

How to Write a Proof

Step 1: Mark all of the given information on the picture

Step 2: List the given information in the proof

Step 3: Look for any of the following relationships

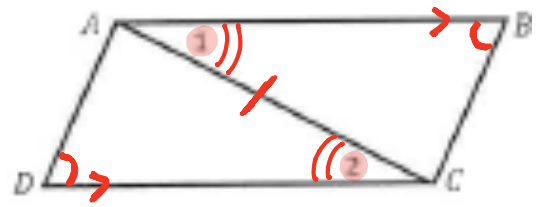
Step 4: Prove your 2 triangles congruent

Step 5: Make sure to prove what you being asked to prove

What you see	What it means	Reason
Shared Side	<p> $\overline{BD} \cong \overline{BD}$ $\overline{BD} \cong \overline{DB}$ Congruent to itself shared side </p>	Ref. Prop. \cong Reflexive Property \cong
Shared Angle	<p> share \angle Congruent to itself $\angle B \cong \angle B$ </p>	Ref. Prop. \cong Reflexive Property \cong
Vertical Angles	<p> $\angle ACB \cong \angle DCE$ </p>	Vertical Angles \cong
Parallel Lines	<p> $\overline{BC} \parallel \overline{AD}$ $\angle 1 \cong \angle 4$ $\angle 2 \cong \angle 3$ </p>	Corresponding Angles \cong Alternate Exterior Angles \cong Alternate Interior Angles \cong
Perpendicular Lines	<p> $\overline{BD} \perp \overline{AC}$ $\angle 3 + \angle 4$ are right \angle's </p>	Def. \perp Lines
2 Right Angles	<p> $\angle 3 + \angle 4$ are right \angle's $\angle 3 \cong \angle 4$ </p>	Def. of Right \angle 's All right angles \cong
Angle Bisector	<p> \overline{BD} bisects $\angle ABC$ $\angle 1 \cong \angle 2$ </p>	Def Angle Bisector
Segment Bisector	<p> \overline{BD} bisects \overline{AC} $\overline{AD} \cong \overline{DC}$ </p>	Def Segment Bisector
Midpoint	<p> D is the midpoint of \overline{AC} $\overline{AD} \cong \overline{DC}$ </p>	Def of Midpoint

Diagram	What's the same?	Proof
	$\overline{AB} \cong \overline{DE}$ $\overline{AF} \cong \overline{DG}$ $\overline{BF} \cong \overline{EG}$	$\begin{array}{l} 1). \overline{AB} \cong \overline{DE} \\ \overline{AF} \cong \overline{DG} \\ \overline{BF} \cong \overline{EG} \end{array} \quad \left \begin{array}{l} \text{Given} \\ \\ \end{array} \right.$ $2). \triangle ABF \cong \triangle DEG \quad \text{SSS}$
	$\overline{AB} \cong \overline{DE}$ $\angle A \cong \angle D$ $\overline{AF} \cong \overline{DG}$	$\begin{array}{l} 1). \overline{AB} \cong \overline{DE} \\ \angle A \cong \angle D \\ \overline{AF} \cong \overline{DG} \end{array} \quad \left \begin{array}{l} \text{Given} \\ \\ \end{array} \right.$ $2). \triangle ABF \cong \triangle DEG \quad \text{SAS} \cong$
	$\angle A \cong \angle D$ $\overline{AF} \cong \overline{DG}$ $\angle F \cong \angle G$	$\begin{array}{l} 1). \angle A \cong \angle D \\ \overline{AF} \cong \overline{DG} \\ \angle F \cong \angle G \end{array} \quad \left \begin{array}{l} \text{Given} \\ \\ \end{array} \right.$ $2). \triangle ABF \cong \triangle DEG \quad \text{ASA} \cong$
	$\angle A \cong \angle D$ $\angle B \cong \angle E$ $\overline{BF} \cong \overline{EG}$	$\begin{array}{l} 1). \angle A \cong \angle D \\ \angle B \cong \angle E \\ \overline{BF} \cong \overline{EG} \end{array} \quad \left \begin{array}{l} \text{Given} \\ \\ \end{array} \right.$ $2). \triangle ABF \cong \triangle DEG \quad \text{AAS} \cong$

Fill in the missing statements and reasons,



1. Given: $\overline{AB} \parallel \overline{DC}$, $\angle B \cong \angle D$
 Prove: $\overline{BC} \cong \overline{DA}$

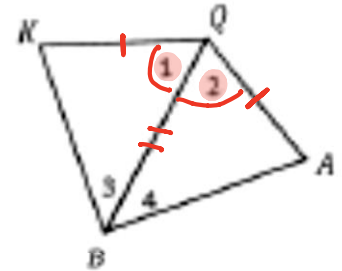
Statements

- $\overline{AB} \parallel \overline{DC}$; $\angle B \cong \angle D$
- $\angle 1 \cong \angle 2$
- $\overline{AC} \cong \overline{AC}$
- $\triangle ABC \cong \triangle CDA$
- $\overline{BC} \cong \overline{DA}$

Reasons

- Given
- Alt. Int. \angle 's \cong
- Ref. Prop. \cong
- AAS Congruence
- CPCTC

2. Given: $\overline{QK} \cong \overline{QA}$, \overline{QB} bisects $\angle KQA$
 Prove: $\overline{KB} \cong \overline{AB}$



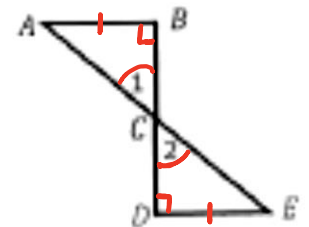
Statements

- $\overline{QK} \cong \overline{QA}$; \overline{QB} bisects $\angle KQA$
- $\angle 1 \cong \angle 2$
- $\overline{QB} \cong \overline{QB}$
- $\triangle KBQ \cong \triangle ABQ$
- $\overline{KB} \cong \overline{AB}$

Reasons

- Given
- Definition of Angle Bisector
- Reflexive Property of Congruence
- SAS Congruence
- CPCTC

3. Given: $\overline{BD} \perp \overline{AB}$, $\overline{BD} \perp \overline{DE}$, $\overline{AB} \cong \overline{DE}$
 Prove: $\angle A \cong \angle E$



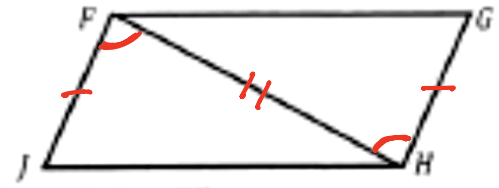
Statements

- $\overline{BD} \perp \overline{AB}$; $\overline{BD} \perp \overline{DE}$; $\overline{AB} \cong \overline{DE}$
- $\angle B$ & $\angle D$ are right angles
- $\angle B \cong \angle D$
- $\angle 1 \cong \angle 2$
- $\triangle ABC \cong \triangle EDC$
- $\angle A \cong \angle E$

Reasons

- Given
- Definition of \perp Lines
- All right angles are congruent
- Vertical $\angle \cong$
- AAS Congruence
- CPCTC

4. Given: $FJ \cong GH$, $\angle JFH \cong \angle GHF$
 Prove: $FG \cong JH$



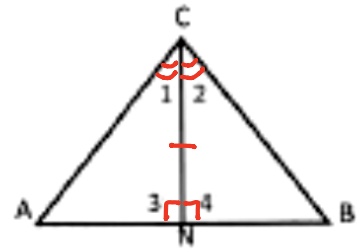
Statements

1. $\underline{FJ \cong GH, \angle JFH \cong \angle GHF}$
2. $\underline{FH \cong HF}$
3. $\underline{\Delta JFH \cong \Delta GHF}$
4. $\underline{FG \cong JH}$

Reason

1. Given
2. Ref. Prop. \cong
3. SAS Congruence
4. CPCTC

6. Given: $CN \perp AB$, CN bisects $\angle ACB$
 Prove: $AC \cong CB$



Statements

1. $\underline{CN \perp AB, CN \text{ bisects } \angle ACB}$
2. $\underline{\angle 3 \text{ \& \ } \angle 4 \text{ are right angles}}$
3. $\underline{\angle 3 \cong \angle 4}$
4. $\underline{\angle 1 \cong \angle 2}$
5. $\underline{CN \cong CN}$
6. $\underline{\Delta ANC \cong \Delta BNC}$
7. $\underline{AC \cong CB}$

Reasons

1. Given
2. Definition of Perpendicular Lines
3. All right angles are congruent
4. Definition of Angle Bisector
5. Ref. Prop. \cong
6. ASA Congruence
7. CPCTC