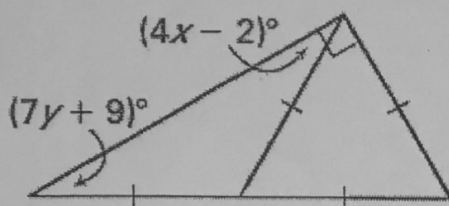


Round 1

Find the values of x and y , if possible. If not possible, *explain* your reasoning.

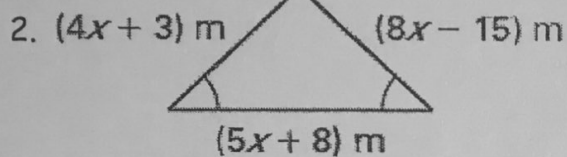
1.



$$\begin{aligned} 4x - 2 &= 30 \\ 4x &= 32 \\ x &= 8 \end{aligned}$$

$$\begin{aligned} 7y + 9 &= 30 \\ 7y &= 21 \\ y &= 3 \end{aligned}$$

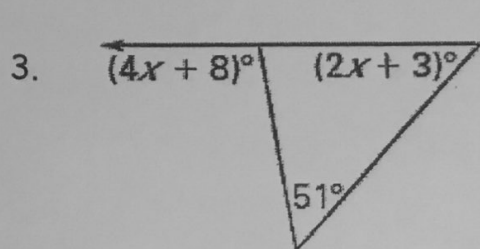
Find the perimeter of the triangle.



$$\begin{aligned} 4x + 3 &= 8x - 15 \\ 18 &= 4x \\ x &= 4.5 \end{aligned}$$

$$\begin{aligned} P &= 21 + 21 + 30.5 \\ P &= 72.5 \end{aligned}$$

Find the measure of the exterior angle shown.



$$\begin{aligned} 2x + 3 + 51 &= 4x + 8 \\ 2x + 54 &= 4x + 8 \\ 46 &= 2x \\ x &= 23 \end{aligned}$$

$$4(23) + 8 = 100^\circ$$

Find the measure of the numbered angle.

4. $m\angle 1$ 60°

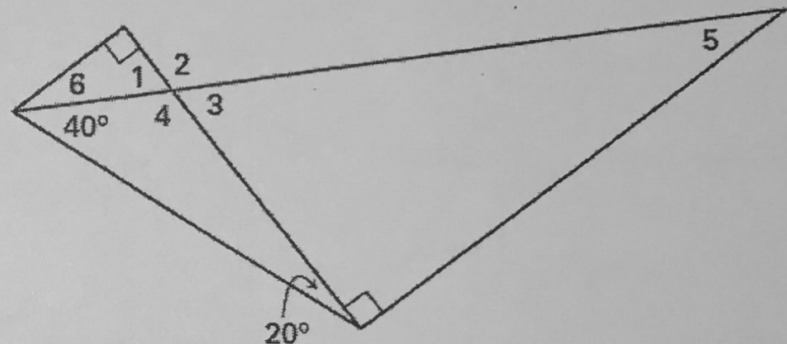
7. $m\angle 2$ 120°

5. $m\angle 3$ 60°

8. $m\angle 4$ 120°

6. $m\angle 5$ 30°

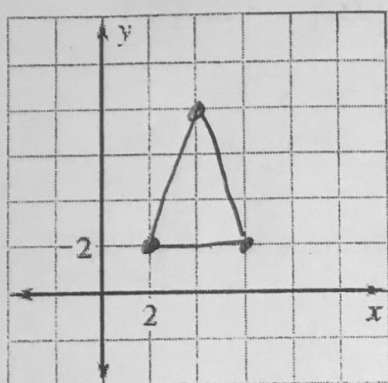
9. $m\angle 6$ 30°



ROUND 2

A triangle has the given vertices. Graph the triangle and classify it by its sides. Then determine if it is a right triangle.

1. $A(2, 2)$, $B(6, 2)$, $C(4, 8)$



Isosceles

In the diagram, $\triangle TJM \cong \triangle PHS$. Complete the statement.

2. $\angle P \cong \underline{?} \angle T$

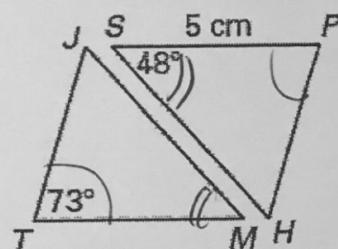
3. $\overline{JM} \cong \underline{?} \overline{HS}$

4. $m\angle M = \underline{?} 48^\circ$

5. $m\angle P = \underline{?} 73^\circ$

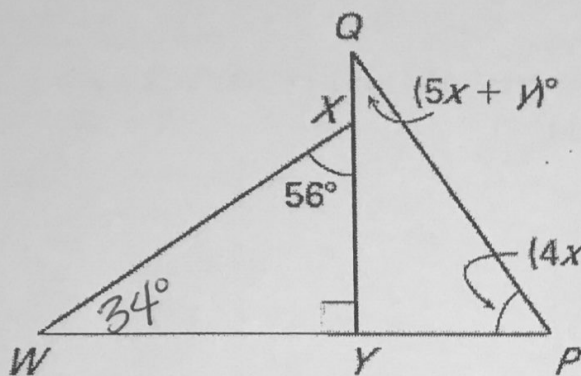
6. $MT = \underline{?} 5\text{cm}$

7. $\triangle HPS \cong \underline{?} \triangle JTM$



Find the value of x and y .

8.



$$\begin{aligned} 4x + 2y &= 56 \\ -2(5x + y &= 34) \\ \hline -10x - 2y &= -68 \\ \hline -6x &= -12 \\ x &= 2 \end{aligned}$$

$$\begin{aligned} 5(2) + y &= 34 \\ 10 + y &= 34 \\ y &= 24 \end{aligned}$$

Complete the sentence with *always*, *sometimes*, or *never*.

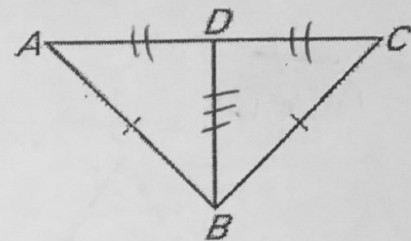
9. An acute triangle is sometimes scalene.

ROUND 3

Proof Complete the proof.

GIVEN: $\overline{AB} \cong \overline{CB}$, D is the midpoint of \overline{AC} .

PROVE: $\triangle ABD \cong \triangle CBD$

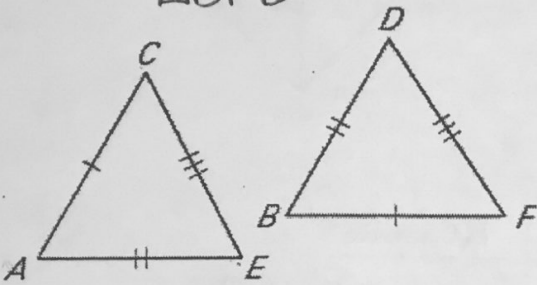


Statements	Reasons
1. $\overline{AB} \cong \overline{CB}$	1. ? Given
2. D is the midpoint of \overline{AC} .	2. ? Given
3. $\overline{AD} \cong \overline{CD}$	3. ? def. of midpoint
4. $\overline{BD} \cong \overline{BD}$	4. ? reflexive
5. $\triangle ABD \cong \triangle CBD$	5. ? SSS

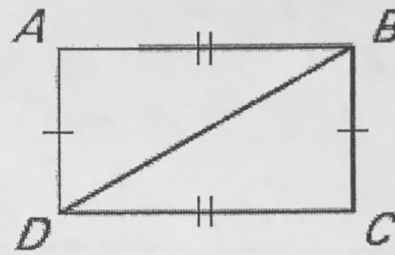
Decide whether the congruence statement is true. If it is true, write TRUE. If it is false, correct it.

6. false 7. true 8. false

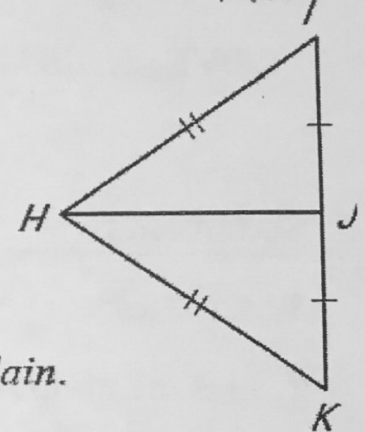
$$\triangle ACE \cong \triangle BDF$$



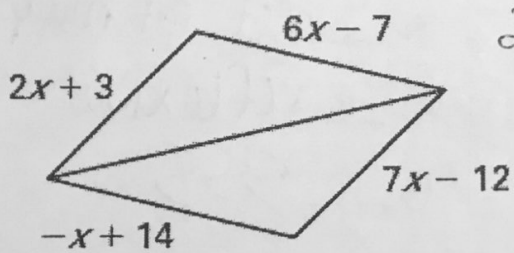
$$\triangle ABD \cong \triangle CDB$$



$$\triangle IHJ \cong \triangle JHK$$



9. Find all values of x that make the triangles congruent. Explain.



$$2x+3 = 7x-12$$

$$15 = 5x$$

$$x = 3$$

$$6x-7 = -x+14$$

$$7x = 21$$

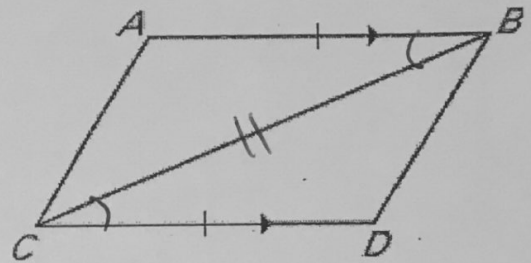
$$x = 3$$

ROUND 4

Proof Complete the proof.

GIVEN: $\overline{AB} \parallel \overline{CD}$, $\overline{AB} \cong \overline{CD}$

PROVE: $\triangle ABC \cong \triangle DCB$



Statements

Reasons

1. $\overline{AB} \parallel \overline{CD}$

1. ? Given

2. $\angle ABC \cong \angle DCB$

2. ? Alt. Int. Angles

3. $\overline{AB} \cong \overline{CD}$

3. ? Given

4. $\overline{CB} \cong \overline{CB}$

4. ? Reflexive

5. $\triangle ABC \cong \triangle DCB$

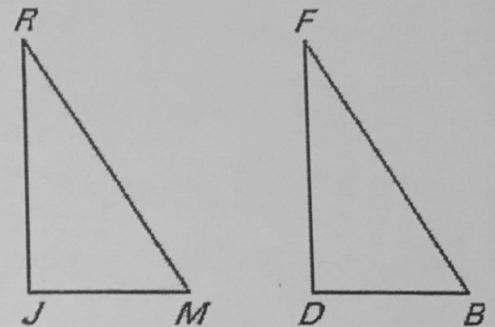
5. ? SAS

State the third congruence that must be given to prove that $\triangle JRM \cong \triangle DFB$ using the indicated postulate.

6. GIVEN: $\overline{JR} \cong \overline{DF}$, $\overline{JM} \cong \overline{DB}$, $\overline{RM} \cong \overline{FB}$
Use the SSS Congruence Postulate.

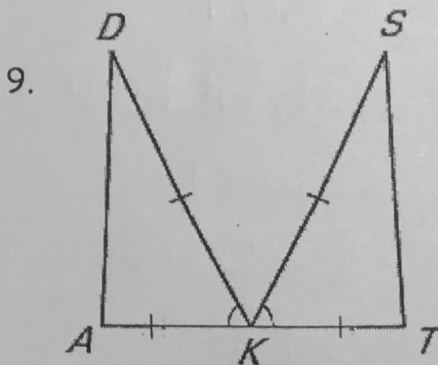
7. GIVEN: $\overline{JR} \cong \overline{DF}$, $\overline{JM} \cong \overline{DB}$, $\angle J \cong \angle D$
Use the SAS Congruence Postulate.

8. GIVEN: $\overline{RM} \cong \overline{FB}$, $\angle J$ is a right angle and $\angle D$ is a right angle, $\angle J \cong \angle D$, $\overline{JM} \cong \overline{DB}$
Use the HL Congruence Theorem.



$\overline{JR} \cong \overline{DF}$
OR
 $\overline{JM} \cong \overline{DB}$

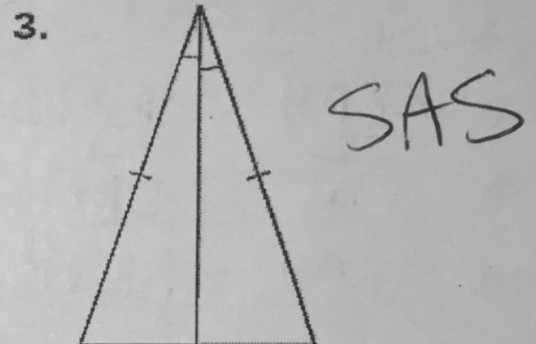
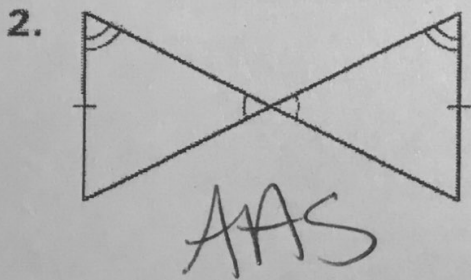
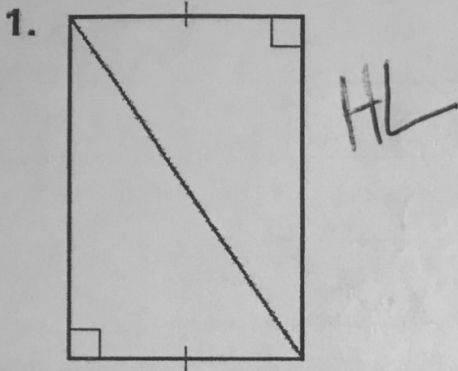
Decide whether enough information is given to prove that the triangles are congruent using the SAS Congruence Postulate.



yes

ROUND 5

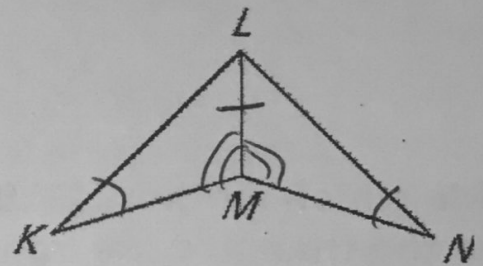
Decide which method, SAS, ASA, AAS, or HL, can be used to prove the triangles are congruent.



In Exercises 4–11, complete the proof.

GIVEN: $\angle K \cong \angle N$, $\angle KML \cong \angle NML$

PROVE: $\triangle KML \cong \triangle NML$



Statements	Reasons
4. $\angle K \cong \angle N$	5. Given
6. $\angle KML \cong \angle NML$	7. Given
8. $\overline{LM} \cong \overline{LM}$	9. Reflexive
10. $\triangle KML \cong \triangle NML$	11. AAS