

Benchmark 3 Review

1. What would the coordinate be for the point (3, -2) after it is reflected over  $y=x$  and then translated  $(x, y) \rightarrow (x-3, y+1)$ ?

$$(3, -2) \xrightarrow{\text{Reflected over } y=x} (-2, 3) \xrightarrow{\text{Translated } (x-3, y+1)} (-5, 4)$$

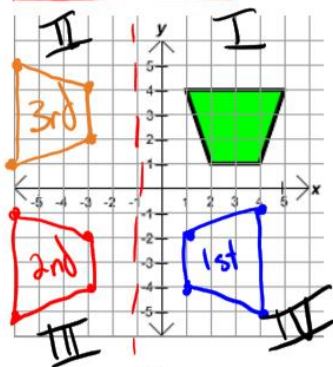
2. If the image coordinate for a rotation of 90° CCW about the origin is  $G'(-4, 7)$  what is the preimage coordinate?

Flip, change 1st term

$$90^\circ \text{ CCW: } (x, y) \rightarrow (-y, x)$$

$$(7, 4) \rightarrow (-4, 7)$$

3. What quadrant will the following figure end up in after a rotation of 270° CCW about the origin, then a reflection over  $x=-1$ , then translate up 6?



Quadrant II

4. How could you map QRST to JKLM if  $Q(-1, 2)$ ,  $R(-1, 5)$ ,  $S(4, 5)$ ,  $T(4, 2)$  and  $J(3, -1)$ ,  $K(0, -1)$ ,  $L(0, 4)$ , and  $M(3, 4)$ ?

$$Q(-1, 2) \rightarrow J(3, -1)$$

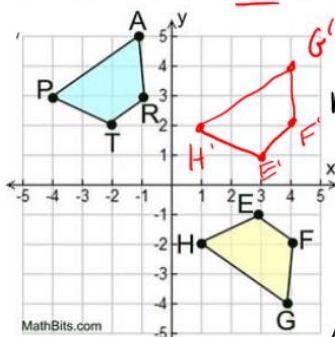
$$R(-1, 5) \rightarrow K(0, -1)$$

$$S(4, 5) \rightarrow L(0, 4)$$

$$T(4, 2) \rightarrow M(3, 4)$$

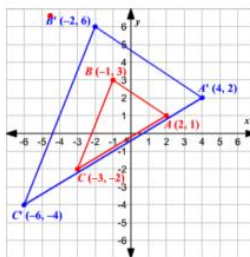
$$(x, y) \rightarrow (-y, x) \rightarrow (-y+5, x)$$

5. Determine how EFGH could be mapped onto TRAP.



EFGH can be mapped onto TRAP by a reflection over the x-axis, then a translation of left 5 and up 1. A reflection and translation are rigid motions. Rigid motions create congruent figures. Thus,  $EFGH \cong TRAP$ .

6. Determine if the following triangles are congruent.



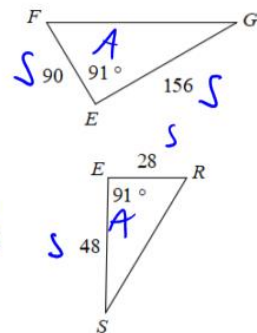
$\triangle ABC$  can be mapped onto  $\triangle A'B'C'$  by a dilation. A dilation is not a rigid motion. Thus  $\triangle ABC \not\cong \triangle A'B'C'$

7. Determine if the two triangles are similar. Provide evidence as to why or why not.

$$\angle FEG \cong \angle RES$$

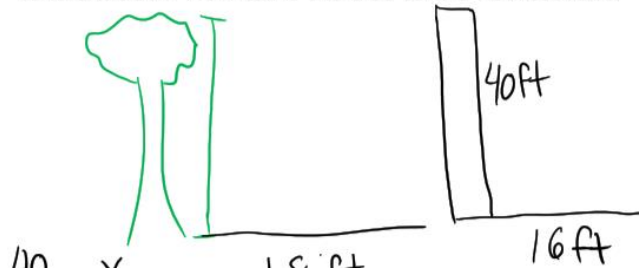
$$\frac{90}{28} = \frac{156}{48}$$

$$3.214 \neq 3.25 \text{ not equal}$$



8. A tree is standing next to a 40 ft. high building.

The tree has an 18 ft. shadow, while the building has a 16 ft. shadow. How tall is the tree to the nearest foot?



$$\frac{40}{16} = \frac{x}{18}$$

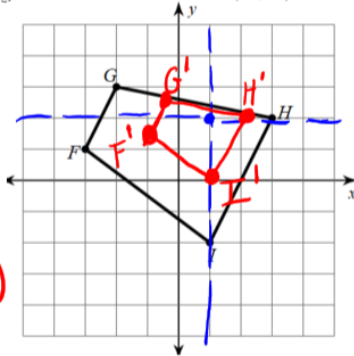
$$720 = 16x \rightarrow \boxed{x = 45}$$

9. Two polygons are similar then their corresponding angles are \_\_\_\_\_, and their corresponding sides are \_\_\_\_\_.

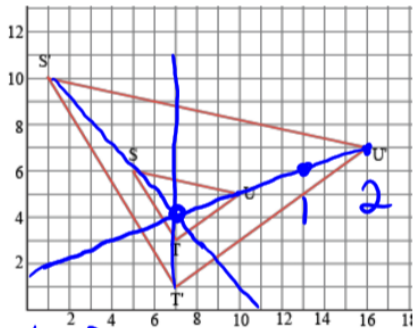
- A. not equal, proportional
- B. Equal, congruent
- C. Congruent, proportional.**
- D. none of above

10. Dilate the following figure with a center at (-1, 2) and scale factor of 1/2.

Distance from Center  
 $G(-3,1) \rightarrow G'(-1.5, 0.5)$   
 $H(2,0) \rightarrow H'(1, 0)$   
 $I(0,-4) \rightarrow I'(0, -2)$   
 $F(-4,-1) \rightarrow F'(-2, -0.5)$



11. Identify the scale factor and center of dilation in the following diagram



$K=2$   
 Center =  $(7, 4)$

12. Which transformations are rigid motions, and why do they preserve congruence in shapes?

Translations, Reflections, Rotations.  
 They do not change size or shape of a figure.

13. If HIJK is congruent to PQRS, name the pairs of congruent sides and congruent angles.

$\overline{HI} \cong \overline{PQ}$ ,  $\overline{IJ} \cong \overline{QR}$ ,  $\overline{JK} \cong \overline{RS}$ ,  $\overline{KH} \cong \overline{SP}$   
 $\angle H \cong \angle P$ ,  $\angle I \cong \angle Q$ ,  $\angle J \cong \angle R$ ,  $\angle K \cong \angle S$

14. Name all proportional sides and congruent angles if  $\triangle NOT \sim \triangle FLY$ .

Proportional sides  
 $\frac{FO}{NO} = \frac{OT}{LY} = \frac{TN}{YF}$

Congruent angles  
 $\angle N \cong \angle F$ ,  $\angle O \cong \angle L$ ,  $\angle T \cong \angle Y$

15. What is the value of x in the following diagram?

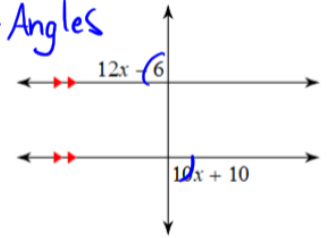
Alternate Exterior Angles

$$12x - 6 = 10x + 10$$

$$2x - 6 = 10$$

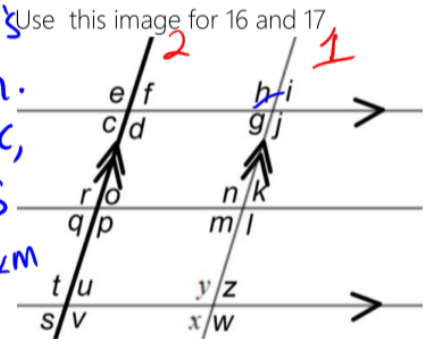
$$2x = 16$$

$$x = 8$$



16. What angles must be supplementary to angle h?

Supplementary to angle h.  
 $\angle g, \angle i, \angle f, \angle c,$   
 $\angle x, \angle z, \angle u, \angle s$   
 \* not  $\angle o, \angle q, \angle k, \angle m$

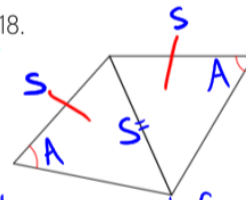


17. Prove angle h is supplementary to angle f.

Statement	Reason
$\ell_1 \parallel \ell_2$	Given
$\angle h \cong \angle e$	Corresponding $\angle$ 's post.
$\angle e$ and $\angle f$ are linear pairs	Def. of Linear Pairs
$\angle e$ and $\angle f$ are supp.	Linear Pairs Conj.
$m\angle e + m\angle f = 180^\circ$	Def. of Supp.
$m\angle h = m\angle e$	Def. of $\cong$
$m\angle h + m\angle f = 180^\circ$	substitution
$\angle h$ and $\angle f$ are supp.	Def. of Supplementary

Are the following triangles congruent? State how you know.

18.



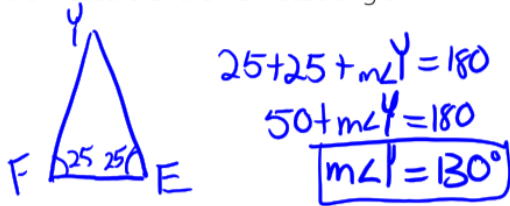
Not enough information to prove  $\cong$ .

19.

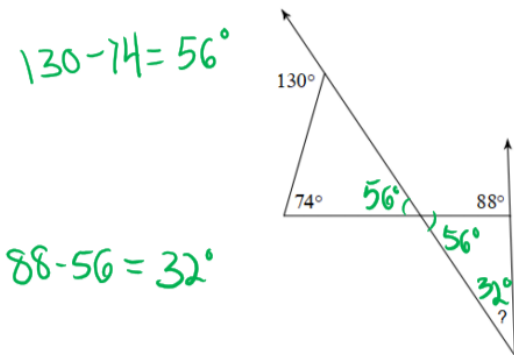


Yes by ASA

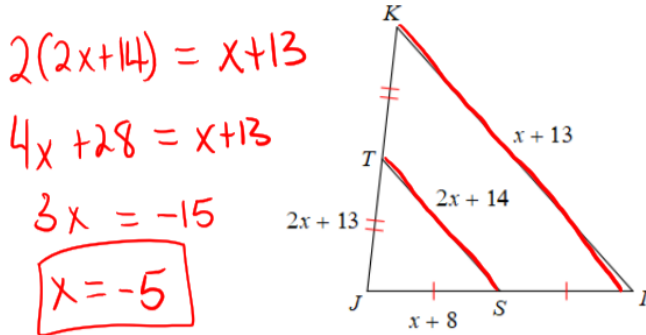
20. If  $\triangle FYE$  is isosceles and one base angle is  $25^\circ$  what is the measure of the non-base angle?



21. Find the value of '?' in the following diagram.

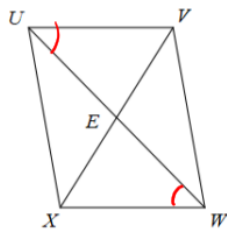


22. Solve for x in the following diagram.



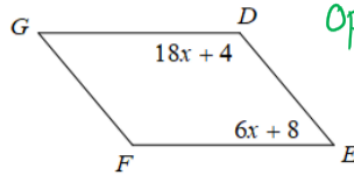
23 and 24 have images of parallelograms. Find the value of x for each.

23. 1  $VE = 6x - 3$   
2  $VX = 9x + 3$



$2(6x-3) = 9x+3$   
 $12x-6 = 9x+3$   
 $3x-6 = 3$   
 $3x = 9$   
 $x = 3$

24. *Opp.  $\angle$ 's supp.*



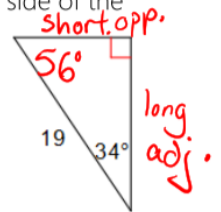
$18x+4+6x+8=180$   
 $24x+12=180$   
 $24x=168$   
 $x=7$

25. In #23's parallelogram, what is the relationship between  $\angle UWX$  and  $\angle WUV$ ?

*Opp.  $\angle$ 's  $\cong$*

26. What is the length of the shortest side of the following right triangle?

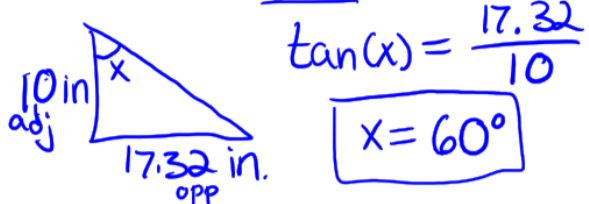
$\sin(34) = \frac{x}{19}$



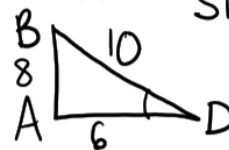
$x = 19 \cdot \sin(34)$

$x = 10.625$

27. A right triangle has legs of 10 in. and 17.32 in. What is the measure of the larger angle?



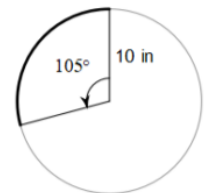
28. In  $\triangle DAB$ , the  $\sin(D) = 8/10$  what is the  $\sin(B)$ ?  $\cos(B)$ ?



$\sin(B) = \frac{6}{10}$   
 $\cos(B) = \frac{8}{10}$   
 $8^2 + b^2 = 10^2$   
 $64 + b^2 = 100$   
 $b^2 = 36$   
 $b = 6$

29. What is the arc length of the bolder arc?

$S = \frac{\theta}{360} \cdot 2\pi r$   
 $S = \frac{105}{360} \cdot 2\pi(10)$



$S = 18.326 \text{ in.}$

30. Find the value of x and y.

$$2(55) = 110^\circ$$

$$\widehat{TW} = 55^\circ$$

$$\widehat{UW} = 55^\circ$$

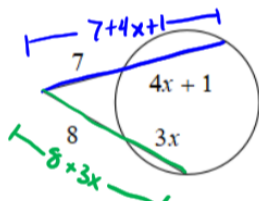
$$180 - 110^\circ = 70^\circ$$

$$2(y) = 45 + 55$$

$$2y = 100$$

$$y = 50^\circ$$

31. What is the value of x?



$$7(7+4x+1) = 8(8+3x)$$

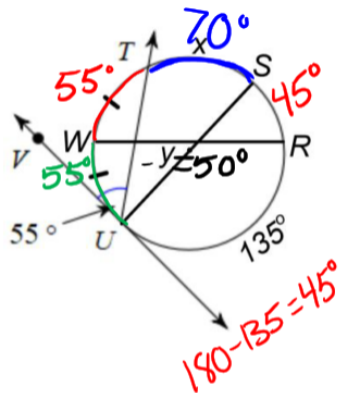
$$7(4x+8) = 64+24x$$

$$28x+56 = 64+24x$$

$$4x+56 = 64$$

$$4x = 8$$

$$\boxed{x=2}$$



### STUDYUNIT 1 VOCABULARY WORDS

Angle – A figure formed by two rays with a common endpoint.

Circle – The set of points in a plane that are a fixed distance from a given point called the center of the circle.

Perpendicular lines – Lines that intersect at 90 degree angles. 'L'

Parallel Line – Lines in the same plane that do not intersect. '||'

Line Segment – A straight line which links two points without extending beyond them.

Point – A specific location in space, often represented by a dot.

Line – A straight pathway that is endless in both directions, has no thickness, and is comprised of points.

Ray – A part of a line that starts at endpoint and extends forever in one direction.

Image - The figure after a transformation has occurred.

Transformation - a change in the position, size, or shape of a figure. A transformation maps the preimage to the image.

Rigid Motion - A transformation of the plane or space, which preserves distance and angles. (AKA Isometry) *Rotation, Reflection, Translation*

Translation - a transformation in which all the points of a figure move the same distance in the same direction.

Rotation - A transformation about a point P, such that each point and its image are the same distance from P.

Reflection - A transformation across a line, called the line of reflection. Each point and its image are the same distance from the line of reflection.

Dilation - A transformation that changes the size of a figure but not its shape.