

Triangle Proofs Practice

If two sides of a triangle are congruent, the angles opposite those sides are congruent. (Isosceles Triangle). Prove this theorem.

1. Given:  $\overline{AC} \cong \overline{BC}$

Prove:  $\angle CAD \cong \angle CBD$

Statements

1.  $\overline{AC} \cong \overline{BC}$

Reasons

Given

2. Draw  $\overline{CD}$  bisecting  $\angle ACB$

3.  $\angle 1 \cong \angle 2$

Def. bisecting  $\angle$ s

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

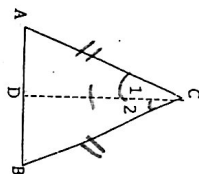
Reflexive

5.  $\triangle ACD \cong \triangle BCD$

SAS

6.  $\angle CAD \cong \angle CBD$

CPCTC



2. Given:  $\overline{BD}$  bisects  $\overline{AC}$ .

$\overline{BD}$  is perpendicular to  $\overline{AC}$ .

Prove:  $\triangle ABC$  is isosceles

Statements

1.  $\overline{BD}$  bisects  $\overline{AC}$

Reasons

Given

2.  $\overline{BD}$  is perpendicular to  $\overline{AC}$

Def. of segment bisector

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

Reflexive

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

Def. of perpendicular lines

5.  $\angle ADB$  and  $\angle BDC$  are right angles

Def. of angle congruence

6.  $\angle ADB \cong \angle BDC$

7.  $\triangle ABD \cong \triangle CBD$

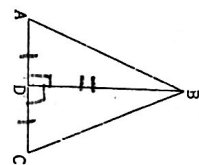
SAS

8.  $\overline{AB} \cong \overline{CB}$

CPCTC

9.  $\triangle ABC$  is isosceles

Def. of isosceles  $\triangle$  - 2 sides and angle are  $\cong$



Geometry, Unit 5 - Congruent Triangles Proof Activity - Part I

Name \_\_\_\_\_

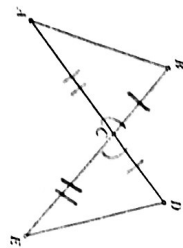
For each problem, do the following:

- Show the given information in the diagram (using tick marks to show congruent sides and arcs to show congruent angles)
- Show any other congruent parts you notice (from vertical angles, sides shared in common, or alternate interior angles with parallel lines)
- Give the postulate or theorem that proves the triangles congruent (SSS, SAS, ASA, AAS, HL)
- Finally, fill in the blanks to complete the proof.

1.

Given:  $\overline{BC} \cong \overline{DC}$ ;  $\overline{AC} \cong \overline{EC}$   
Prove:  $\triangle BCA \cong \triangle DCE$

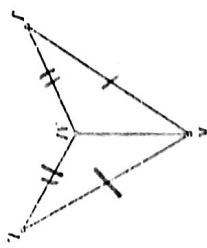
| Statements   | Reasons                        |
|--|--------------------------------|
| 1. $\overline{BC} \cong \overline{DC}$ $\overline{AC} \cong \overline{EC}$ | 1. Given                       |
| 2. $\angle BCA \cong \angle DCE$   | 2. Vertical $\angle$ s Theorem |
| 3. $\triangle BCA \cong \triangle DCE$                                     | 3. SAS                         |



2.

Given:  $\overline{JK} \cong \overline{LK}$ ;  $\overline{JM} \cong \overline{LM}$   
Prove:  $\triangle KJM \cong \triangle LKM$

| Statements   | Reasons            |
|--|--------------------|
| 1. $\overline{JK} \cong \overline{LK}$ $\overline{JM} \cong \overline{LM}$ | 1. Given           |
| 2. $\overline{KM} \cong \overline{KM}$                                     | 2. Reflexive Prop. |
| 3. $\triangle KJM \cong \triangle LKM$                                     | 3. SSS             |



3.

Given:  $\angle C \cong \angle I$ ;  $\overline{FI}$  bisects  $\angle GFI$   
Prove:  $\triangle GFI \cong \triangle IFI$

| Statements  | Reasons            |
|---|--------------------|
| 1. $\angle C \cong \angle I$ ; $\overline{FI}$ bisects $\angle GFI$ | 1. Given           |
| 2. $\angle GFH \cong \angle IFH$                                    | 2. Def. of bisect  |
| 3. $\overline{FH} \cong \overline{FH}$                              | 3. Reflexive Prop. |
| 4. $\triangle GFI \cong \triangle IFI$                              | 4. AAS             |

