

Geometry Chapter 4 Topics List

1. Triangle Interior Angle Sum Conjecture
2. Properties of Isosceles Triangles
 - a. Base Angle Congruence
3. Properties of Equilateral Triangles
4. Triangle Exterior Angle Conjecture
5. Proofs

6. Triangle Congruency Conjectures

- a. SSS (Side-Side-Side)
- b. SAS (Side-Angle-Side)
- c. ASA (Angle-Side-Angle) *Hypotenuse Leg*
- d. SAA (Side-Angle-Angle)
- e. Non-congruencies
 - i. SSA (Side-Side-Angle)
 - ii. AAA (Angle-Angle-Angle)

1. If the pair of triangles are congruent, write the congruent statement and the congruence property. If the pair of triangles are not congruent, state "cannot be determined"

a.

$\triangle ACD \cong \triangle BCD$
Conjecture: HL

b.

$\triangle HMO \cong \triangle SEM$
Conjecture: CBD

c.

$\triangle EKF \cong \triangle GKH$
Conjecture: SAS

d.

$\triangle WZX \cong \triangle YXZ$
Conjecture: CBD

2. Solve for x and/or y. Show all work.

a.

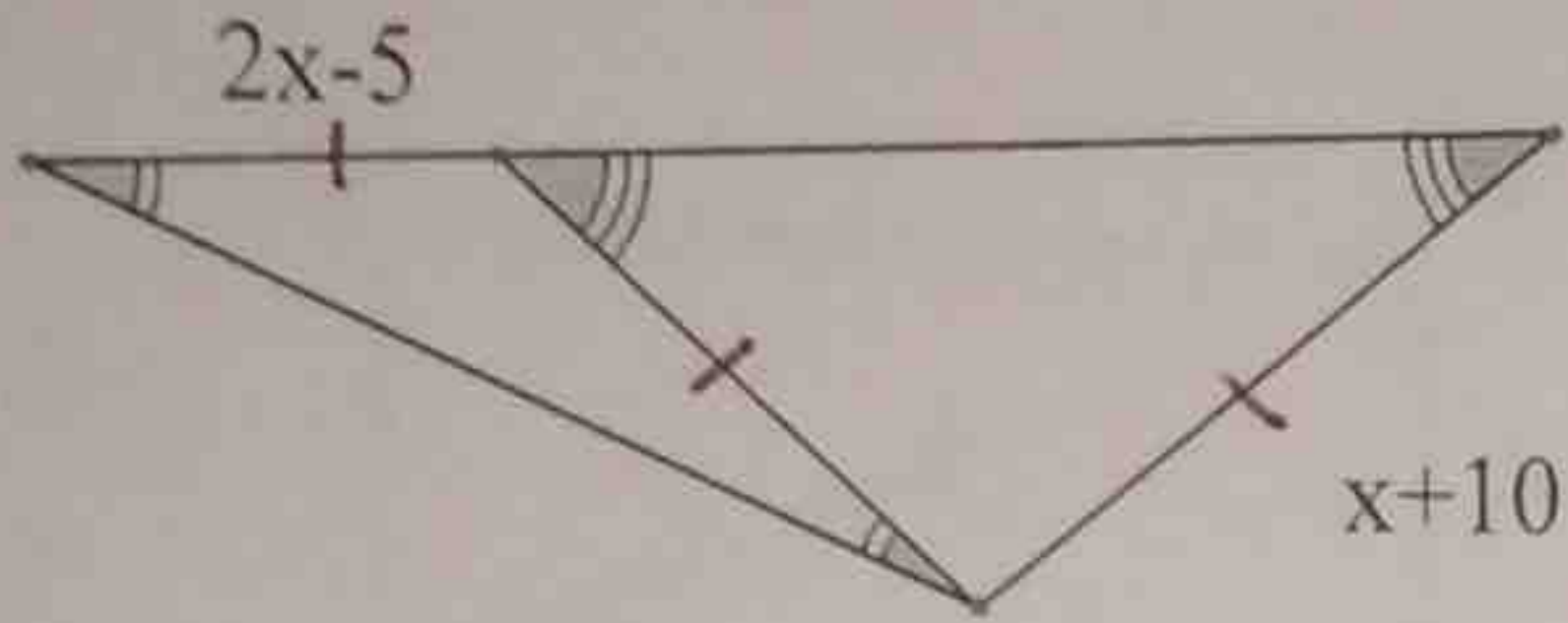
$27 - x = 12 + 2x$
 $39 = 3x$
 $13 = x$

$\Delta's \cong$ by AAS
 $y = 35$

b.

Ext. \angle Theorem
 $5x + 2 = x + 64$
 $4x = 62$
 $x = \frac{31}{2}$

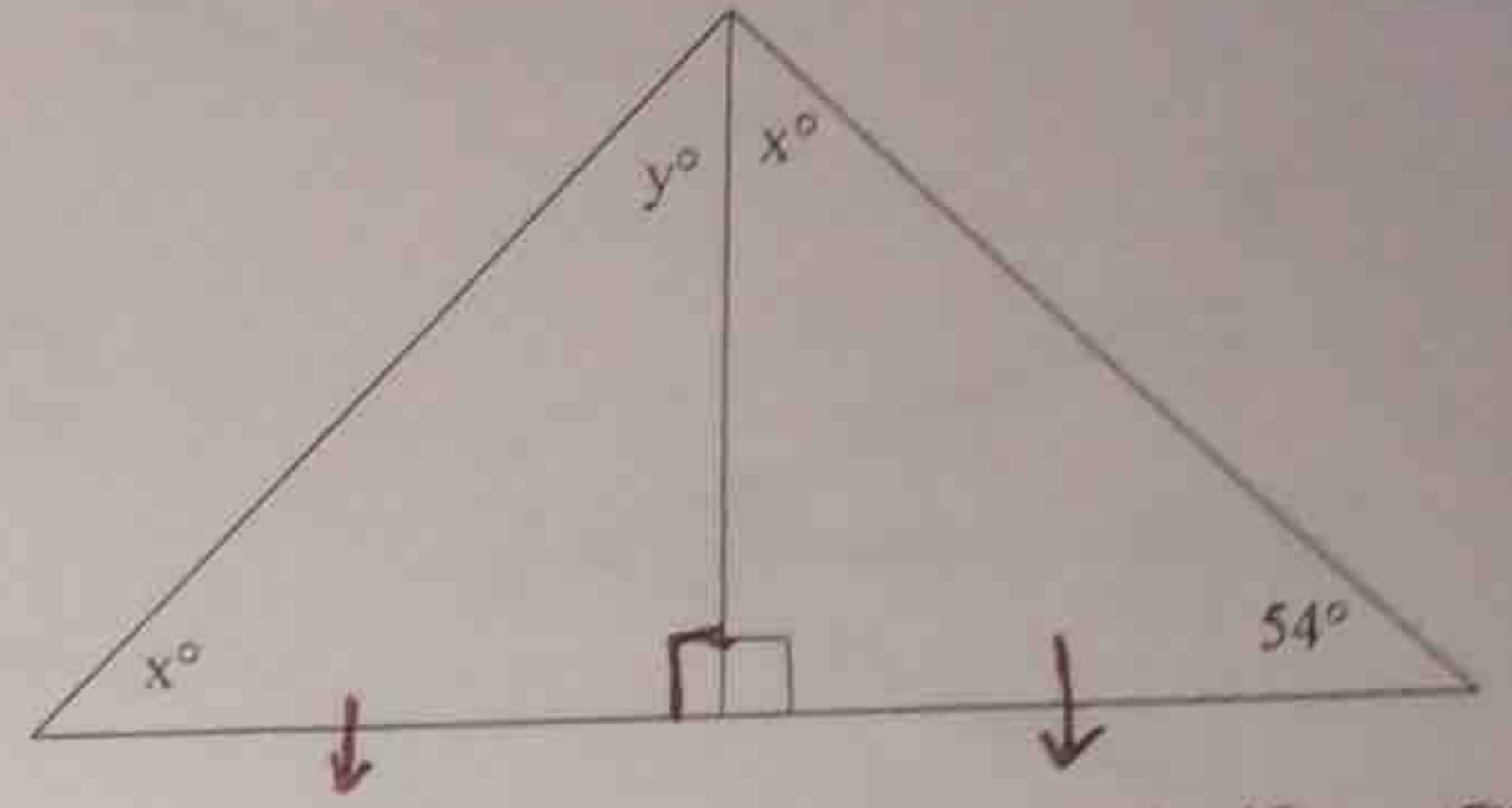
c.



$$2x-5 = x+10$$

$$x = 15$$

d.



$$x + y + 90 = 180$$

$$(36) + y + 90 = 180$$

$$y = 54$$

$$x + 54 + 90 = 180$$

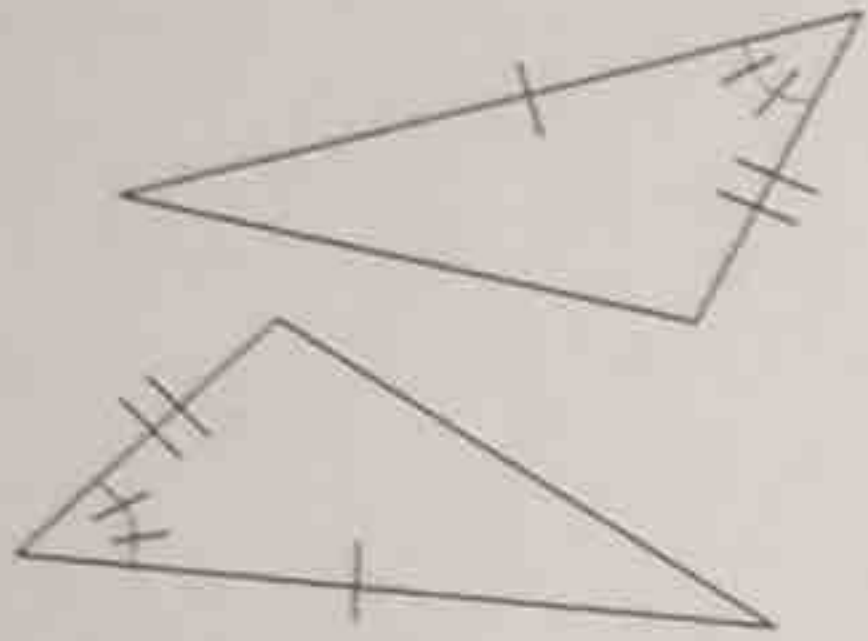
$$x + 54 = 90$$

$$x = 36$$

3. If the pair of triangles are congruent, write the congruence property. If the pair of triangles are not congruent, state "cannot be determined".

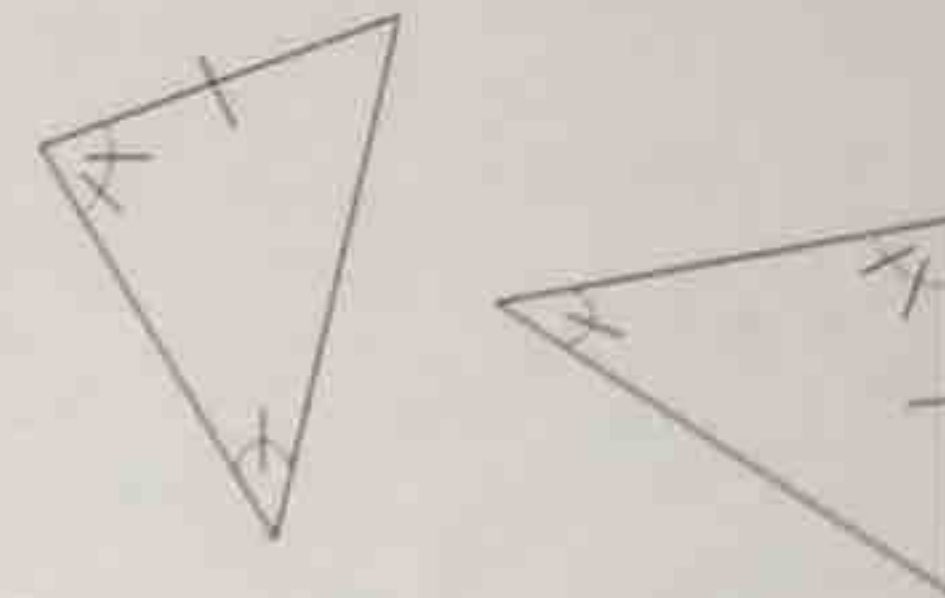
a.

SAS



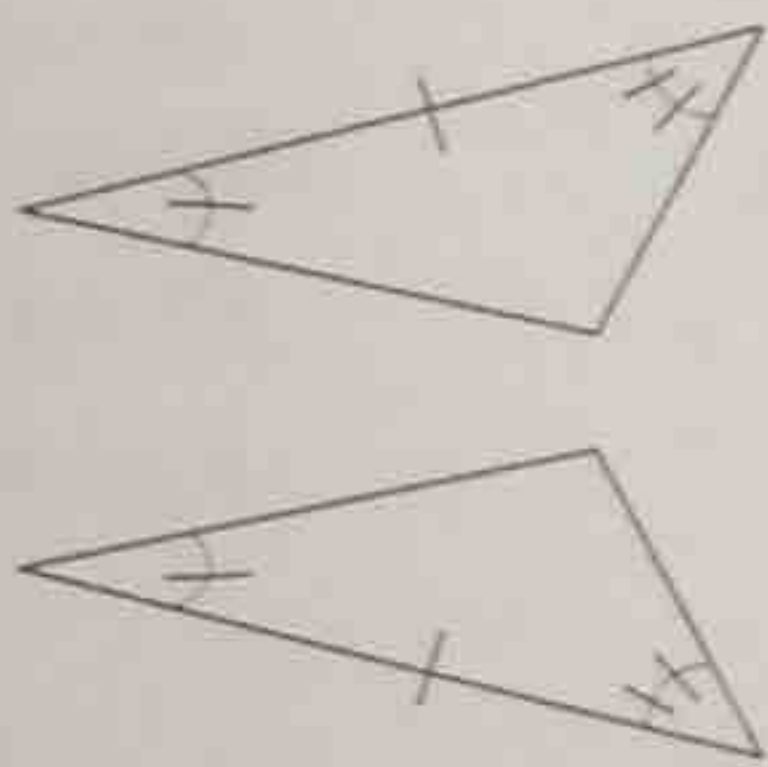
b.

AAS



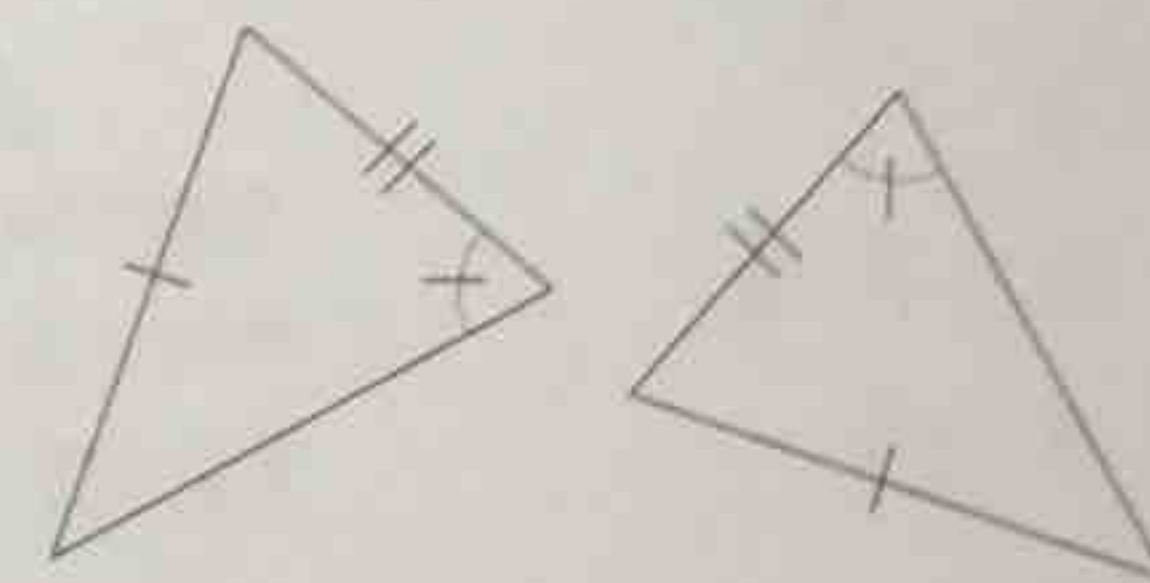
c.

ASA



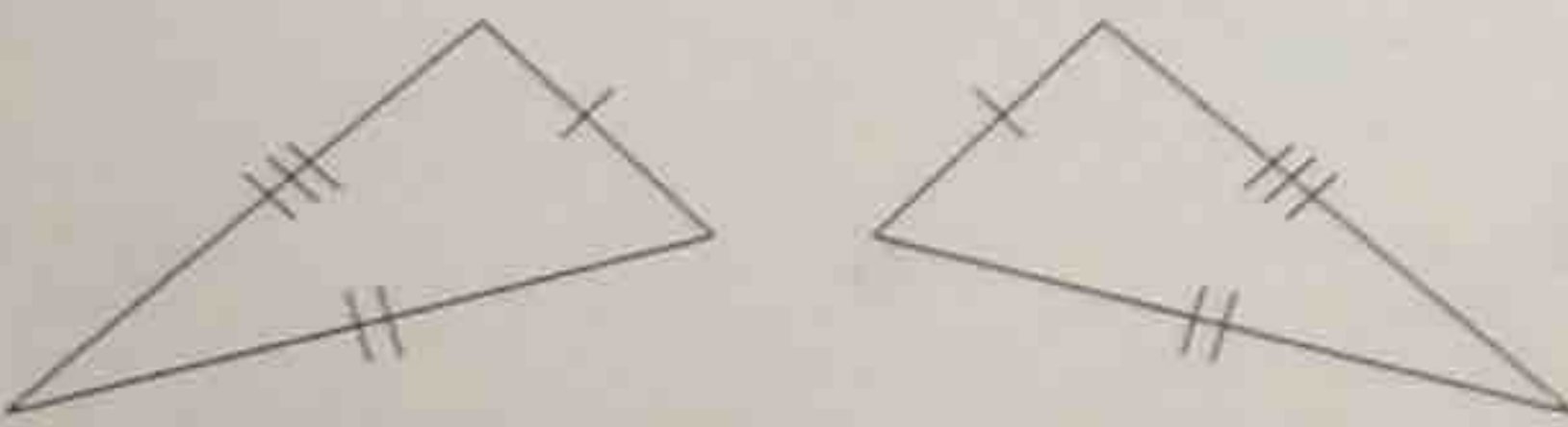
d.

(CBD)



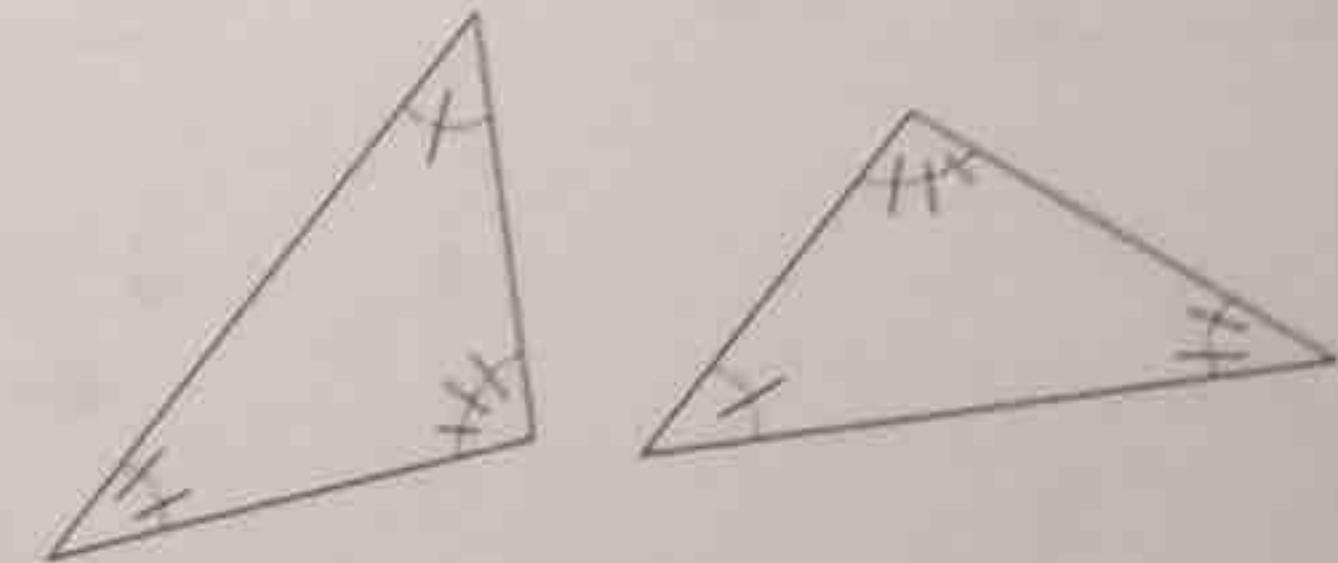
e.

SSS



f.

(CBD)



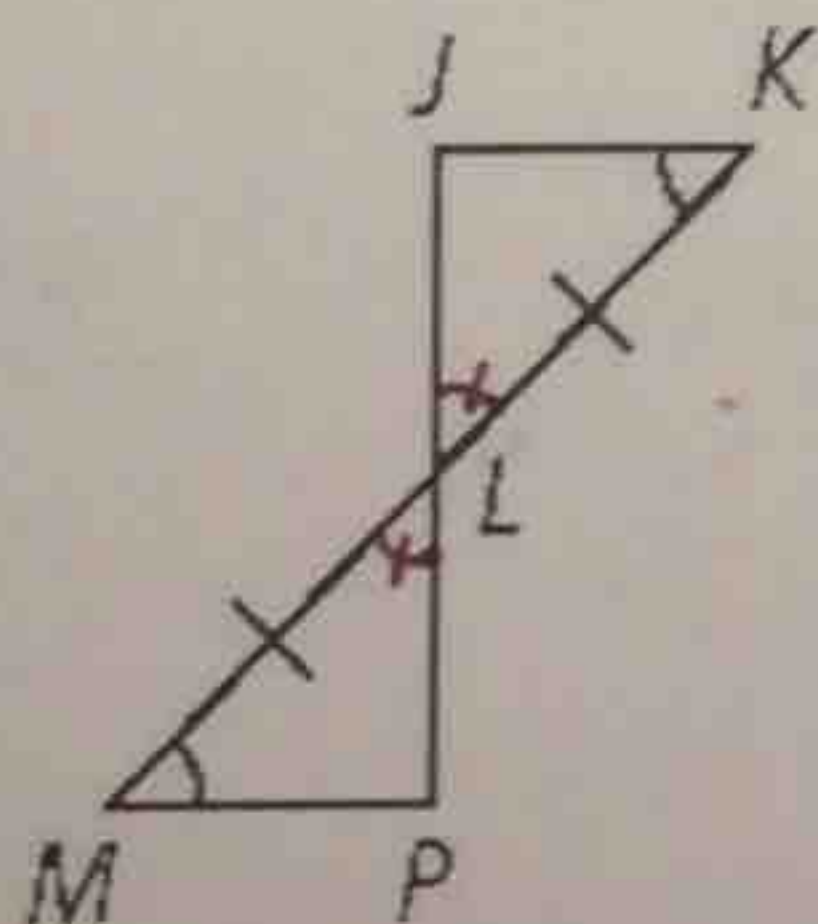
4.

Write a congruence statement for the triangles if they are congruent and state the congruence property. If the triangles are not congruent write "cannot be determined".

a.

$\Delta JKL \cong \Delta PML$

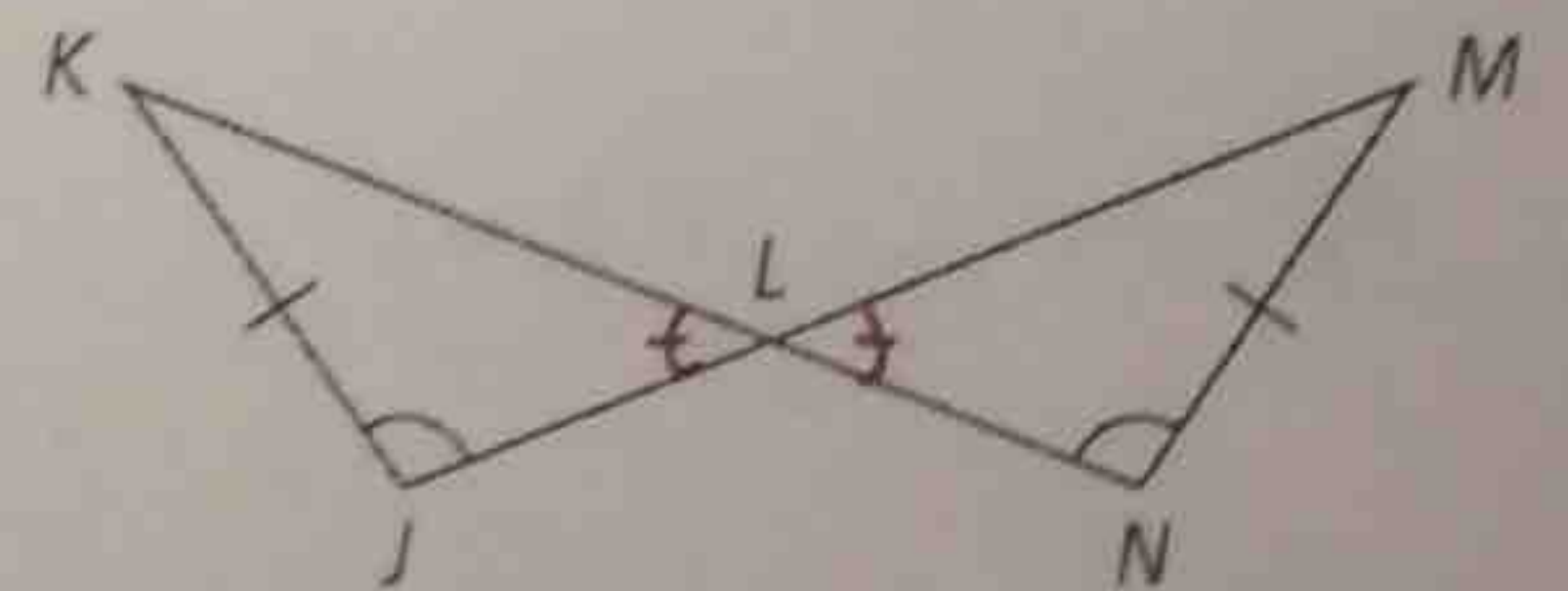
ASA



b.

$\Delta JKL \cong \Delta NML$

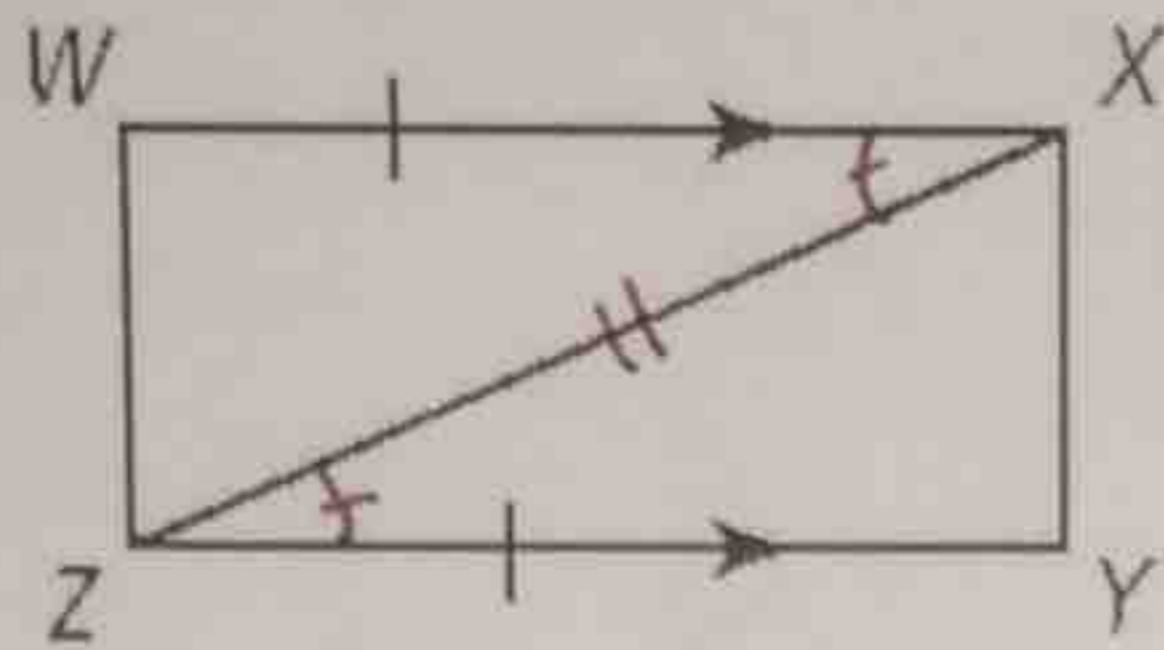
AAS



c.

$$\underline{\Delta XYZ \cong \Delta ZWX}$$

SAS

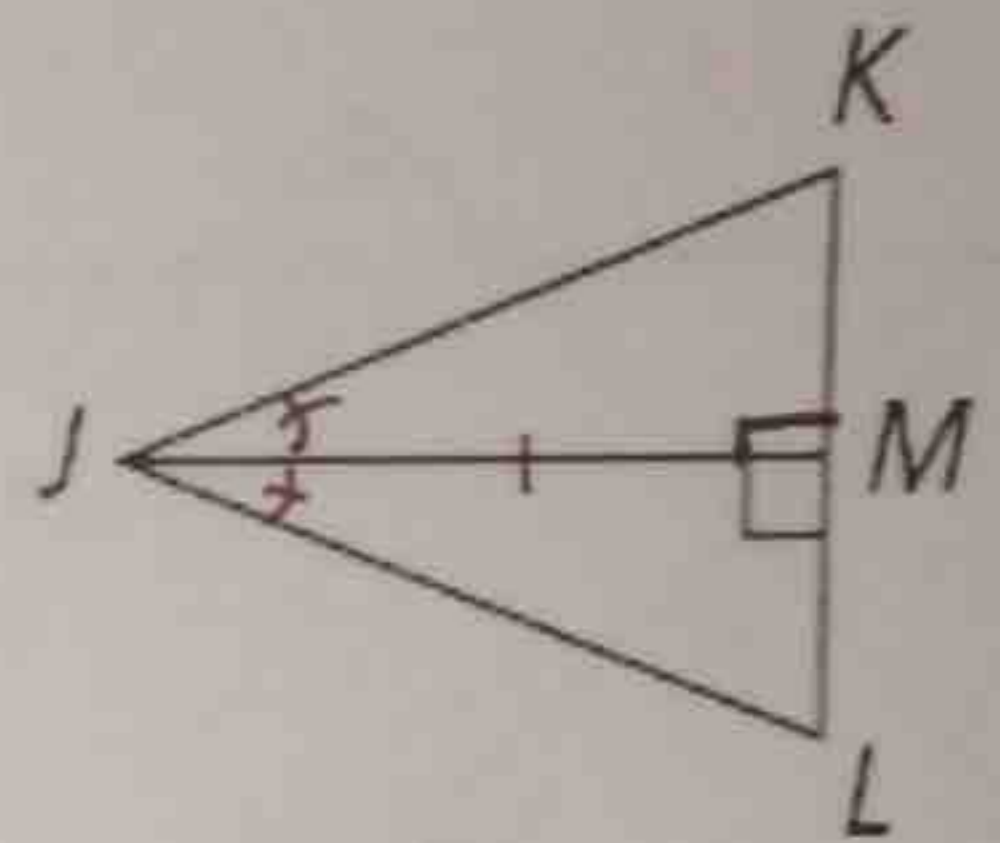


d.

\overline{JM} bisects $\angle J$

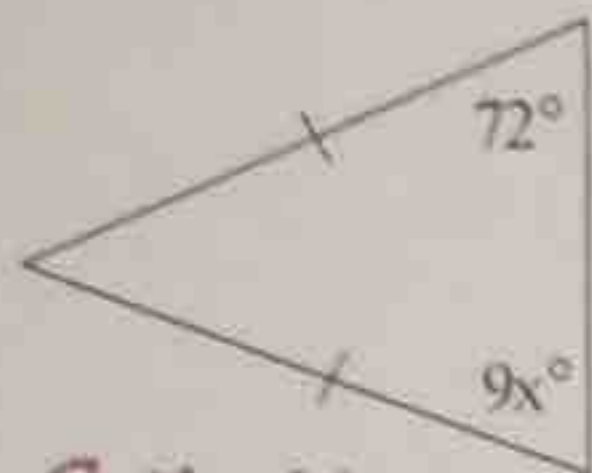
$$\underline{\Delta JKM \cong \Delta JLM}$$

ASA



5. Solve for x and/or y . Show your work using equations.

a.

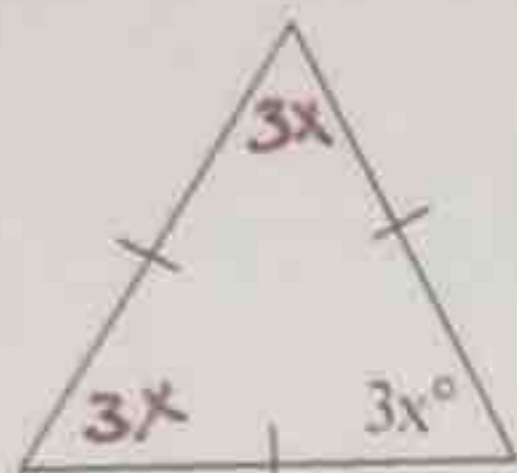


$$9x = 72$$

$$x = 8$$

$x = \underline{8}$

b.



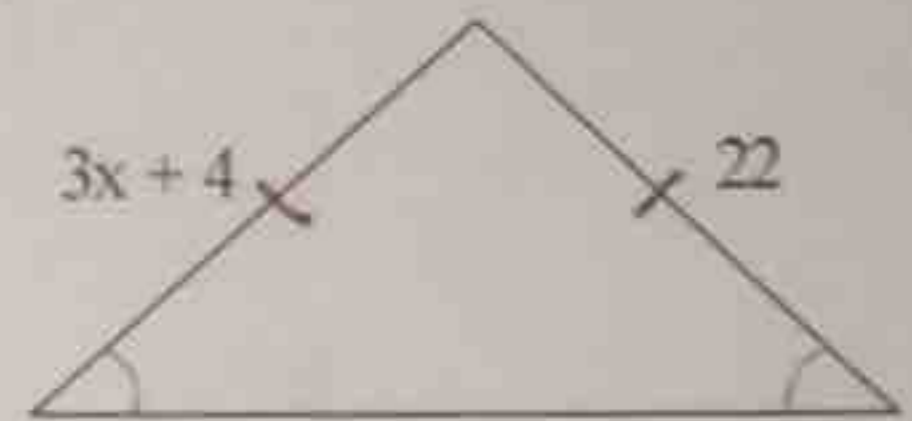
$$3x + 3x + 3x = 180$$

$$9x = 180$$

$$x = 20$$

$x = \underline{20}$

c.



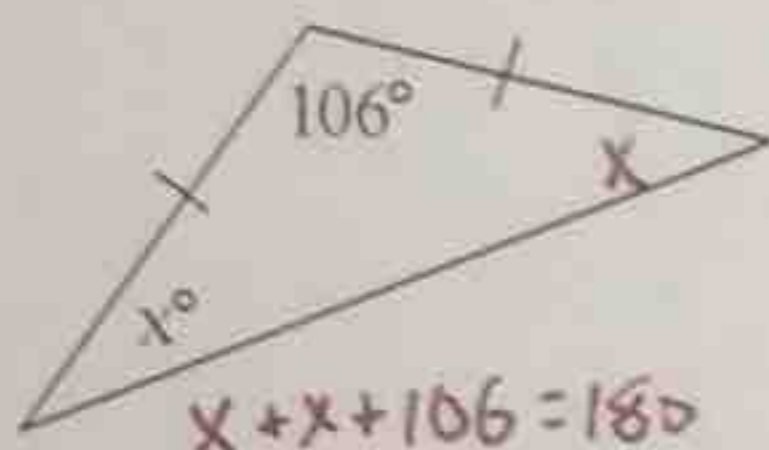
$$22 = (3x+4)$$

$$18 = 3x$$

$$6 = x$$

$x = \underline{6}$

d.



$$x + x + 106 = 180$$

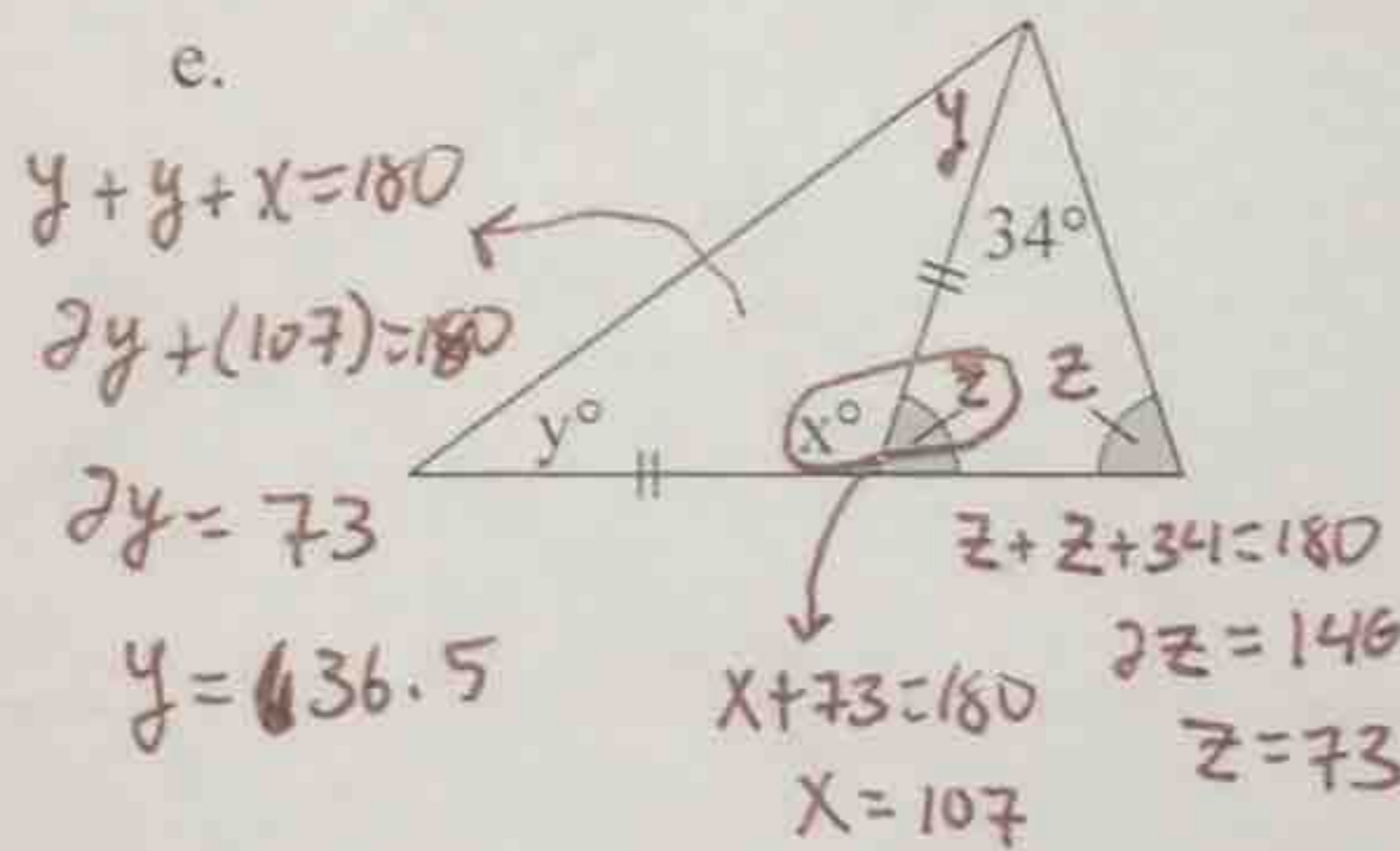
$$2x + 106 = 180$$

$$2x = 74$$

$$x = 37$$

$x = \underline{37}$

e.



$$y + y + x = 180$$

$$2y + (107) = 180$$

$$2y = 73$$

$$y = 36.5$$

$$z + z + 34 = 180$$

$$2z = 146$$

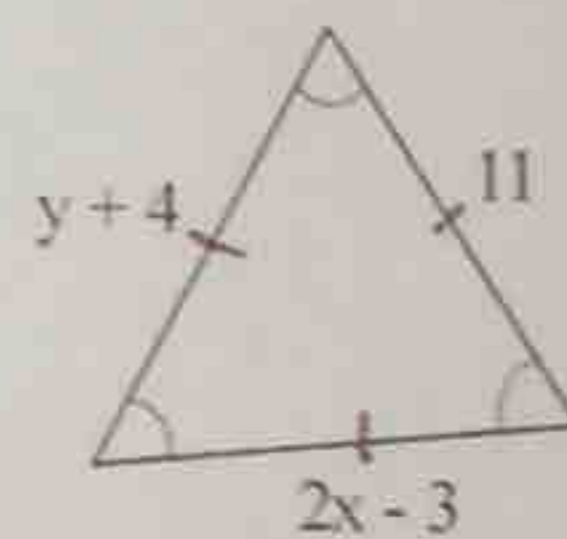
$$z = 73$$

$$x + 73 = 180$$

$$x = 107$$

$x = \underline{107}$ $y = \underline{36.5}$

f.



$$y + 4 = 11$$

$$y = 7$$

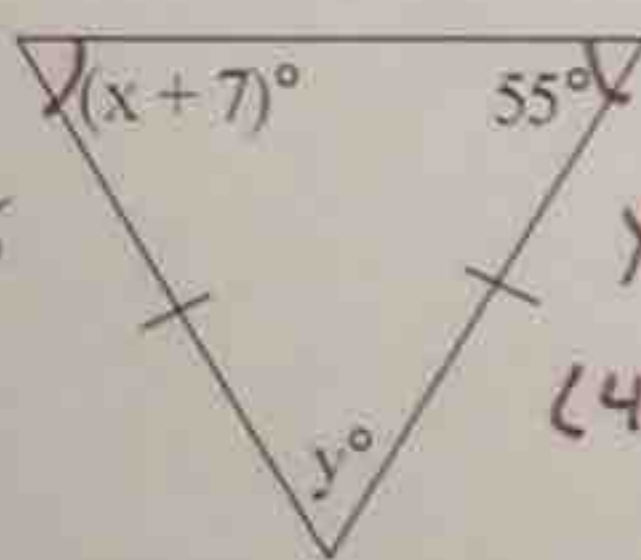
$$2x - 3 = 11$$

$$2x = 14$$

$$x = 7$$

$x = \underline{7}$ $y = \underline{7}$

g.



$$x + 7 = 55$$

$$x = 48$$

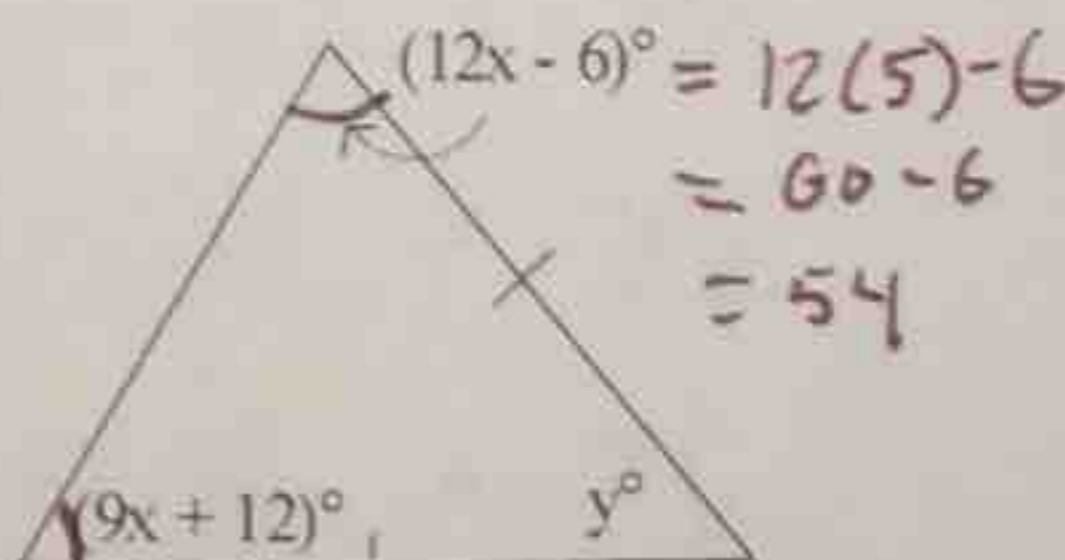
$$x + y + 55 = 180$$

$$(48) + y + 55 = 180$$

$$y = 77$$

$x = \underline{48}$ $y = \underline{77}$

h.



$$(12x - 6) = 12(5) - 6$$

$$= 60 - 6$$

$$= 54$$

$$12x - 6 = 9x + 12$$

$$3x = 18$$

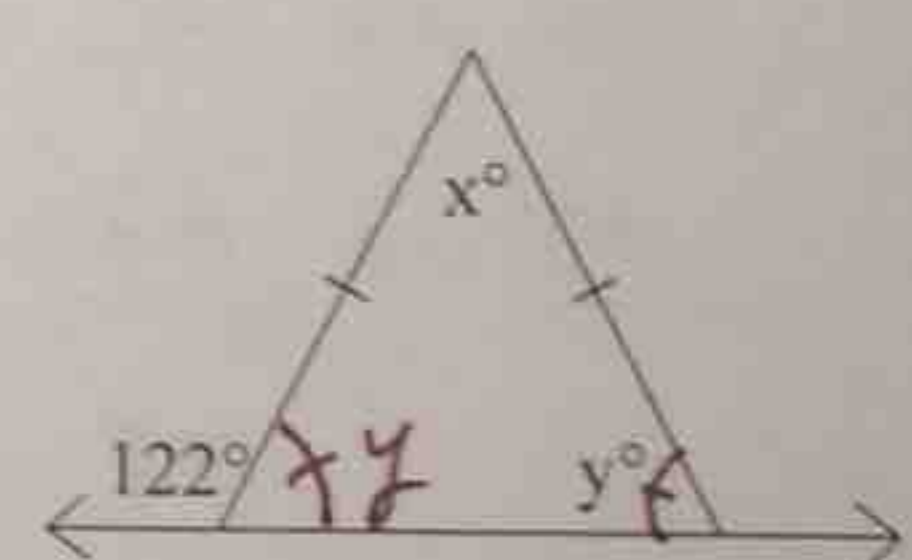
$$x = 6$$

$$108 + y = 180$$

$$y = 72$$

$x = \underline{6}$ $y = \underline{72}$

i.



$$y + 122 = 180$$

$$y = 58$$

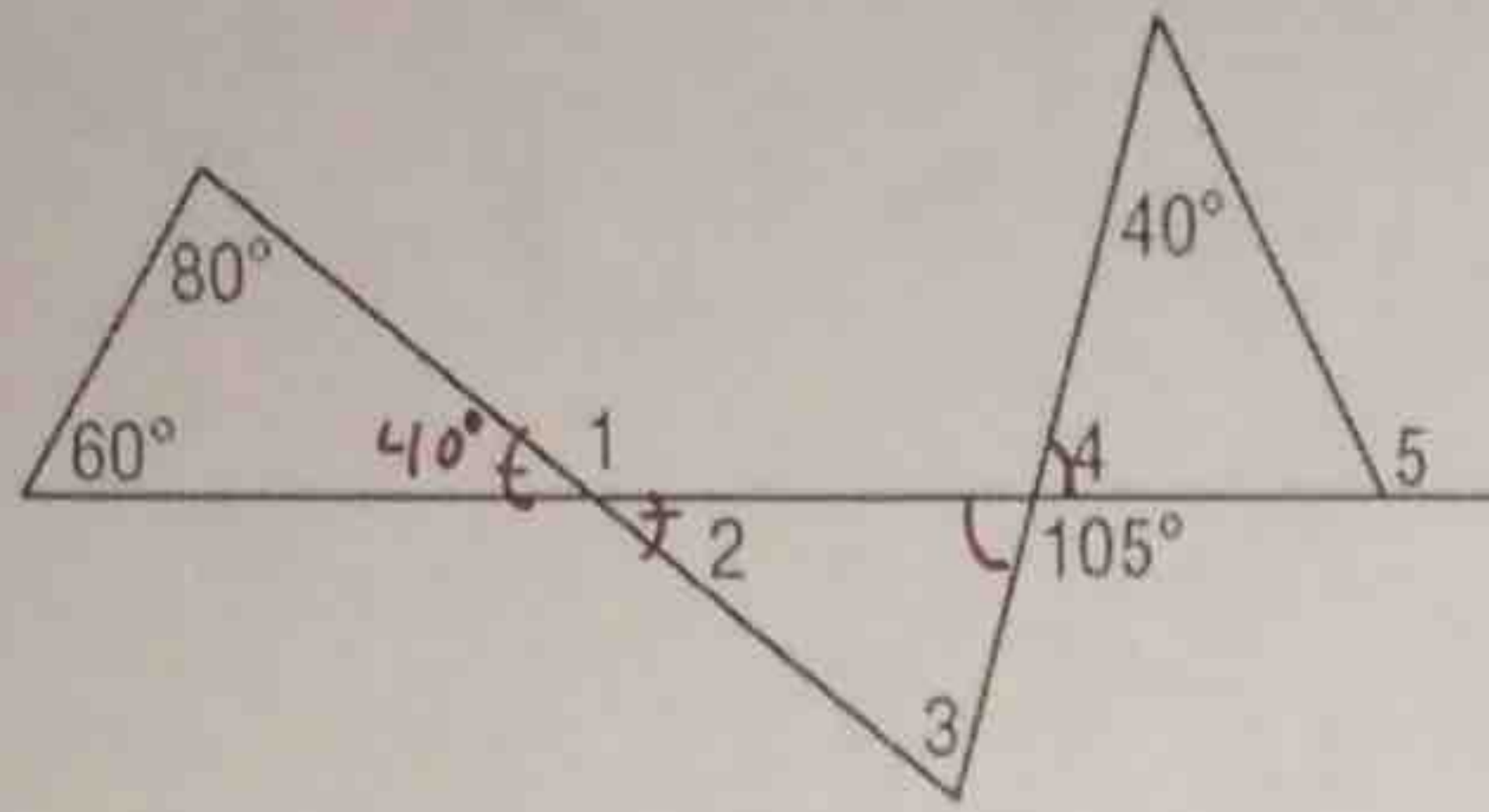
$$116 + x = 180$$

$$x = 64$$

$x = \underline{64}$ $y = \underline{58}$

6. Solve for the missing parts.

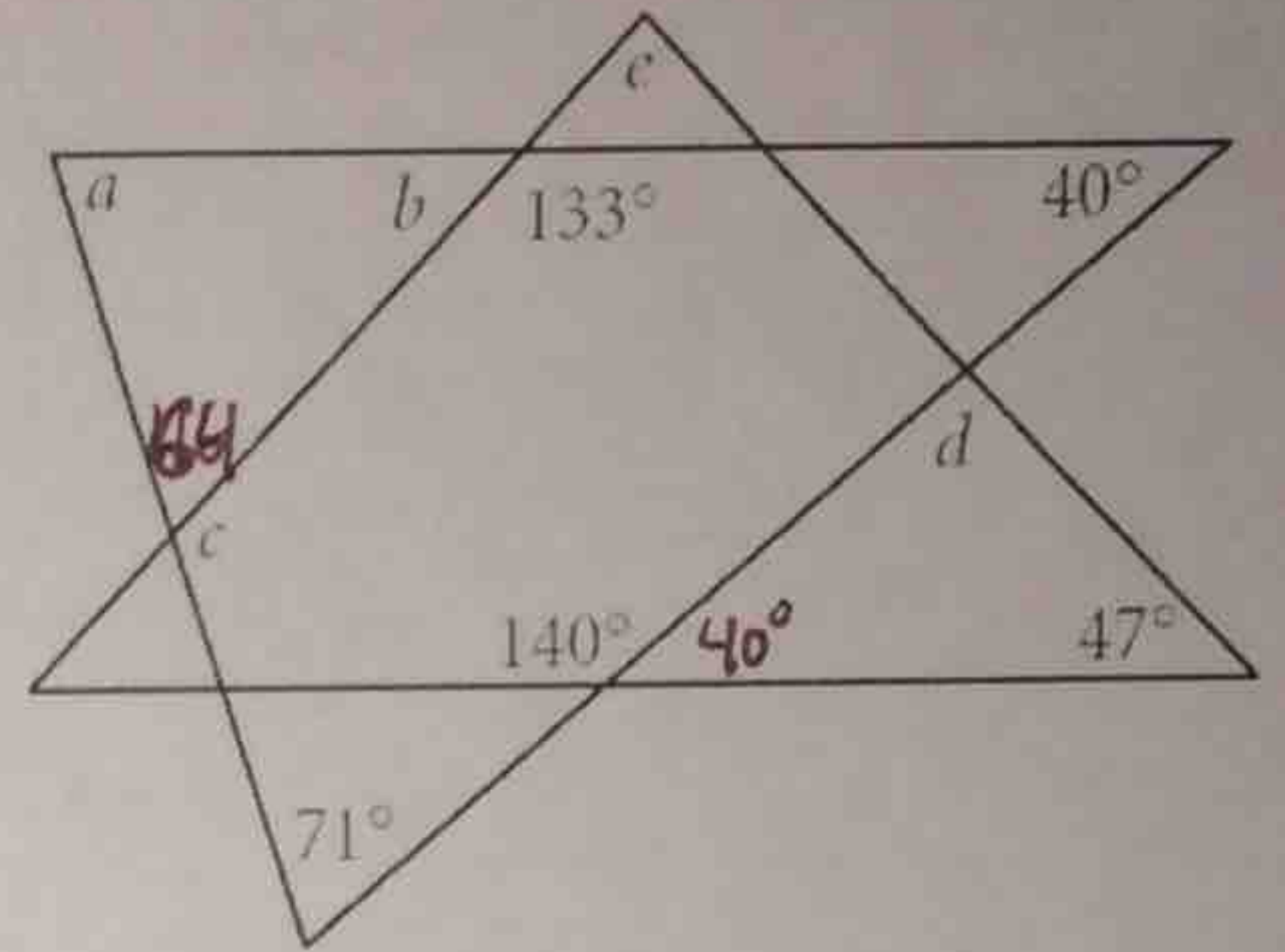
a.



$$m\angle 1 = \underline{140^\circ} \quad m\angle 2 = \underline{40^\circ} \quad m\angle 3 = \underline{65} \quad m\angle 4 = \underline{75}$$

$$m\angle 5 = \underline{115}$$

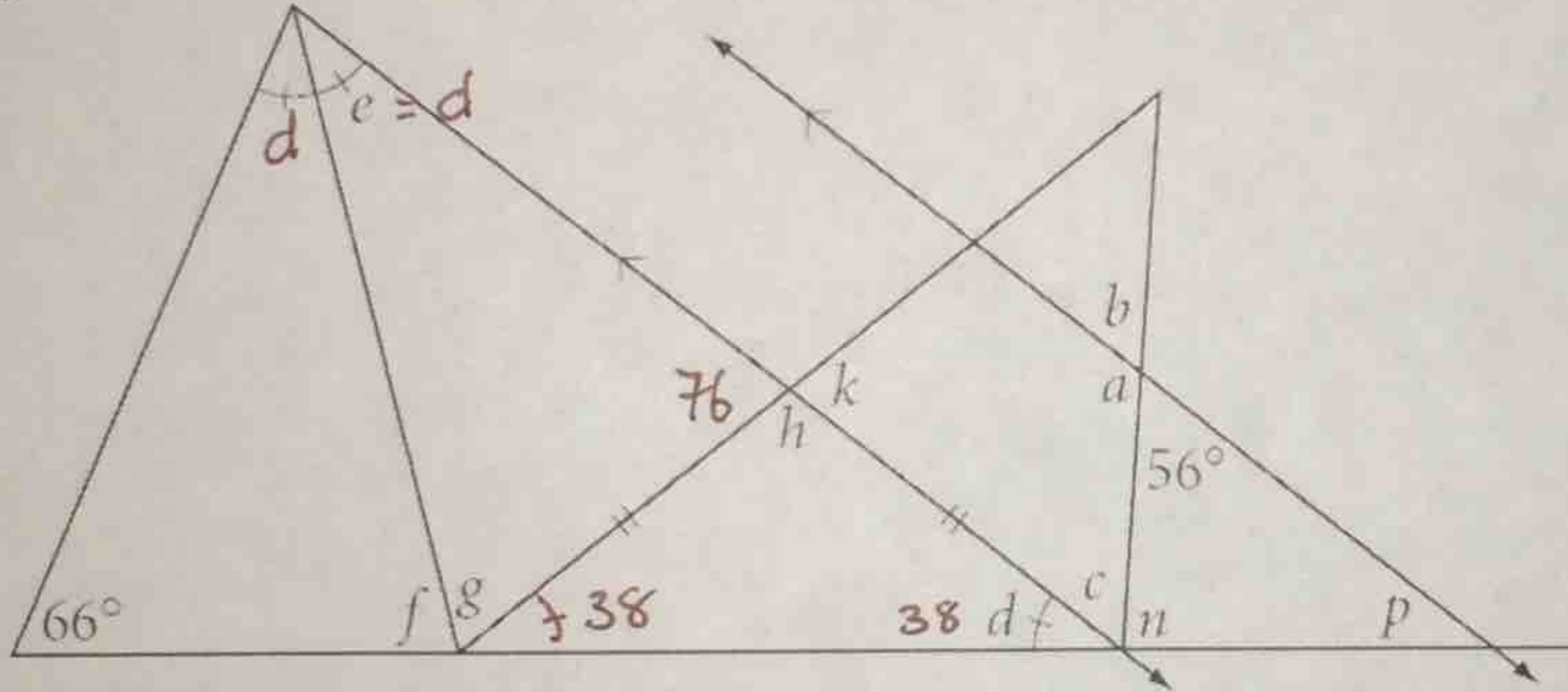
b.



$$a = \underline{69} \quad b = \underline{47}$$

$$c = \underline{116} \quad d = \underline{93}$$

c.



$$66 + d + d + d = 180$$

$$3d + 66 = 180$$

$$3d = 114$$

$$d = 38$$

$$a = \underline{124} \quad b = \underline{56}$$

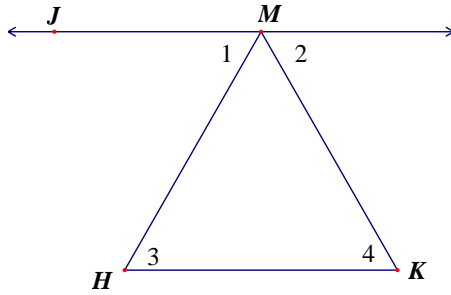
$$c = \underline{56} \quad d = \underline{38}$$

$$e = \underline{38} \quad f = \underline{86}$$

$$g = \underline{66} \quad h = \underline{104}$$

$$k = \underline{76} \quad n = \underline{86}$$

$$p = \underline{38}$$



1. Given: $\angle 1 \cong \angle 2$
 $\overline{JM} \parallel \overline{HK}$

Prove: $\triangle HMK$ is isosceles

Statement	Reason
1. $\angle 1 \cong \angle 2$	1. Given
2. $\overline{JM} \parallel \overline{HK}$	2. Given
3. $\angle 1$ and $\angle 3$ are alternate interior angles.	3. Definition of Alternate Interior Angles
4. $\angle 2$ and $\angle 4$ are alternate interior angles.	4. Definition of Alternate Interior Angles
5. $\angle 1 \cong \angle 3$	5. Alternate Interior Angles Theorem
6. $\angle 2 \cong \angle 4$	6. Alternate Interior Angles Theorem
7. $\angle 3 \cong \angle 4$	7. Transitive Property
8. $\triangle HMK$ is isosceles	8. Converse of Isosceles Triangle Theorem

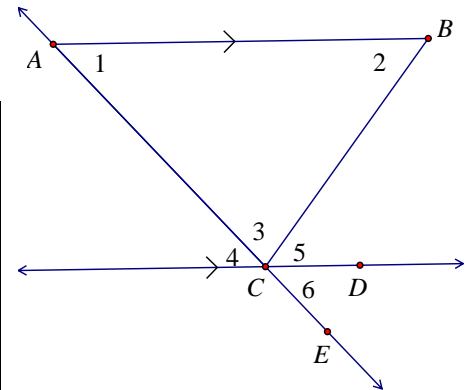
2. Solve each equation and state the property of equality or arithmetic as a reason to solve the equation.

a.		b.	
$3(x-11) = 15$	Given	$\frac{1}{3}(2x-1) = 9$	Given
$3x - 33 = 15$	Distributive Property	$2x - 1 = 27$	Multiplication Property
$3x = 48$	Addition Property	$2x = 28$	Addition Property
$x = 16$	Division Property	$x = 14$	Division Property

3. Complete the proof below.

Given: $\triangle ABC$ with exterior angle $\angle BCE$ and $\overline{CD} \parallel \overline{AB}$.

Prove: $m\angle 1 + m\angle 2 = \angle BCE$

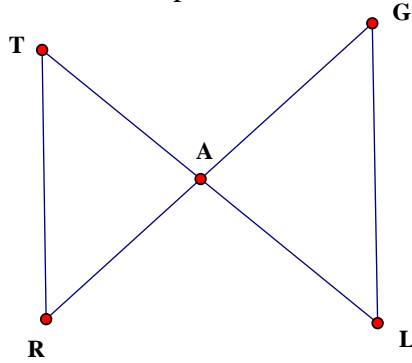


Statement	Reason
1. $\overline{CD} \parallel \overline{AB}$	1. Given
2. $\angle 2$ and $\angle 5$ are alternate interior angles. $\angle 1$ and $\angle 4$ are alternate interior angles.	2. Definition of Alternate Interior \angle s
3. $\angle 2 \cong \angle 5$, $\angle 1 \cong \angle 4$	3. Alternate Interior Angles Theorem
4. $\angle 4$ and $\angle 6$ are vertical angles.	4. Definition of Vertical Angles
5. $\angle 4 \cong \angle 6$	5. Vertical Angles Theorem
5. $\angle 1 \cong \angle 6$	5. Transitive Property
6. $m\angle 5 + m\angle 6 = \angle BCE$	6. Angle Addition Postulate
7. $m\angle 1 + m\angle 2 = \angle BCE$	7. Transitive Property (Substitution)

4-5. Write a two-column proof for the statements below.

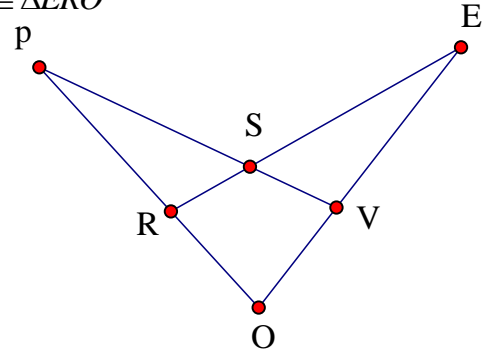
4. Given: $\angle T \cong \angle L$ and A is a midpoint of \overline{RG}

Prove: $\overline{TR} \cong \overline{GL}$



5. Given: $\overline{PO} \cong \overline{EO}$ and $\angle P \cong \angle E$

Prove: $\Delta PVO \cong \Delta ERO$



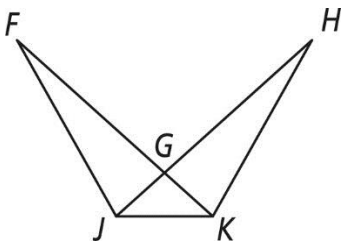
Statement	Reason
1. $\angle T \cong \angle L$	1. Given
2. A is a midpoint of \overline{RG}	2. Given
3. $\overline{AR} \cong \overline{AG}$	3. Def of Midpoint
4. $\angle TAG$ and $\angle LAG$ are vertical angles	4. Def of Vertical Angles
5. $\angle TAR \cong \angle LAG$	5. Vertical Angles Theorem
6. $\Delta TAR \cong \Delta LAG$	6. AAS Theorem
7. $\overline{TR} \cong \overline{GL}$	7. CPCTC

Statement	Reason
1. $\overline{PO} \cong \overline{EO}$	1. Given
2. $\angle P \cong \angle E$	2. Given
3. $\angle O \cong \angle O$	3. Reflexive Prop
4. $\Delta PVO \cong \Delta ERO$	4. ASA Postulate

Create a **flowchart** proof.

6. Given: $\angle FJK \cong \angle HKJ, \overline{FJ} \cong \overline{HK}$

Prove: $\angle F \cong \angle H$



Statement	Reason
1. $\angle FJK \cong \angle HKJ$	1. Given
2. $\overline{FJ} \cong \overline{HK}$	2. Given
3. $\overline{JK} \cong \overline{KJ}$	3. Reflexive Property
4. $\Delta FJK \cong \Delta HKJ$	4. SAS Postulate
5. $\angle F \cong \angle H$	5. CPCTC

7. Define the following terms:

postulate _____ A simple and useful statement that is accepted without proof _____

definition _____ A statement of the exact meaning of a word _____

theorem _____ A previously proved conjecture _____