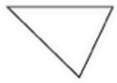
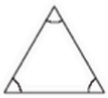
Write your questions here!

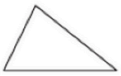
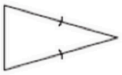
Name: _____

3.2 NOTES: Triangle Types & Properties

Classifying Triangles (by Angles)

Classification (and ways to remember)		DESCRIPTION	PICTURE
... by ANGLES	ACUTE		
	RIGHT		
	OBTUSE		
	EQUIANGULAR		

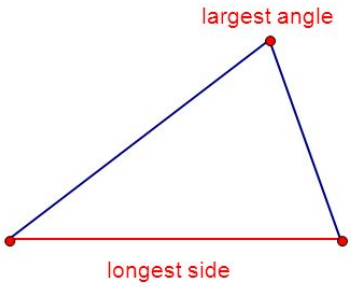
Classifying Triangles (by Sides)

Classification (and ways to remember)		DESCRIPTION	PICTURE
... by SIDES	SCALENE	____ congruent sides	
	ISOCELES	At least ___ congruent sides	
	EQUILATERAL	___ congruent sides	

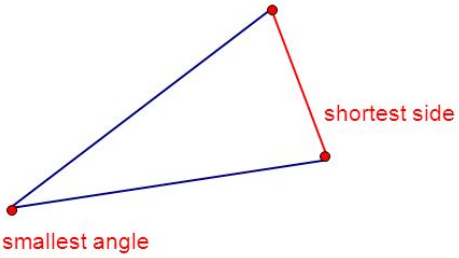
Can an isosceles triangle be equilateral? **Can an equilateral triangle be isosceles?**

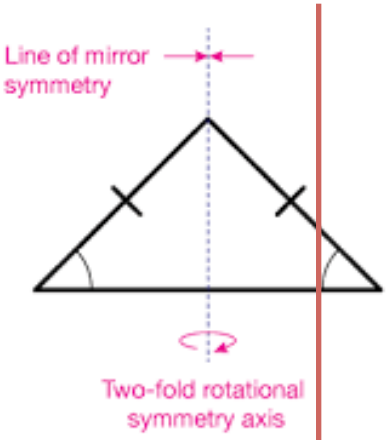
Comparing Measurements of a Δ

- The longest side and largest angle of a Δ are opposite each other.



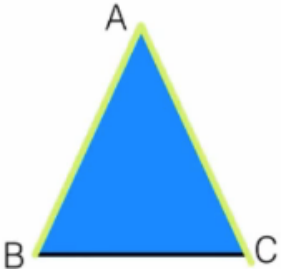
- The shortest side and smallest angle of a Δ are opposite each other.





Isosceles Triangles Theorem 01

If two sides of a triangle are congruent, then the angles opposite them are also congruent.

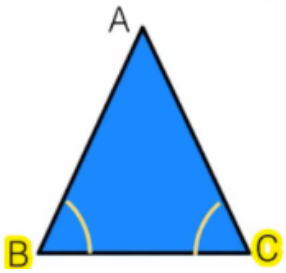


If $\overline{AB} \cong \overline{AC}$

Then

Isosceles Triangles Theorem 02

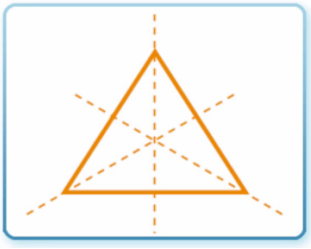
If two angles of a triangle are congruent, then the sides opposite them are also congruent.



If $\angle B \cong \angle C$

Then

What else do we know to be true? Mark the parts that are congruent in the picture below.

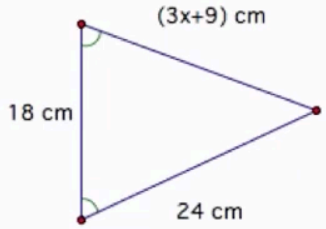


Equilateral triangles are _____

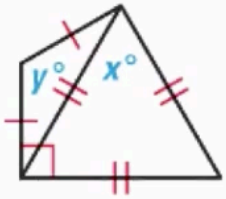
Example #2: Find the angle measures of equilateral ΔPHS.

Write your questions here!

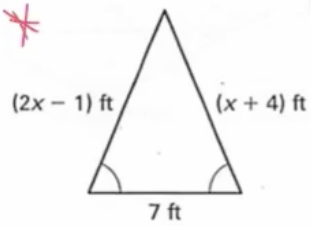
Example #3: Find the value of x in the figure below.

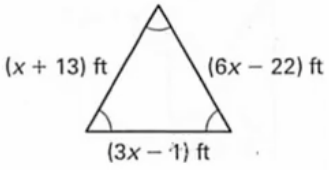


Example #4: Find the values of x and y in the diagram.

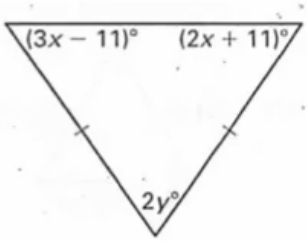


Example #6: Find the perimeter for each of the following.





Example #7: Find the values of x and y.



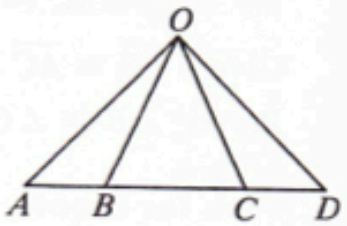
Summarize your notes:

Now, summarize your notes here!

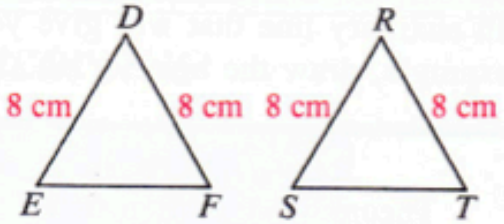
Practice Problems

Draw the following. Mark the picture!!!		
1. Obtuse Isosceles Triangle	2. Acute Equilateral Triangle	3. Right Scalene Triangle

1. If $\triangle AOD$ is isosceles, with $\overline{OA} \cong \overline{OD}$, then $\angle \_?\_ \cong \angle \_?\_$.
2. If $\triangle BOC$ is isosceles, with $\overline{OB} \cong \overline{OC}$, then $\angle \_?\_ \cong \angle \_?\_$.
3. If $\triangle AOD$ is an isosceles right triangle with right $\angle AOD$, then the measure of $\angle A$ is $\_?\_$.

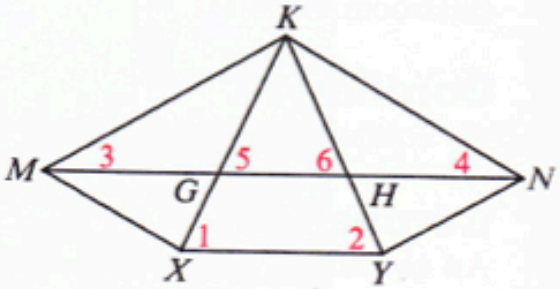


4. Given the triangles at the right, which of the following can you conclude are true?
   - a. $\angle D \cong \angle R$
   - b. $\overline{DE} \cong \overline{DF}$
   - c. $\overline{DF} \cong \overline{RT}$
   - d. $\angle E \cong \angle F$
   - e. $\angle E \cong \angle S$
   - f. $\angle S \cong \angle T$



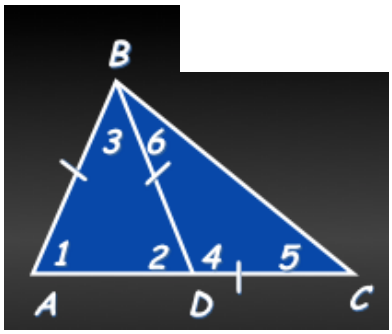
Given the two congruent angles, name two segments that must be congruent.

5. $\angle 1 \cong \angle 2$
6. $\angle 3 \cong \angle 4$
7. $\angle 5 \cong \angle 6$
8. Is the statement "$\overline{MK} \cong \overline{NK}$ if and only if $\angle 3 \cong \angle 4$" true or false?



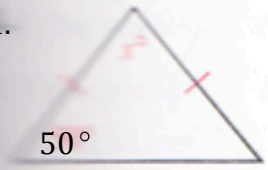
Solve for x.		
9. 	10. 	11. 

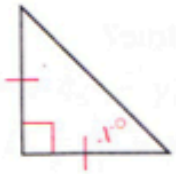
12. Find the measures of $\angle 1, \angle 2, \angle 3, \angle 5, and\ \angle 6, if\ \angle 4 = 110^\circ$

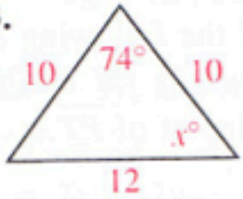


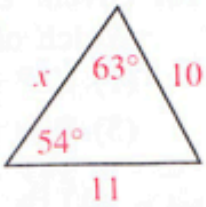
Written Exercises

Find the value of x.

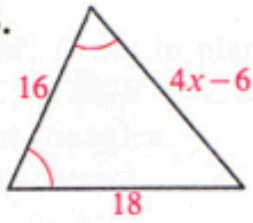
1. 

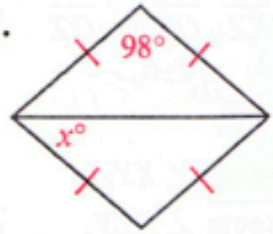
2. 

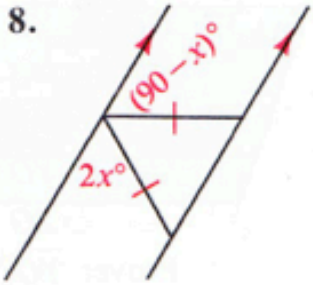
3. 

4. 

5. 

6. 

7. 

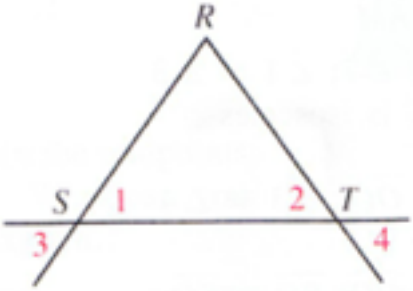
8. 

For each exercise place the statements in the appropriate order for a proof.
(There may be more than one correct order.)

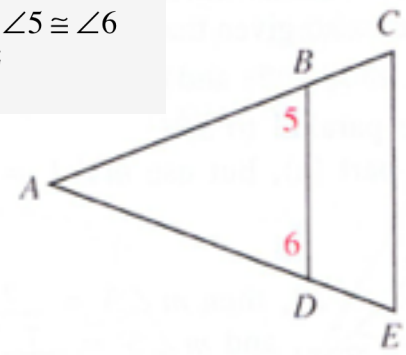
9. Given: M is the midpoint of $\overline{JK}$;
$\angle 1 \cong \angle 2$
Prove: $\overline{JG} \cong \overline{MK}$

S	R

.



10. Given: $\overline{BD} \parallel \overline{CE}; \angle 5 \cong \angle 6$
Prove: $\overline{AC} \cong \overline{AE}$



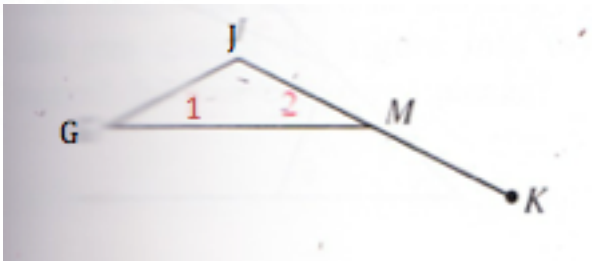
S	R

.

11.

Given: M is the midpoint of $\overline{JK}$; $\angle 1 \cong \angle 2$

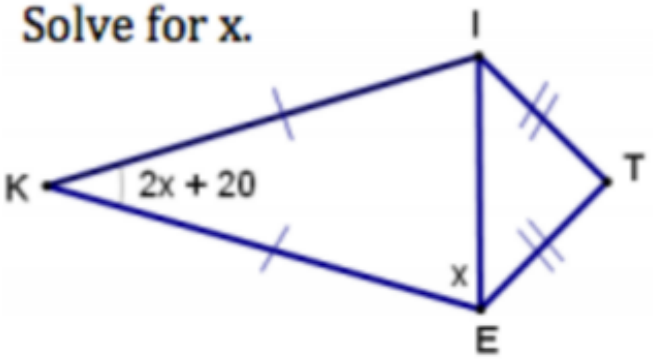
Prove: $\overline{JG} \cong \overline{MK}$



S | R .

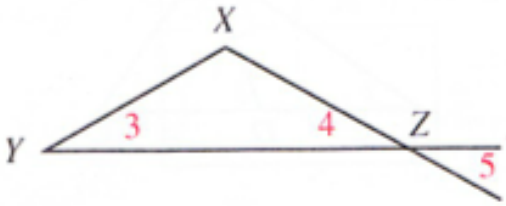
12.

Solve for x.



14. Given: $\overline{XY} \cong \overline{XZ}$

Prove: $\angle 3 \cong \angle 5$

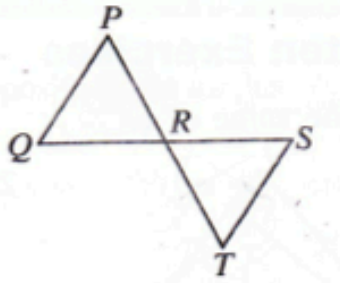


S | R .

15. Given: $\overline{PQ} \cong \overline{PR}$; $\overline{TR} \cong \overline{TS}$

Which one(s) of the following *must* be true?

(1) $\overline{ST} \parallel \overline{QP}$ (2) $\overline{ST} \cong \overline{QP}$ (3) $\angle T \cong \angle P$

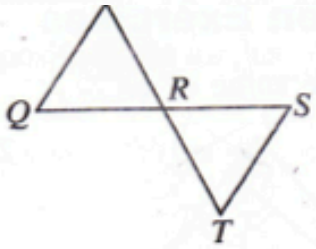


16. Given: $\angle S \cong \angle T$; $\overline{ST} \parallel \overline{QP}$

Which one(s) of the following *must* be true?

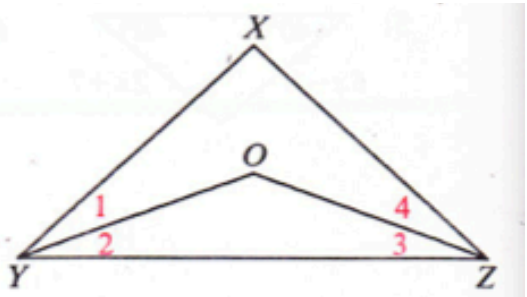
(1) $\angle P \cong \angle Q$ (2) $PR = QR$

(3) R is the midpoint of $\overline{PT}$.

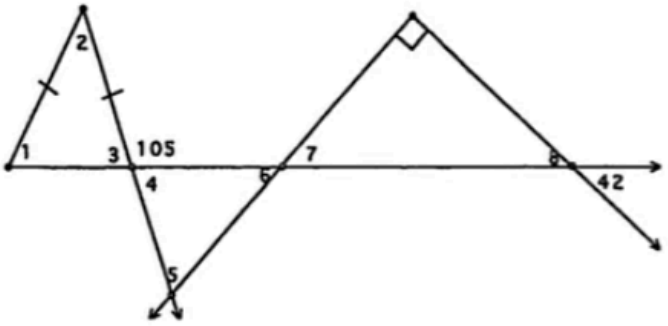


Write proofs in two-column form.

17. Given: $\overline{XY} \cong \overline{XZ}$; $\overline{OY} \cong \overline{OZ}$
Prove: $m\angle 1 = m\angle 4$



18.



$\angle 1 =$ ____ $\angle 5 =$ ____

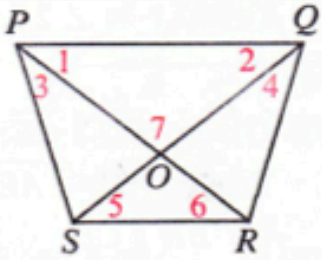
$\angle 2 =$ ____ $\angle 6 =$ ____

$\angle 3 =$ ____ $\angle 7 =$ ____

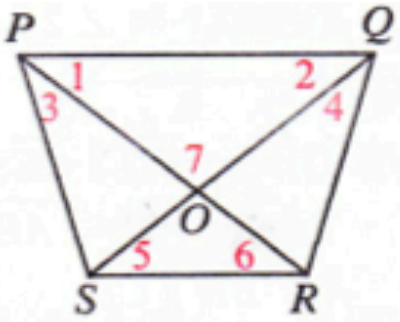
$\angle 4 =$ ____ $\angle 8 =$ ____

22. Given: $\overline{PO} \cong \overline{QO}$; $\overline{RO} \cong \overline{SO}$

a. If you are also given that $m\angle 1 = 40$, find the measures of $\angle 2$, $\angle 7$, $\angle 5$, and $\angle 6$. Then decide whether $\overline{PQ}$ must be parallel to $\overline{SR}$.

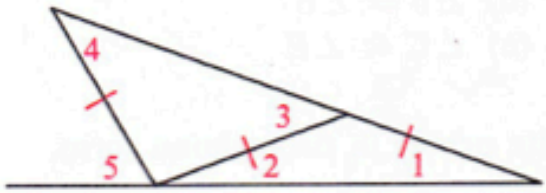


b. Repeat part (a), but use $m\angle 1 = k$.

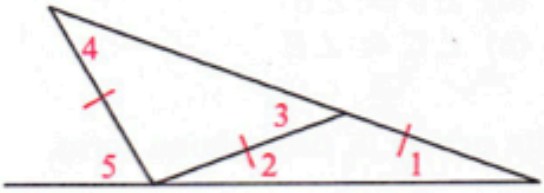


23. Complete.

a. If $m\angle 1 = 20$, then $m\angle 3 =$?, $m\angle 4 =$?, and $m\angle 5 =$?.

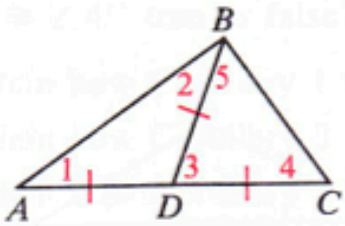


b. If $m\angle 1 = x$, then $m\angle 3 =$?, $m\angle 4 =$?, and $m\angle 5 =$?.



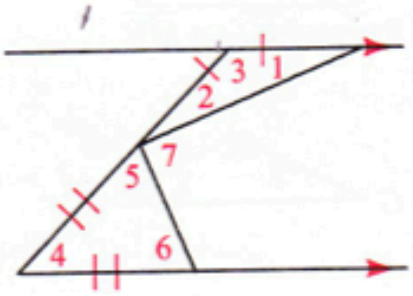
24. a. If $m\angle 1 = 35$, find $m\angle ABC$.

b. If $m\angle 1 = k$, find $m\angle ABC$.



25. a. If $m\angle 1 = 23$, find $m\angle 7$.

b. If $m\angle 1 = k$, find $m\angle 7$.



Find the values of x and y. (Hint: Systems of Equations)

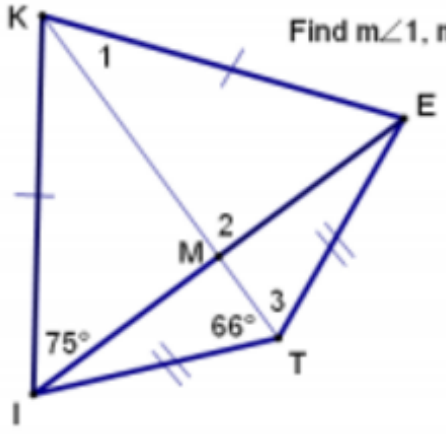
Picture

26. In equiangular $\triangle ABC$, $AB = 4x - y$, $BC = 2x + 3y$, and $AC = 7$.

27. In equilateral $\triangle DEF$, $m\angle D = x + y$ and $m\angle E = 2x - y$.

28. In $\triangle JKL$, $\overline{JK} \cong \overline{KL}$, $m\angle J = 2x - y$, $m\angle K = 2x + 2y$, and $m\angle L = x + 2y$.

29.



Find m∠1, m∠2 and m∠3.

$m\measuredangle 1 =$ _____

$m\measuredangle 2 =$ _____

$m\measuredangle 3 =$ _____