Unit K Review: Similarity
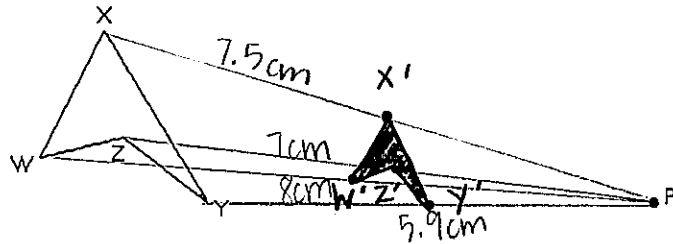
1. Draw the image of WXYZ under a size
    change of with center P, magnitude $\frac{1}{2}$.

    1)

$7.5cm \cdot \frac{1}{2} = 3.75$

$7cm \cdot \frac{1}{2} = 3.5$

$8cm \cdot \frac{1}{2} = 4$

$5.9cm \; \frac{1}{2} = 2.95$
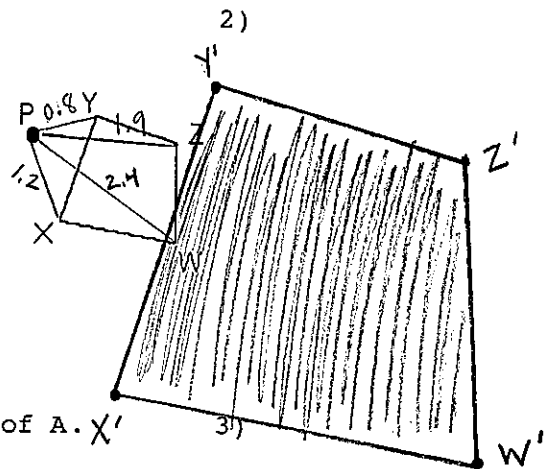

2. Draw the image of XYZW under a size
    change with center P and magnitude 3.

    2)

$0.8cm \times 3 = 2.4$

$1.9cm \times 3 = 5.7$

$2.4cm \times 3 = 7.2$
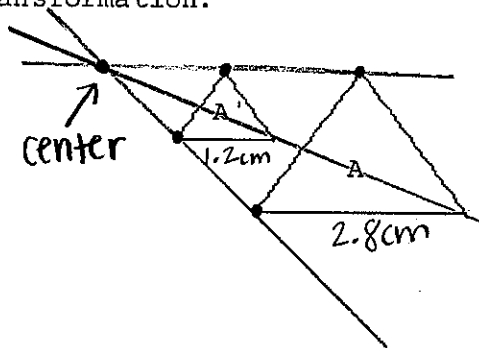
$1.2cm \times 3 = 3.6$

3. For the figures below, A' is the image of A.
    a. Determine the center for
       the size transformation.

    b. Determine the scale-factor, k,
       for the size transformation.

    b) ≈ 0.43

$\downarrow$

$\dfrac{new}{old} = \dfrac{1.2}{2.8}$

$\approx .43$

center

4. △BCD ~ △ACE. If CD = 6, BD = 7, and AE = 10, find CE to the nearest tenth.

4) $\underline{CE = 8.57}$

$$\frac{7}{10} \nearrow\!\!\!\!\times \frac{6}{x}$$

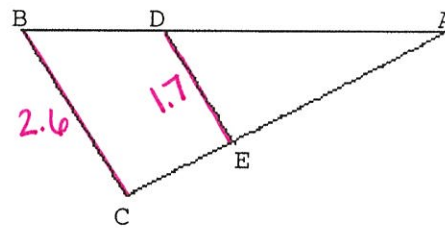$10 \cdot 6 \div 7 = 8.57$

A B C
10
7
6
D
}?
E
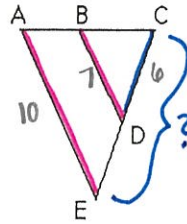
5. Let S be the size change such that $S_k(\triangle ABC) = \triangle ADE$. shrink
   start   end

   a. Is this size change an expansion or a contraction?

   b. What is the value of k in this size change?

5)
a) $\underline{\text{contraction}}$
b) $\underline{k \approx 0.65}$

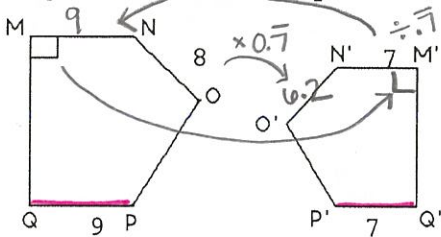↳ $k = \dfrac{new}{old}$ *no #'s, so measure your own!

$\dfrac{1.7}{2.6} \approx 0.65$

B D A
2.6   1.7
E
C
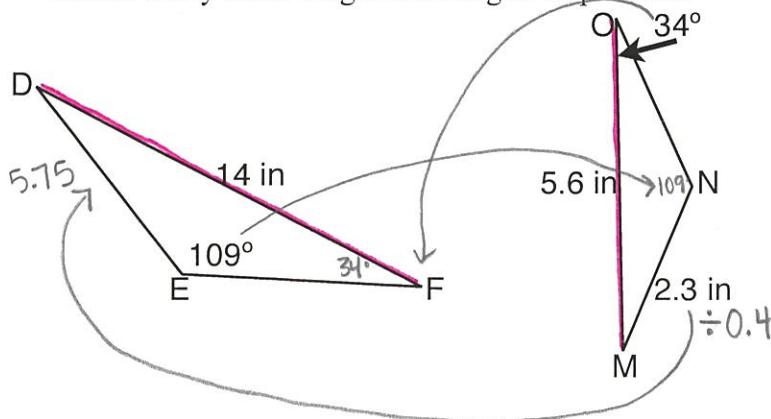
6. MNOPQ ~ M'N'O'P'Q', with sides and angle measures as indicated below. Find as many missing lengths and angle measures as possible.

M 9 N
8   ×0.7   N' 7 M' ÷.7
O   6.2
O'
Q 9 P   P' 7 Q'

$k = \dfrac{new}{old} = \dfrac{7}{9} = .\overline{7}$

6) MN = 9
N'O' = 6.2
∠M' = 90°

7. ΔDEF ~ ΔMNO with angle measures and sides as indicated. Find as many other lengths and angles as possible.

D
5.75   14 in
109°   34°
E   F

O 34°
5.6 in →109° N
2.3 in ÷0.4
M

$k = \dfrac{new}{old} = \dfrac{5.6}{14} = 0.4$

DE = 5.75, ∠N = 109°,
& ∠F = 34°

8. **Multiple Choice.** Size changes do **not** preserve...   7) ___D___

   A. collinearity.   C. angle measure.

   B. betweenness.   (D.) volume.

9. A painting is 24 inches wide and 33 inches high. A reproduction,   9) __26.1"__
which is similar to the original, is 19 inches wide. How high
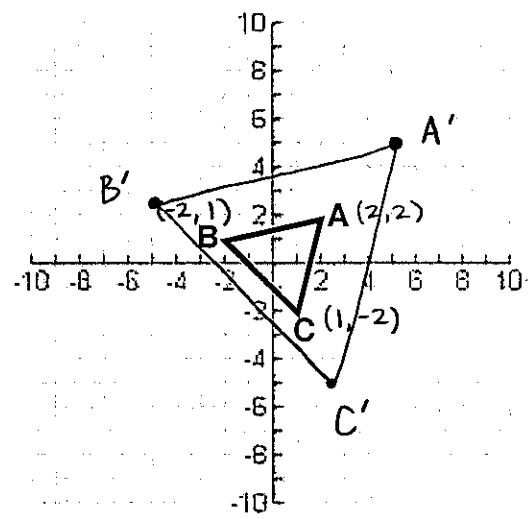is the reproduction?

$$\frac{24}{33} \diagdown \frac{19}{x}$$

$$x = 26.13''$$
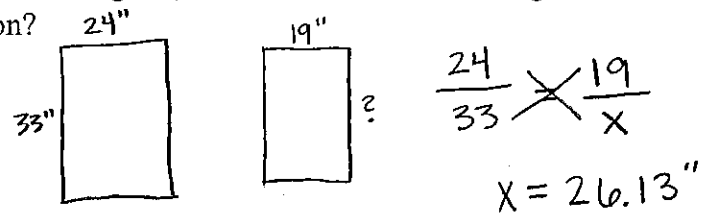
10. George Costanza paid \$23.68 for 8 gallons of gasoline. How   10) __\$74.00__
much would she have to pay for a whole tankful if her tank holds
25 gallons?

$$\frac{23.68}{8} = \$2.96 \cdot 25$$

11. a. On the coordinate axes to the right, graph
the image of $\triangle ABC$ under $S_{2.5}$ and give
the coordinates of the new vertices.

A' = $(5, 5)$

B' = $(-5, 2.5)$

C' = $(2.5, -5)$

b. What is $S_{0.25}(C)$? $(0.25, -0.5)$

$(1, -2)$
$\times 0.25 \ \times 0.25$

12. A photo measures 5" by 7". If the shorter dimension of   12) __14"__
a similar photo is 10", what is the longer dimension?

$$\frac{5}{7} \diagdown \frac{10}{x}$$

$$x = 14''$$
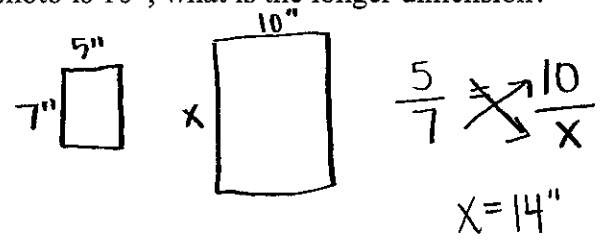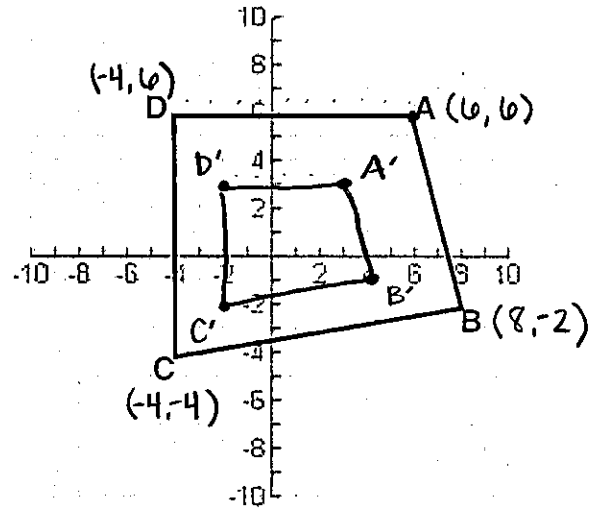
13. a. On the coordinate axes to the right, graph
     the image of ABCD under $S_{0.5}$ and give
     the coordinates of the new vertices.

     A' = $(3, 3)$ B' = $(4, -1)$

     C' = $(-2, -2)$ D' = $(-2, 3)$

     b. Show that the distance between A and D
        is half of the distance between A' and D'.

     $AD = 10$, $A'D' = 5$

     5 is half of 10.

14. If $\frac{a}{b} \cancel{\times} \frac{c}{d}$, find c.

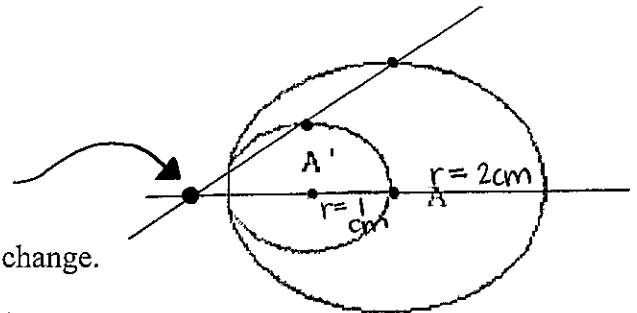 $\frac{a \cdot d}{b}$

     14) $\frac{ad}{b}$

15. **True or False.** A size change does not preserve
     angle measure.

     15) False

16. For the figures below, A' is the image of A.

     a. Determine the center for the size change.

     b. Determine the scale factor, k, for the size change.

     $k = 0.5$ $\frac{new}{old} = \frac{1}{2}$

     r = 2cm, r = 1cm

17. Let S be the size change such that $S_k(\triangle DEC) = \triangle ABC$.
            start   end

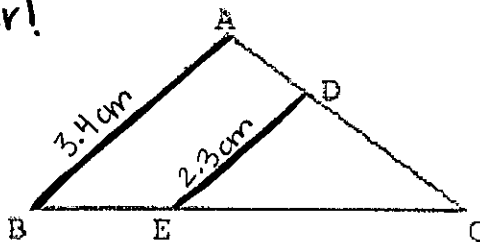   a. Is this size change an expansion or a contraction?   17a) expansion

     b. What is the value of k in this size change?   b) ≈ 1.48

     no #'s - use a ruler!

     $k = \frac{new}{old} = \frac{3.4}{2.3}$

     $= 1.48$

     3.4cm   2.3cm

18. An octagon has area 225 in² and longest side 16 in.
A similar octagon has longest side 8 in. What is the
area of the similar octagon?

18) ___56.25 in^2___

$$\frac{\text{new side}}{\text{old side}} = \frac{8}{16} = 0.5 \xrightarrow{K} \overset{K^2}{(0.5)^2} = .25 \overset{K^2}{\cdot} \overset{\text{old area}}{225} = \diagup$$

19. Two figures are similar and the ratio of their areas is
4:1. What is the ratio of the corresponding sides?

19) ___$2:1$___

$$\frac{\text{new area}}{\text{old area}} = \frac{4}{1} = \overset{K^2}{4} \xrightarrow{} \overset{K}{\sqrt{4}} = 2 \diagup$$

20. It takes 1 yd² of fabric to make a teddy bear 16 inches tall.
How much fabric would it take to make a similar teddy bear
24 inches tall?

20) ___2.25 yd^2___

$$\frac{\text{new side}}{\text{old side}} = \frac{24}{16} = \overset{K}{1.5} \xrightarrow{} \overset{K^2}{(1.5)^2} = 2.25 \overset{K^2}{\cdot} \overset{\text{old fabric}}{1 \text{ yd}^2}$$

21. A trophy 12" tall weights 13 ounces. How much would
a similar trophy 10" tall weigh?

21) ___7.5 oz___

$$\frac{\text{new side}}{\text{old side}} = \frac{10}{12} = \overset{K}{.83} \xrightarrow{} \overset{K^3}{(.83)^3} = .579 \overset{K^3}{\cdot} \overset{\text{old weight}}{13 \text{ oz}}$$

22. A hexagon has an area 90 in2 and shortest side length 5 in.
A similar hexagon has shortest side of length 4 in. What is
the area of the similar hexagon?

22) ___57.6 in^2___

$$\frac{\text{new side}}{\text{old side}} = \frac{4}{5} = \overset{K}{0.8} \xrightarrow{} \overset{K^2}{(0.8)^2} = .64 \overset{K^2}{\cdot} \overset{\text{old area}}{90}$$

23. If a 12-inch pizza costs $9.50, at the same cost per square inch,
what should a 14-inch pizza of the same thickness with the same
ingredients cost?

23) ___$12.93___

$$\frac{\text{new side}}{\text{old side}} = \frac{14}{12} = \overset{K}{1.16} \xrightarrow{} \overset{K^2}{(1.16)^2} = 1.36 \overset{K^2}{\cdot} \overset{\text{old cost}}{\$9.50}$$