

Geometry

Chapter 4

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Ch 4.1 Classifying Angles

OBJECTIVE: TSW identify and classify triangles by sides and angles.

Classifying by angles: acute - all angles are less than 90°
obtuse - one angle is greater than 90°
right - one angle is 90°
equiangular - all angles are congruent, i.e. 60°

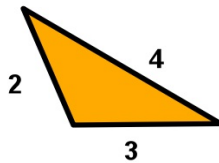
Classifying by sides: scalene - no two sides have the same measurement
isosceles - has two congruent sides
equilateral - all three sides are congruent

Identify the following triangles by angle and side:

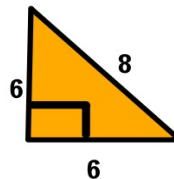
1)



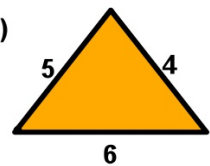
2)



3)



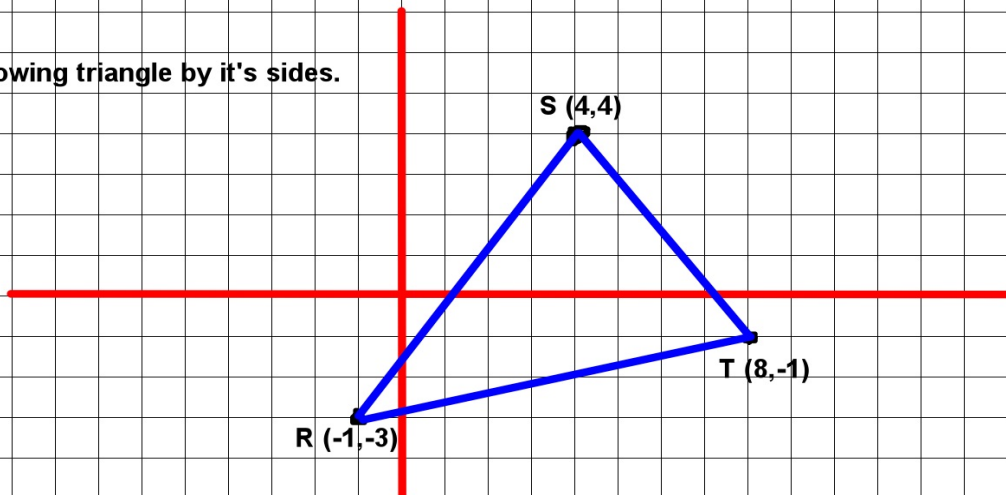
4)



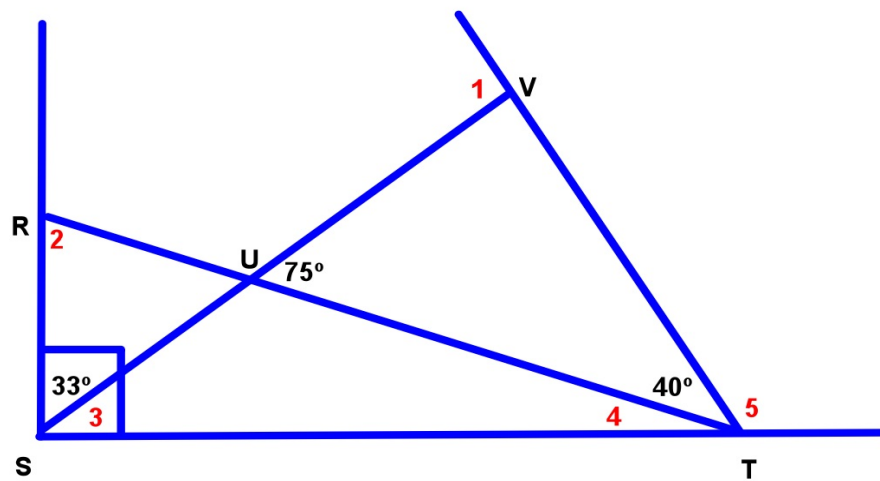
Find "d" and the measure of each side of equilateral $\triangle KLM$ if $KL = d+2$, $LM = 12-d$ and $KM = 4d-13$. **HINT: Draw a picture.**

Find "x" and the measure of each side of an equilateral $\triangle ABC$ if $AB = 6x-8$, $BC = 7+x$, and $AC = 13-x$.

Identify the following triangle by it's sides.



ANSWER: $RS = \sqrt{74}$
 $ST = \sqrt{41}$
 $RT = \sqrt{85}$
SO TRIANGLE RST IS A SCALENE TRIANGLE



MEASURE OF ANGLE 1 = _____
 MEASURE OF ANGLE 2 = _____
 MEASURE OF ANGLE 3 = _____
 MEASURE OF ANGLE 4 = _____
 MEASURE OF ANGLE 5 = _____

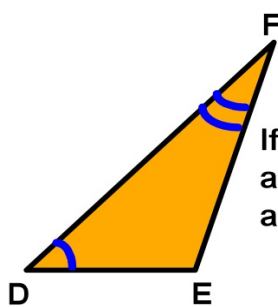
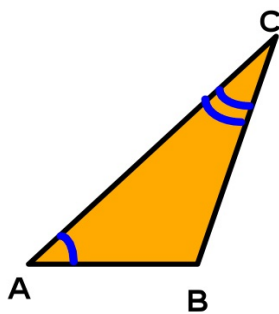


4.2 ANGLES OF TRIANGLES

OBJECTIVE: TSW apply the Angle Sum Theorem and the Exterior Angle Theorem

Angle Sum Thm: The sum of the measures of a triangles angles is 180°

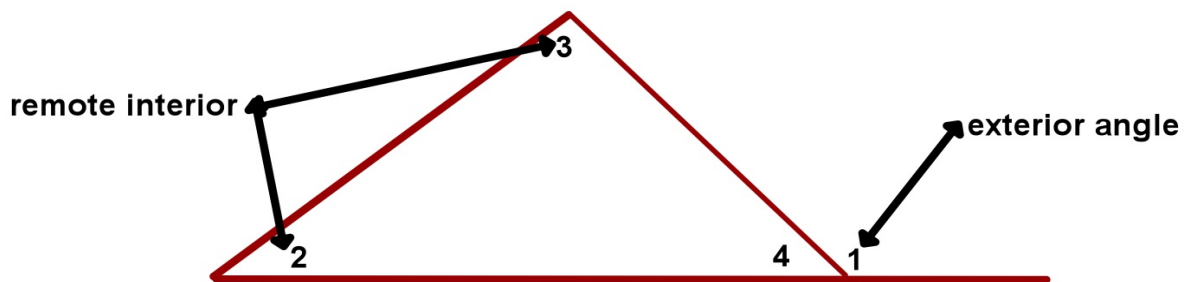
Third Angle Thm: If two angles of a triangle are congruent to two angles of a second triangle then the third angle of each triangle is congruent.



If angle $A \cong$ angle D
and angle $C \cong$ angle F then
angle $B \cong$ angle E .

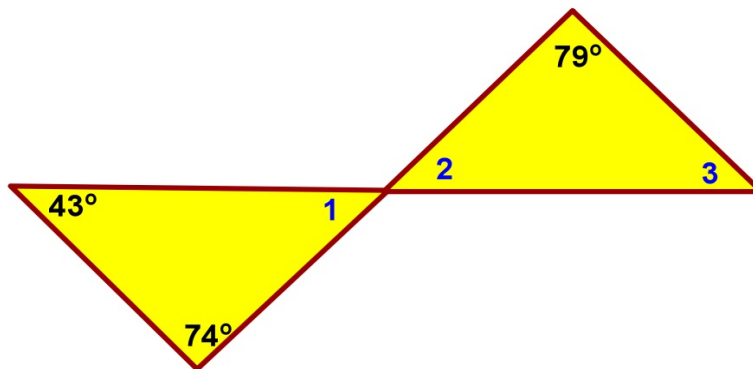
Exterior Angle: an angle formed by one side of a triangle and the extension of another side.

Remote Interior Angles: The interior angles of a triangle that are not adjacent to the exterior angle.



Exterior Angle Thm: The measure of the exterior angle is equal to the sum of the remote interior angles,
 i.e. $\text{angle } 1 = \text{angle } 2 + \text{angle } 3$

ex 1)



Find the measure of the following angles

angle 1 = _____

angle 2 = _____

angle 3 = _____

ex 2)

Find the measure of the following angles

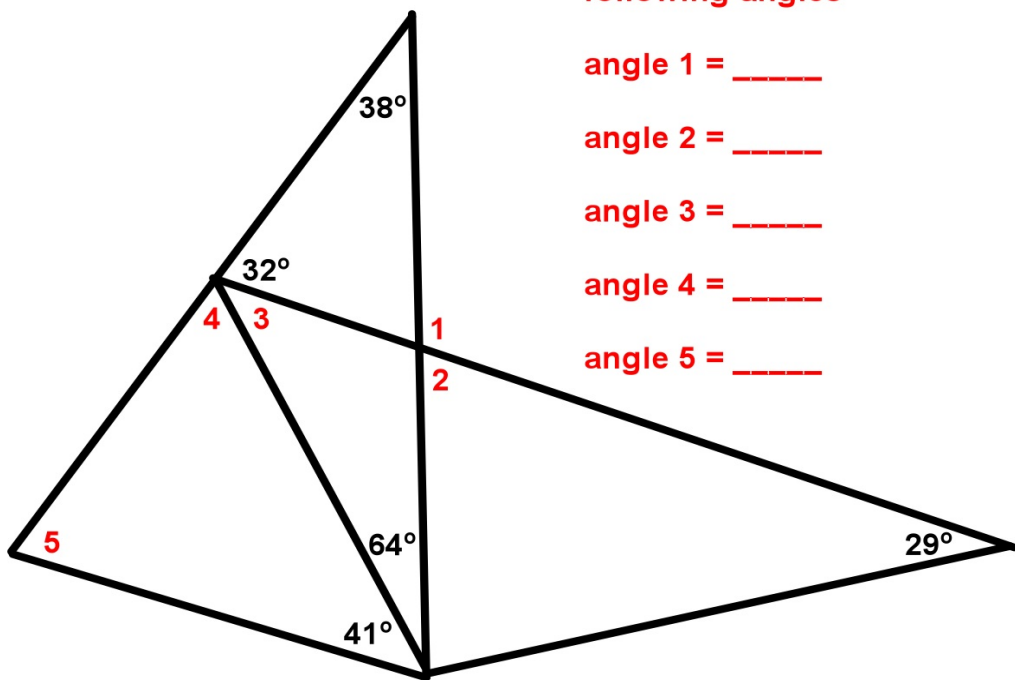
angle 1 = _____

angle 2 = _____

angle 3 = _____

angle 4 = _____

angle 5 = _____



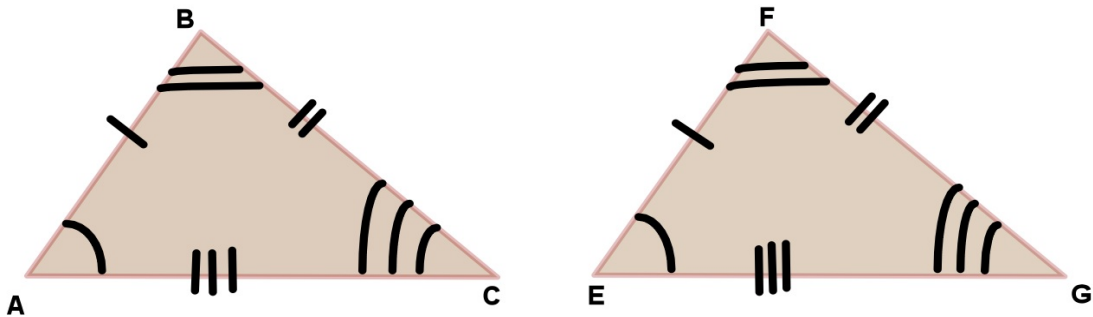


4.3 CONGRUENT TRIANGLES

OBJECTIVE: TSW name and label corresponding parts of congruent triangles.

Congruent: same shape and size.

NOTE: all six corresponding parts must be congruent for the triangles to be congruent.
i.e. 3 angles and 3 sides



Congruent corresponding angles

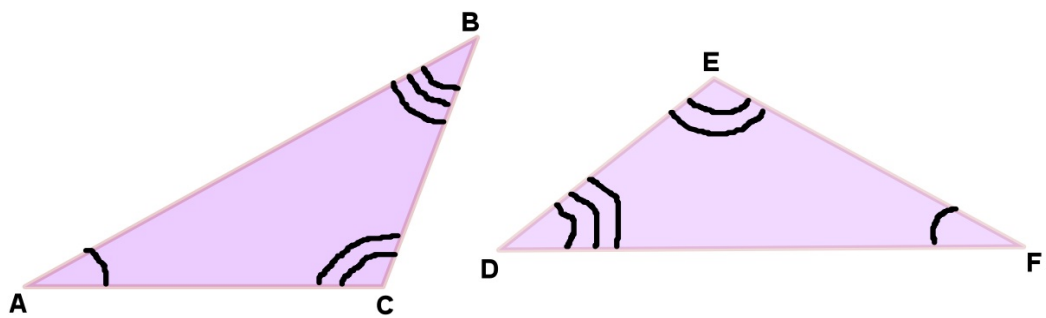
- *
- *
- *

Congruent corresponding sides

- *
- *
- *

Congruency Statement:

ex 1)



Name the six congruent parts:

sides

angles

Write a congruency statement: _____

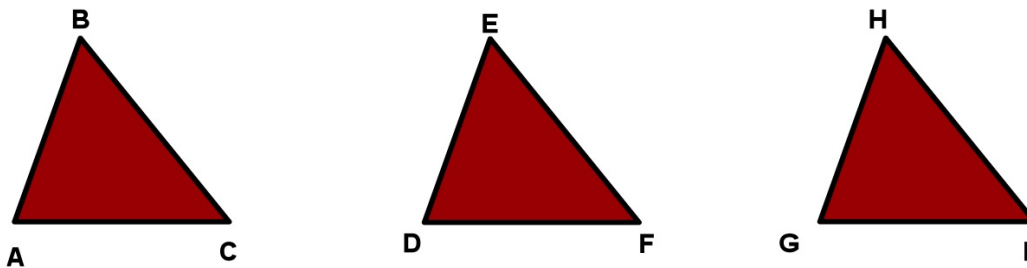
Can we list the congruent sides and angles of $\triangle GET$ and $\triangle MOR$ without drawing the picture?



4.4 Congruence of Triangles

OBJECTIVE: TSW use the SSS and SAS Postulate to test for triangle congruence.

Congruence of triangles is reflexive, symmetric, and transitive.

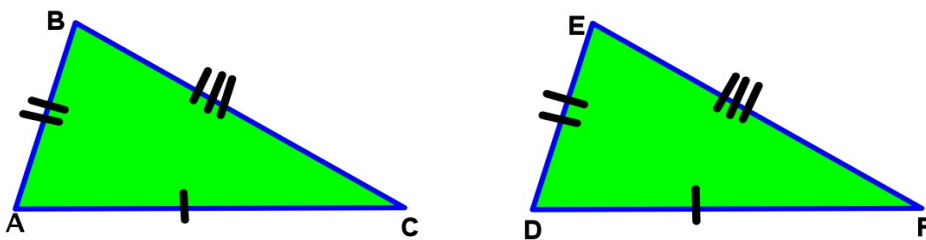


Reflexive: $\triangle ABC \cong \triangle ABC$

Symmetric: if $\triangle ABC \cong \triangle DEF$ then $\triangle DEF \cong \triangle ABC$

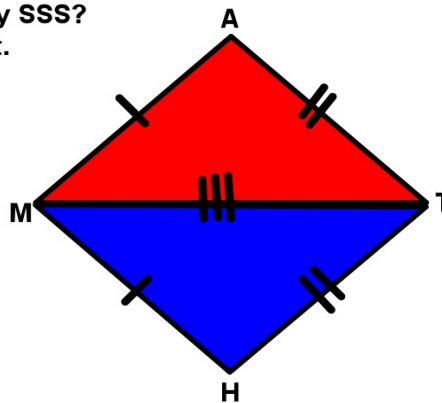
Transitive: if $\triangle ABC \cong \triangle DEF$ and $\triangle DEF \cong \triangle GHI$ then $\triangle ABC \cong \triangle GHI$

Postulate: Side-Side-Side Congruence (SSS): If the sides of one triangle are congruent to the sides of another triangle then the triangle's are congruent

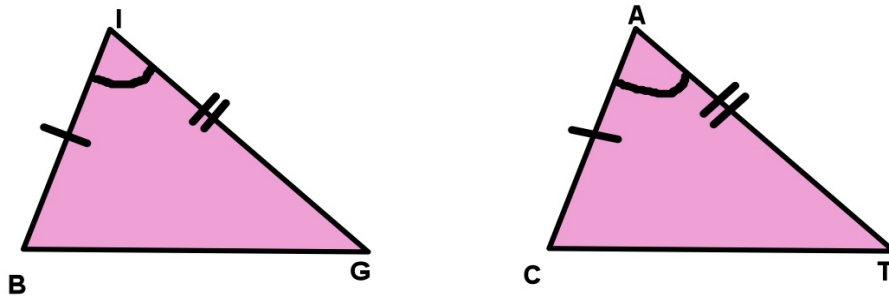


$\triangle ABC \cong \triangle DEF$ by SSS Congruence
Congruency Statement: $ABC \cong DEF$

ex) Are the two \triangle 's below congruent by SSS?
If so write a congruency statement.



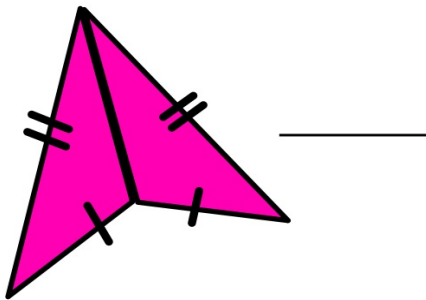
Postulate: Side-Angle-Side Congruence (SAS): If two sides and the **included angle** of one triangle are congruent to two sides and the **included angle** of another triangle then the triangles are congruent.



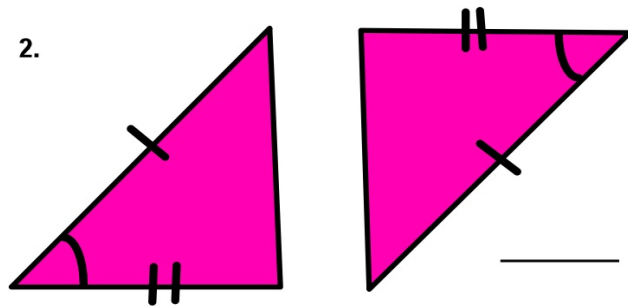
ΔBIG is congruent to ΔCAT by SAS Congruence

Which postulate can be used to prove the given triangles are congruent?

1.



2.

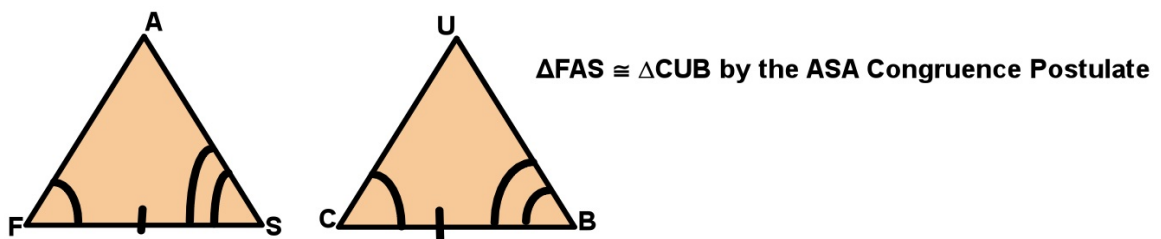




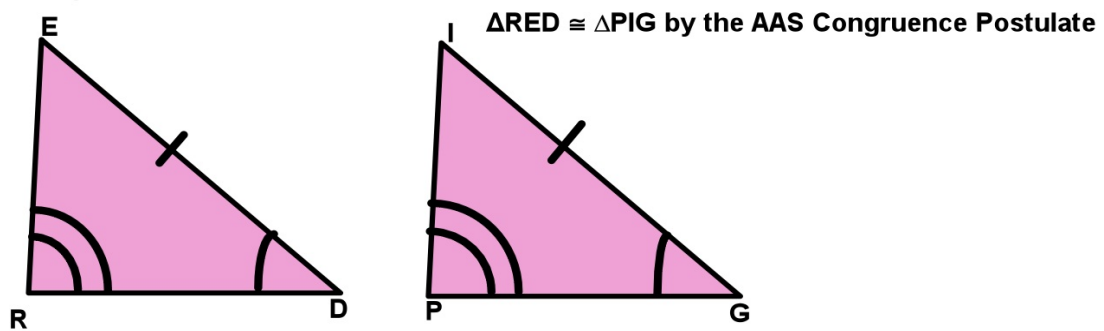
Ch 4.5 ASA and AAS

OBJECTIVE: TSW use the ASA and AAS Postulate to test for triangle congruence.

Angle-Side-Angle Congruence (ASA) If two angles and the **included side** of one triangle is congruent to two angles and the **included side** of another triangle then the triangles are congruent.



Angle-Angle-Side Congruence (AAS) If two angles and a **nonincluded side** of one triangle are congruent to two angles and a **nonincluded side** of another triangle then the two triangles are congruent.





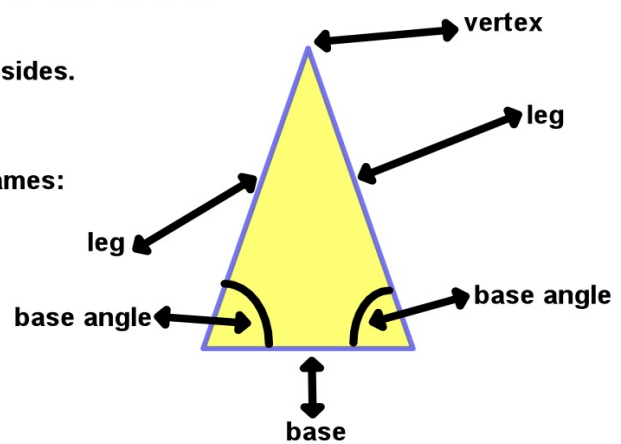
Ch. 4.6 Isosceles Triangles

OBJECTIVE: TSW use properties of isosceles and equilateral triangles.

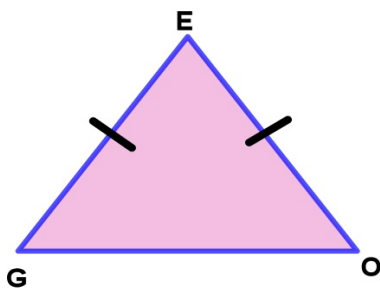
Isosceles Triangle: a triangle with two congruent sides.

The parts of an isosceles triangle have special names:

NOTE: the base angles of an isosceles triangle are congruent.

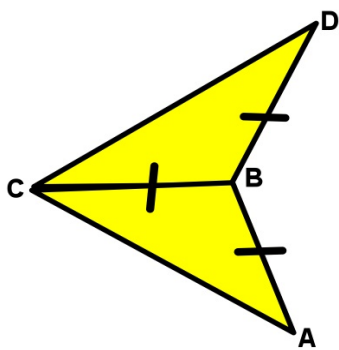


Isosceles Triangle Thm: If two sides of a triangle are congruent then the angles opposite those sides are congruent.

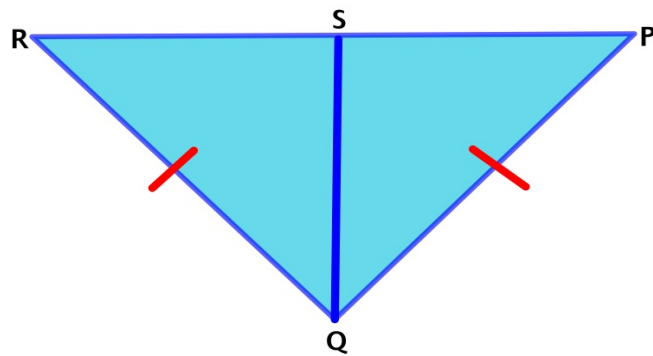


If $GE \cong EO$ then angle G \cong angle O

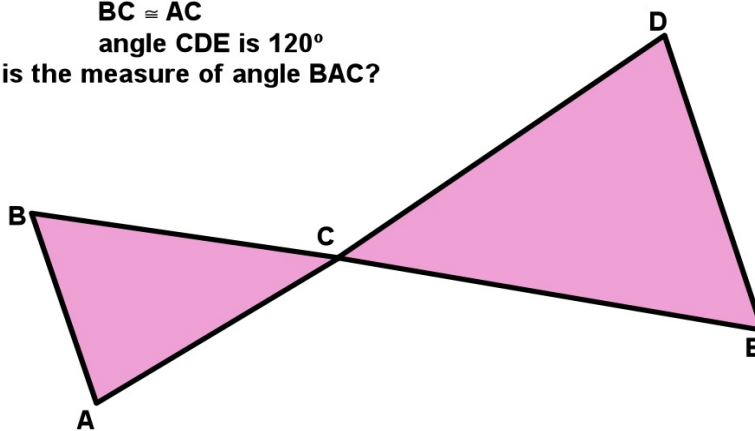
ex. 1) Prove angle A is congruent to angle D



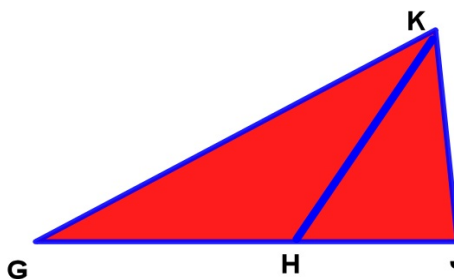
ex. 2) Prove angle P is congruent to angle R



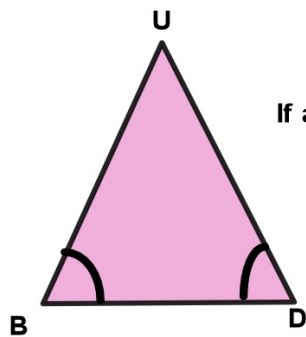
ex. 3) Given: $DE \cong CD$
 $BC \cong AC$
angle CDE is 120°
What is the measure of angle BAC?



ex. 4) Given: $GH \cong HK$
 $HJ \cong JK$
Measure of angle GJK is 100°
Find the measure of angle HGK. _____

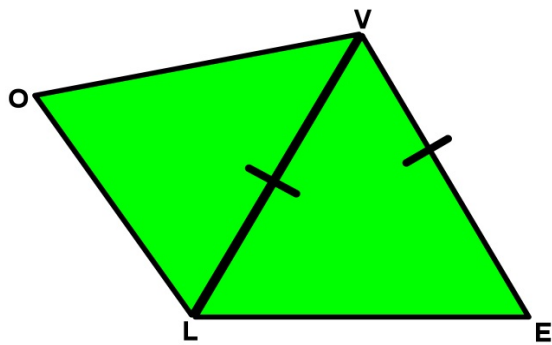


Theorem: If two angles of a triangle are congruent then the sides opposite those angles are congruent.



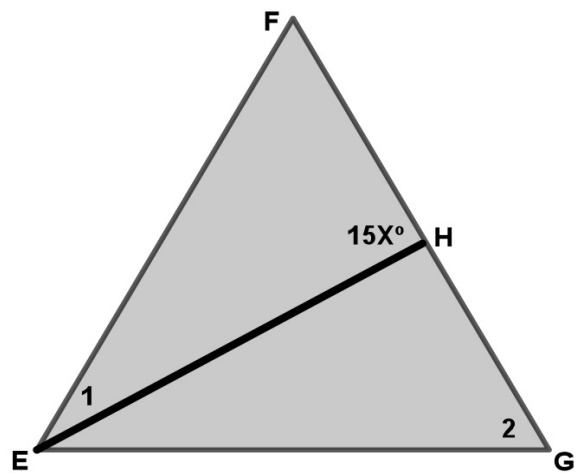
If angle B is congruent to angle D then $BU \cong UD$.

ex. 5) Name 2 congruent angles

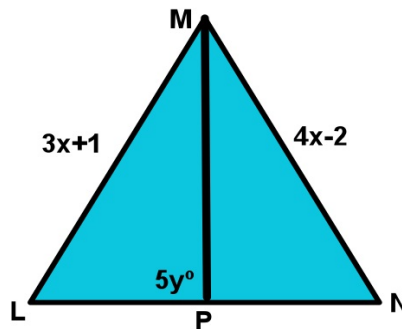


NOTE: IF A TRIANGLE IS EQUILATERAL IT IS ALSO EQUIANGULAR. THE CONVERSE IS ALSO TRUE

ex. 6) Given: $\triangle EFG$ is equilateral
EH bisects angle E
Find the measure of angle 1 and 2 _____, _____
Find X _____



ex. 7) Given: $\triangle LMN$ is equilateral
MP bisects LN
Find x and y _____, _____
Find the measure of each side _____





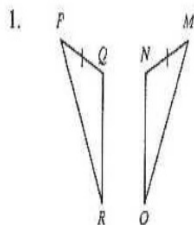


Geometry Chapter 4

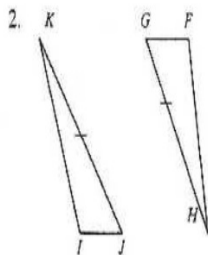
Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

Identify the congruent triangles in the figure.



- a. $\triangle MNO \cong \triangle RQP$
- b. $\triangle OMN \cong \triangle RPQ$
- c. $\triangle NMO \cong \triangle RPQ$
- d. $\triangle NOM \cong \triangle RQP$



- a. $\triangle FGH \cong \triangle KJI$
- b. $\triangle GFH \cong \triangle KIJ$
- c. $\triangle HFG \cong \triangle KIJ$
- d. $\triangle GHF \cong \triangle KJI$

Determine whether $\triangle PQR \cong \triangle STU$ given the coordinates of the vertices. Explain.

3. $P(0,3), Q(0,-1), R(-2,-1), S(1,2), T(1,-2), U(-1,-2)$
- a. No; each side of triangle PQR is not the same length as the corresponding side of triangle STU .
 - b. Yes; each side of triangle PQR is the same length as the corresponding side of triangle STU .
 - c. No; two sides of triangle PQR and angle PQR are not the same measure as the corresponding sides and angle of triangle STU .
 - d. Yes; both triangles have an obtuse angle.

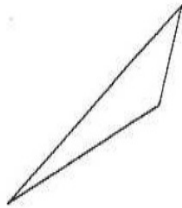
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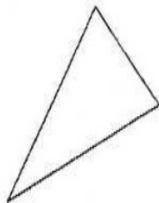
Short Answer

Use a protractor to classify the triangle as acute, equiangular, obtuse, or right.

4.



5.



Find the measures of the sides of $\triangle ABC$ and classify the triangle by its sides.

6. $A(7,5), B(2,3), C(3,7)$

Find each measure.

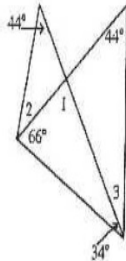
7. $m\angle 1, m\angle 2, m\angle 3$



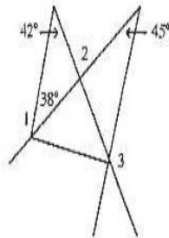
Name: _____

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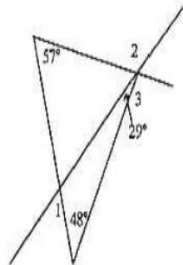
8. $m\angle 1, m\angle 2, m\angle 3$



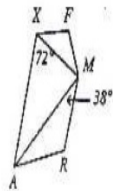
9. $m\angle 1, m\angle 2, m\angle 3$



10. $m\angle 1, m\angle 2, m\angle 3$



Refer to the figure. $\triangle ARM$, $\triangle MAX$, and $\triangle XFM$ are all isosceles triangles.

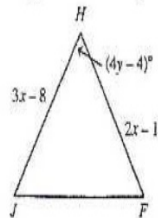


11. What is $m\angle RAM$?
12. What is $m\angle AMX$?
13. What is $m\angle MAX$?

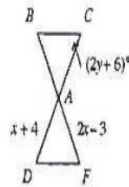
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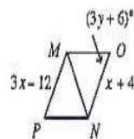
14. What is $m\angle RAX$?
15. If $m\angle FXA = 96$, what is $m\angle FXM$?
16. If $m\angle FXA = 96$ what is $m\angle XFM$?
17. If $m\angle FXA = 96$ what is $m\angle FMR$?
18. What is $m\angle ARM$?
19. If $m\angle FMR = 155$ what is $m\angle FMX$?
20. If $m\angle FMX = 23$ what is $m\angle FXA$?
21. Triangle FJH is an equilateral triangle. Find x and y .



22. Triangles ABC and AFD are vertical congruent equilateral triangles. Find x and y .



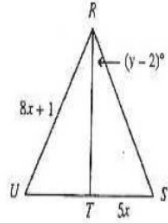
23. Triangles MNP and OMN are congruent equilateral triangles. Find x and y .



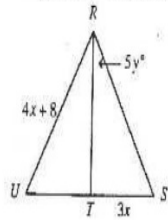
Name: _____

ID: A

24. Triangle RSU is an equilateral triangle. \overline{RT} bisects \overline{US} . Find x and y .



25. Triangle RSU is an equilateral triangle. \overline{RT} bisects \overline{US} . Find x and y .



CH4 Pt. 2

Tell whether the given triangles can be proven congruent by Side-Angle-Side (SAS), Side-Side-Side (SSS), Angle-Side-Angle (ASA) or Angle-Angle-Side (AAS)

If none of the above write none.

