Geometry (A)
Unit 4 Review

Name : Key
Date : _____ Period : _____

Solve the following proportions :

1. $\frac{11}{26} = \frac{x}{15}$

$26x = 165$

$x = 6.3$

2. $\frac{5}{x-1} = \frac{7}{x}$

$5x = 7(x-1)$

$5x = 7x - 7$

$-2x = -7 \Rightarrow$ $x = 7/2$

3. $\frac{3}{2x} = \frac{7}{5}$

$14x = 15$

$x = 15/14$

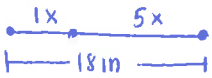
4. The official width-to-length ratio of the United States flag is 1 : 1.9. If a United States flag is 9.5 feet long, how wide should it be?

$\frac{\text{width}}{\text{length}} : \frac{1}{1.9} = \frac{x}{9.5} \Rightarrow$ $1.9x = 9.5$

$x = 5$

$\Rightarrow$ The flag should be 5 ft wide

5. A board that is 18 inches long is cut into two pieces in the ratio 1 : 5. Find the length of each piece.



$x + 5x = 18$

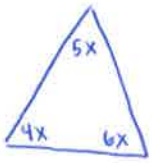
$6x = 18$

$x = 3$

Lengths: $1(3) = 3$ in

$5(3) = 15$ in

6. The measures of the angles of a triangle are in the extended ratio of 4: 5: 6. Find the measures of the angles in the triangle.



$4x + 5x + 6x = 180$

$15x = 180$

$x = 12$

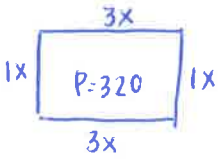
Angles: $4(12) = 48°$

$5(12) = 60°$

$6(12) = 72°$

7. A rectangular region of land has a perimeter of 320 feet and the ratio of its length to width is 3 : 1. Find the length and the width of the region of land.

3x : 1x



$3x + 1x + 3x + 1x = 320$

$8x = 320$

$x = 40$

Length = $3(40) = 120$ ft

Width = $1(40) = 40$ ft

8. A map has a scale of 0.5 inch : 10 miles. If the actual distance between the two cities is 340 miles, how far apart are they on the map?

$\frac{0.5 \text{ in}}{10 \text{ mi}} = \frac{x}{340 \text{ mi}} \Rightarrow$ $10x = 170$

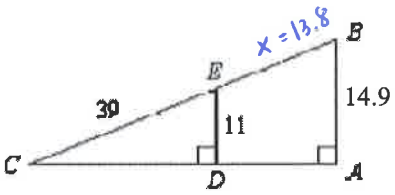
$x = 17$

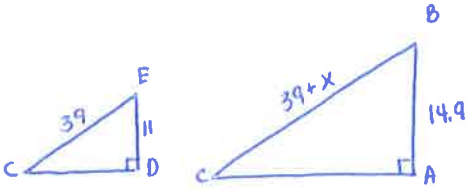
They are 17 in apart on the map

9. If two polygons are similar, then the corresponding angles must be congruent.

10. If two polygons are similar, then the corresponding sides must be proportional.

11. Given that $\frac{ED}{BA} = \frac{EC}{BC}$, find BC to the nearest tenth.





$\frac{39}{39+X} = \frac{11}{14.9} \Rightarrow$ $581.1 = 11(39+X)$

$581.1 = 429 + 11X$

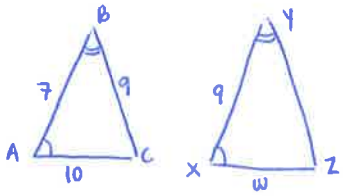
$152.1 = 11X$

$X = 13.8$

$BC = 39 + 13.8$

$BC = 52.8$

12. $\triangle ABC \sim \triangle XYZ$ with $\angle A \cong \angle X$ and $\angle B \cong \angle Y$. If AB = 7 inches, BC = 9 inches, and AC = 10 inches and XY = 9 inches, find XZ.

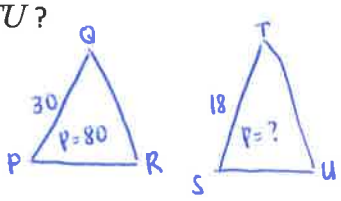


$\frac{AB}{XY} = \frac{AC}{XZ} \Rightarrow \frac{7}{9} = \frac{10}{w}$

$7w = 90$

$w = 12.9 \Rightarrow$ XZ = 12.9 in

13. The perimeter of ΔPQR is 80, PQ = 30 and ST = 18. If $\Delta PQR \sim \Delta STU$, what is the perimeter of ΔSTU?



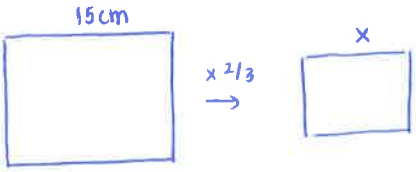
$\frac{\Delta PQR}{\Delta STU} = \frac{30}{18} = \frac{80}{X} \Rightarrow$ $30X = 1440$

$X = 48$

(corresp. sides; perimeters)

The perimeter of ΔSTU is 48 units

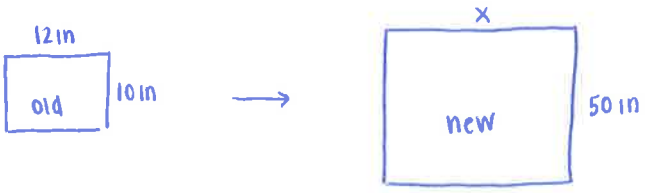
14. A rectangle has length 15 centimeters. Another rectangle is drawn using a scale factor of $\frac{2}{3}$. What is the length of the second triangle?



$15\left(\frac{2}{3}\right) = 10$

The length of the second rectangle is 10 cm

15. A photo needs to be enlarged from an original with a length of 12 inches and a width of 10 inches to a size where the new width is 50 inches. What is the new length? What is the scale factor?



scale factor : $\frac{\text{new}}{\text{old}} = \frac{50}{10} = \frac{5}{1}$

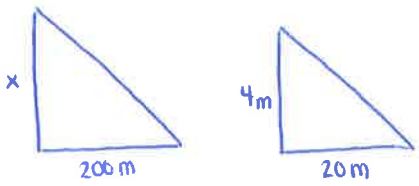
$\frac{12}{X} = \frac{10}{50}$

$10X = 600$

$X = 60$

The length of the new picture should be 60 in with a scale factor of 5:1 or $\frac{5}{1}$

16. A building casts a shadow 200 meters long. At the same time, a pole 4 meters high casts a shadow 20 meters long. What is the height of the building?



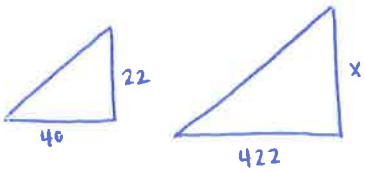
$\frac{x}{4} = \frac{200}{20}$

$20x = 800$

$x = 40$

The building is 40 m tall

17. Melody wants to find the height of the tallest building in the city. She stands 422 feet away from the building. There is a tree 40 feet in front of her, which she knows is 22 feet tall. How tall is the building to the nearest foot?

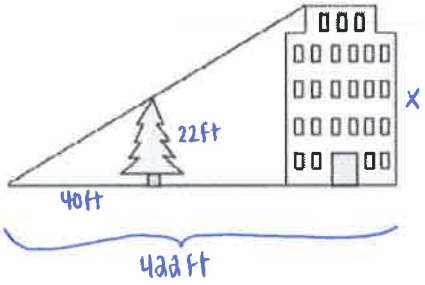


$\frac{22}{x} = \frac{40}{422}$

$40x = 9284$

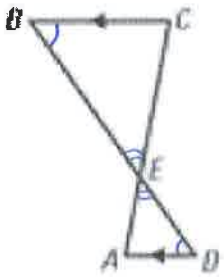
$x = 232.1$

The building is 232.1 ft tall



Determine whether the triangles are similar. If they are, give a reason why and write a similarity statement.

18.



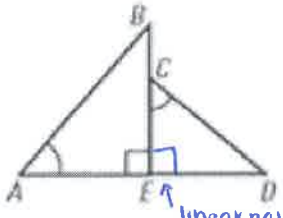
$\angle B \cong \angle D$ OR $\angle C \cong \angle A$ by alt. int. angles

and

$\angle BEC \cong \angle DEA$ by vertical angles

So $\triangle BEC \sim \triangle DEA$ by AA~

19.

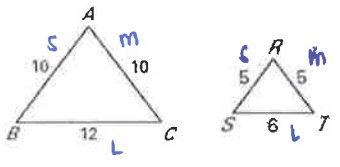


linear pair so $m\angle CED = 90°$

Since $\angle A \cong \angle C$ and $\angle BEA \cong \angle CED$,

$\triangle BEA \sim \triangle DEC$ by AA~

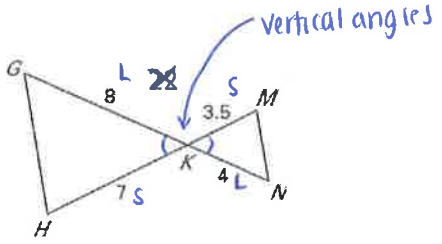
20.



$\frac{\triangle ABC}{\triangle SRT}$: $\frac{10}{5}, \frac{10}{5}, \frac{12}{6}$

$\frac{2}{1}, \frac{2}{1}, \frac{2}{1}$ $\Rightarrow$ $\triangle ABC \sim \triangle SRT$ by SSS~

21.



$\frac{\triangle GKH}{\triangle NKM}$: $\frac{7}{3.5}, \frac{8}{4}$ $\Rightarrow$

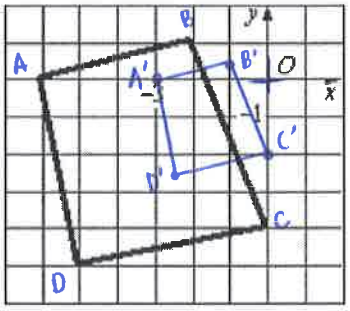
$\frac{2}{1}, \frac{2}{1}$

Since sides are proportional and the included angles are congruent by VAT,

$\triangle GKH \sim \triangle NKM$ by SAS~

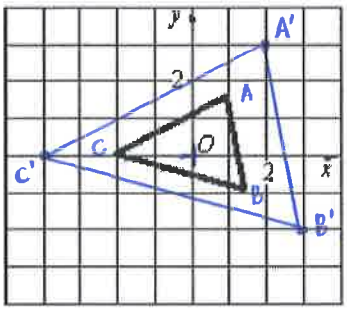
Draw the image of the given figure after a dilation with center (0 , 0) and the given scale factor.

22. Scale factor : $\frac{1}{2}$



A(-6,0) x ½ → A'(-3, 0)
B(-2,1) x ½ → B'(-1, ½)
C(0,-4) x ½ → C'(0, -2)
D(-5,-5) x ½ → D'(-2.5, -2.5)

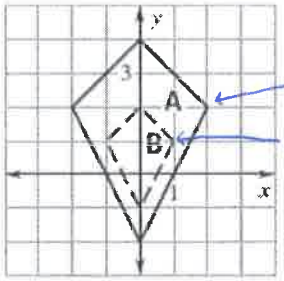
23. Scale factor : 2



A (1, 1.5) x 2 → A' (2, 3)
B (1.5, -1) x 2 → B' (3, -2)
C (-2, 0) x 2 → C' (-4, 0)

Determine whether the dilation from Figure A to Figure B is a *reduction* or an *enlargement*. Then find its scale factor. old new

24.

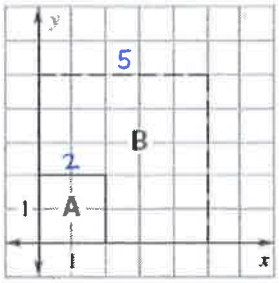


new / old : (1,1) / (2,2) ⇒ ½

Reduction

K = ½

25.



new / old = 5/2 = 2.5

K = 5/2

Enlargement

26. The table below shows the coordinated of ΔRST and the coordinates of R' in ΔR'S'T' under a dilation centered at the origin.

Triangle RST		Triangle R'S'T'	
R	(–2, –3)	R'	(–6, –9)
S	(0, 2) x 3	S'	(0, 6)
T	(2, –3) x 3	T'	(6, -9)

⇒ Scale factor : (-6,-9) / (-2,-3) ⇒ -6/-2 = 3/1

What are the coordinates of S' and T'? Explain how you determined your answer.

S'(0,6) and T'(6,-9)

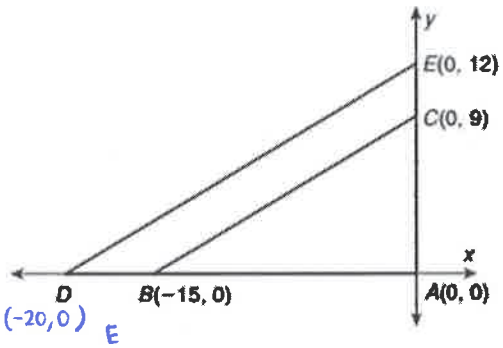
Since the scale factor is 3 (see above for work), multiply S and T by 3 to get S' and T'.

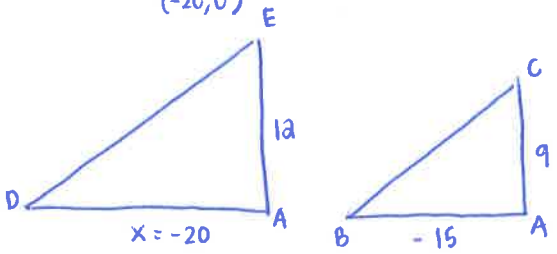
27. ΔEAD is the dilation image of ΔCAB about the origin. What are the coordinates of D?

$\frac{x}{-15} = \frac{12}{9}$

$9x = -180$

$x = -20 \Rightarrow$ D (-20, 0)





ANSWER KEY :

1) 6.3 2) $\frac{7}{2}$ 3) $\frac{15}{14}$ 4) 5 ft 5) 3in, 15in 6) 48, 60, 72 7) 40ft, 120ft 8) 17 inches

9) Congruent 10) Proportional 11) 52.8 12) XZ =12.9 13) 48 14) 10 cm

15) 60 in, Scale factor 5 : 1 16) 40m 17) 232

18) $\Delta ECB \sim \Delta EAD$, AA Similarity 19) $\Delta AEB \sim \Delta CED$, AA Similarity

20) $\Delta BAC \sim \Delta SRT$, SSS Similarity 21) $\Delta HKG \sim \Delta MKN$, SAS Similarity

22) New Coordinates : (-3, 0) (-1, 0.5) (0, -2) (-2.5, -2.5)

23) New Coordinates : (-4, 0) (2, 3) (3, -2) 24) Reduction, scale factor : $\frac{1}{2}$

25) Enlargement, scale factor : 2.5 26) S' (0, 6), T' (6, -9), Scale factor is 3 27) (-20,0)