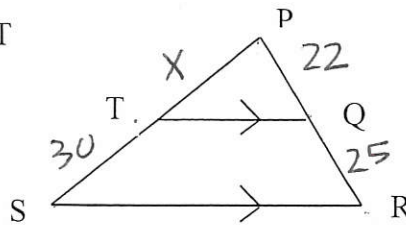
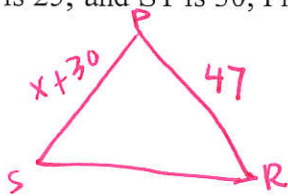
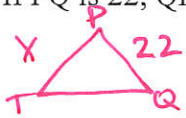
$$A'(7.5, 2.5)$$

$$M'(-7.5, -5)$$

$$B'(5, -5)$$



14. If PQ is 22, QR is 25, and ST is 30, Find PT



$$\frac{X}{22} = \frac{X+30}{47}$$

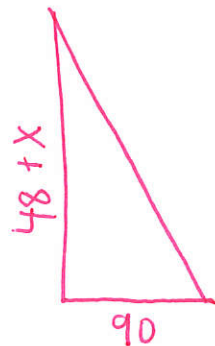
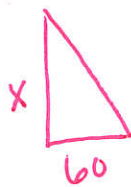
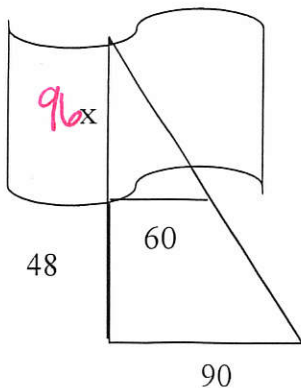
$$47X = 22(X+30)$$

$$47X = 22X + 660$$

$$25X = 660$$

$$X = 26.4$$

15. Find the width of the river.



$$\frac{X}{60} = \frac{48+X}{90}$$

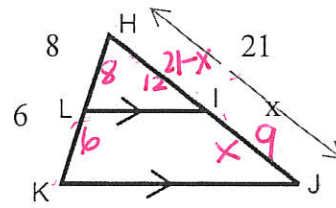
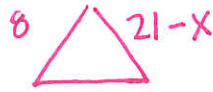
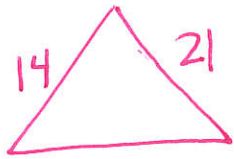
$$90X = 60(48+X)$$

$$90X = 2880 + 60X$$

$$\frac{30X}{30} = \frac{2880}{30}$$

$$X = 96$$

16. Given the following figure, find the value of x.



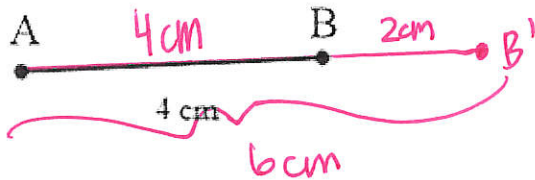
$$\frac{14}{8} = \frac{21}{21-x}$$

$$168 = 294 - 14x$$

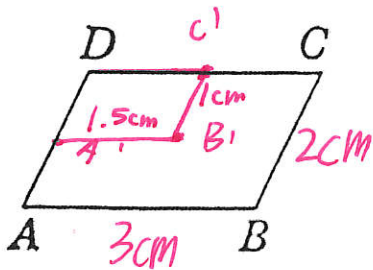
$$-126 = -14x$$

$$\boxed{x=9}$$

17. Given the segment below AB draw the dilation AB' with the center of dilation A and the scale factor of 1.5. Then state the length of AB'.



18. For the given shape, draw a dilation centered at D with a scale factor of  $\frac{1}{2}$ .

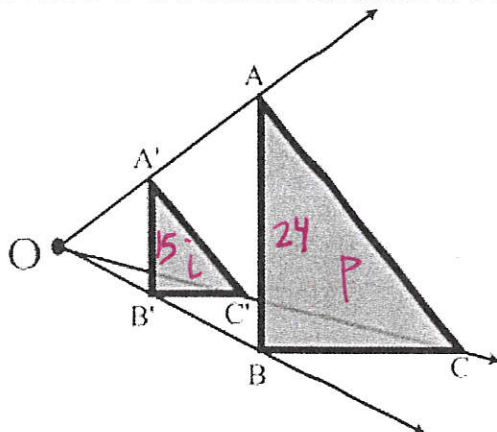


19. In the parallelogram ABCD from above, what are the dimensions, in centimeters, of the original figure and what are the dimensions of the dilated figure?

Original Figure: 3 x 2

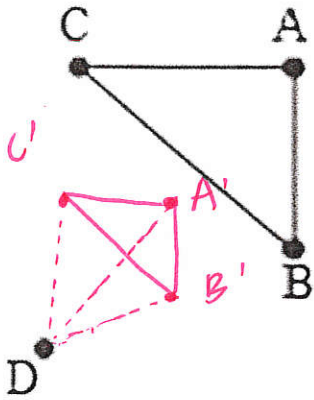
Dilated Figure: 1.5 x 1

20.  $\Delta A'B'C'$  is a dilation of  $\Delta ABC$ . If O is the center of dilation, what is the scale factor?  $AB = 24$  and  $A'B' = 15$ .

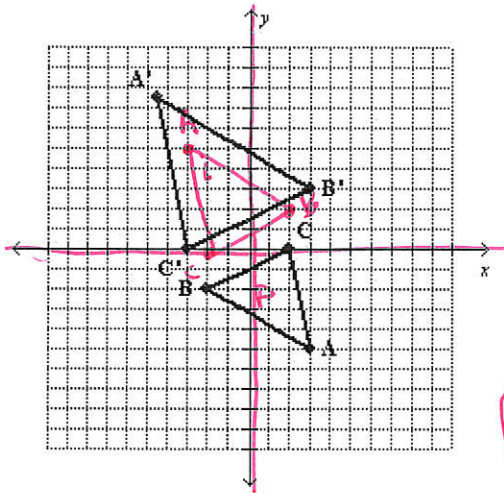


$$K = \frac{i}{p} = \frac{15}{24} = \frac{5}{8} = .625 = K$$

21. Dilate  $\triangle ABC$  with the given Center D and a scale factor of  $\frac{1}{2}$ .



22. For the graph, describe the composition of transformations that map  $\triangle ABC$  onto  $\triangle A'B'C'$ .



Rotate  $180^\circ$

$A'(-3, 5)$   
 $B'(2, 2)$   
 $C'(-2, 0)$

original

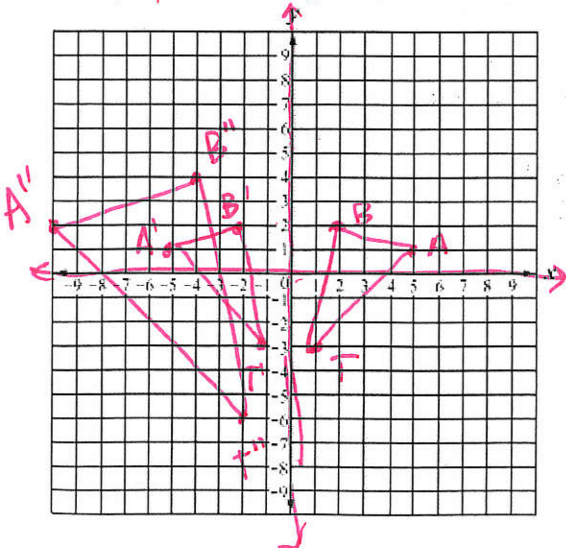
$A(3, -5)$   
 $B(-2, -2)$   
 $C(2, 0)$

Dilation  $i: B''(3, 3)$   
 $p: B'(2, 2)$   
 $k = \frac{i}{p} = \frac{3}{2}$

Rotate  $180^\circ$ , dilate w/  $k = \frac{3}{2}$

23.  $\triangle BAT$  has vertices  $B(2, 2)$ ,  $A(5, 1)$  and  $T(1, -3)$ . Sketch the image and list the new vertices of  $B'$ ,  $A'$ , and  $T'$  after it has been reflected across the y-axis and dilated by a scale factor of 2. Give the new coordinates.

$B''(-4, 4)$ ,  $A''(-10, 2)$  and  $T''(-2, -6)$



Reflection

$A'(-5, 1)$   
 $B'(-2, 2)$   
 $T'(-1, -3)$

Dilation

$A''(-10, 2)$   
 $B''(-4, 4)$   
 $T''(-2, -6)$