

GEOMETRY

The Complete Course

Lesson Eleven

More Theorems Related To Congruent Triangles

KA8471

Worksheet

4. $\triangle GIN \cong \triangle ANI$
3. $\overline{IN} \cong \overline{IN}$
2. $\triangle GIN$ and $\triangle ANI$ are right triangles
1. $\angle G$ and $\angle A$ are right angles $\overline{GI} \cong \overline{AN}$ 1. Given

- | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 6. REASONS 5. T11-1 (in $\triangle AES$) 4. CPCTC 3. S.A.S. 2. T11-2 (in $\triangle CEI$) 1. Given | <ol style="list-style-type: none"> 6. STATEMENTS 5. $\angle 3 \cong \angle 4$ 4. $\overline{AE} \cong \overline{SE}$ 3. $\triangle CAE \cong \triangle ASE$ 2. $\overline{CE} \cong \overline{IE}$ 1. $\angle 1 \cong \angle 6, \overline{CA} \cong \overline{IS}$ |
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5. REASONS

4. STATEMENTS

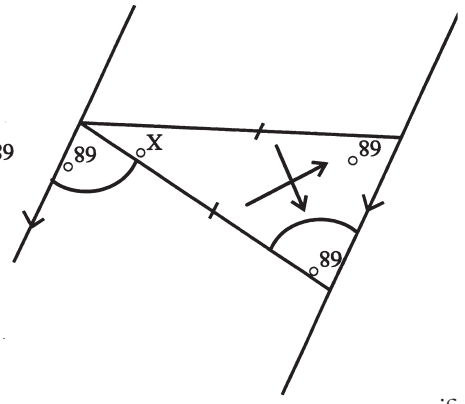
4. If one angle of a triangle is 60, then the sum of the other two angles is 120. Since the other two angles are equal, they must each equal 60. Therefore, this is an equilateral triangle which is also equilateral. Therefore:

$5X = 3X + 20$
 $X = 10$

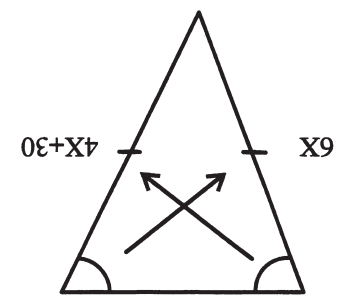
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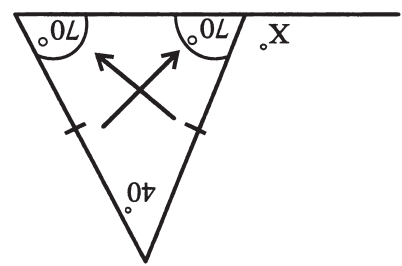
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$68^\circ + 68^\circ + x = 180^\circ$
 $x = 44^\circ$



$6X = 4X + 30$
 $x = 15$



$x + 70^\circ = 180^\circ$
 $x = 110^\circ$

I. VIDEOTAPE FOLLOW-UP QUESTIONS

- I. Introduction.
- II. Theorems related to isosceles triangles.
- Parts of an isosceles triangle
 - Leg
 - Base
 - Vertex angle
 - Base angle
 - The isosceles triangle theorem:** If two sides of a triangle are congruent, then the angles opposite those sides are congruent. (T11-1)
 - The converse of the isosceles triangle theorem:** If two angles of a triangle are congruent, then the sides opposite those angles are congruent. (T11-2)
 - The equiangular-equilateral theorem:** A triangle is equiangular if and only if it is equilateral. (T11-3)

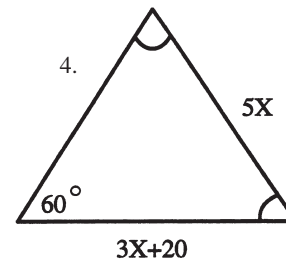
- SSS
 - SAS
 - ASA
 - AAS
- B. Right triangles
- SSS
 - SAS
 - ASA
 - AAS
 - HL
 - LL
 - LA
 - HA

III. More ways to prove triangles congruent.

- AAS congruence theorem:** If two angles and the non-included side of one triangle are congruent, respectively, to the corresponding angles and non-included side of another triangle, then the two triangles are congruent. (T11-4)
- Proving right triangles congruent
 - Definition
 - hypotenuse
 - leg
 - HL theorem:** if the hypotenuse and a leg of one right triangle are congruent to the corresponding parts of another right triangle, then the triangles are congruent. (T11-5)
 - LL (SAS) theorem:** If the two legs of one right triangle are congruent to the legs of another right triangle, then the triangles are congruent. (T11-6)
 - LA (AAS or ASA) theorem:** If a leg and an acute angle of one right triangle are congruent to the corresponding parts of another right triangle, then the triangles are congruent., (T11-7)
 - HA (AAS) theorem:** If the hypotenuse and an acute angle of one right triangle are congruent to the corresponding parts of another right triangle, then the triangles are congruent. (T11-8)

IV. Summary of ways to prove triangles congruent

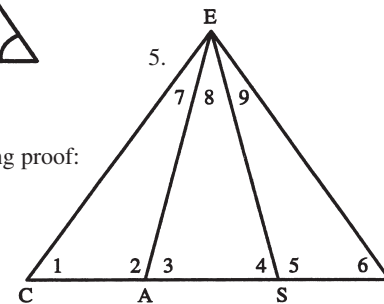
- All triangles



5. Complete the following proof:

Given: $\angle 1 \cong \angle 6$
 $\overline{CA} \cong \overline{IS}$

Prove: $\angle 3 \cong \angle 4$



STATEMENTS

1. $\angle 1 \cong \angle 6, \overline{CA} \cong \overline{IS}$

2. $\overline{CE} \cong \overline{IE}$

3. $\triangle CAE \cong \triangle ISE$

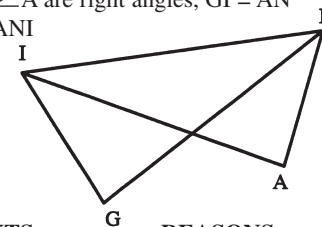
4. $\overline{AE} \cong \overline{SE}$

5. $\angle 3 \cong \angle 4$

6. Complete the following proof:

Given: $\angle G$ and $\angle A$ are right angles, $\overline{GI} \cong \overline{AN}$

Prove: $\triangle GIN \cong \triangle ANI$



STATEMENTS

1. $\angle G$ and $\angle A$ are right angles $\overline{GI} \cong \overline{AN}$

2. $\triangle GIN$ and $\triangle ANI$ are right triangles

3. $\overline{IN} \cong \overline{IN}$

4. $\triangle GIN \cong \triangle ANI$

II. SUPPLEMENTARY EXERCISES

1-4 Find the value of X in the following problems:

