# Proving the Congruence of Triangles

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Sauyo High School

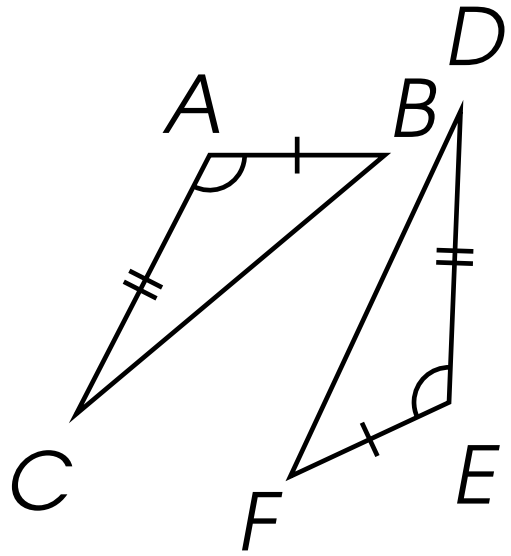
# Example 1

Given: $\overline{AB} \cong \overline{EF}$

$\overline{AC} \cong \overline{ED}$

$\angle A \cong \angle E$

Prove: $\triangle ABC \cong \triangle EFD$



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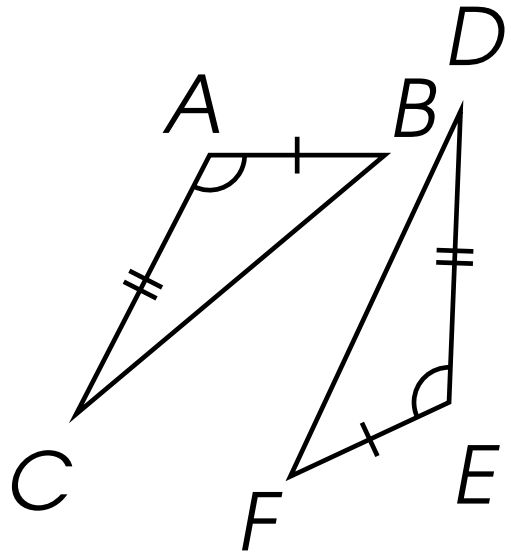
Proof:




| Statements | Reasons |
| --- | --- |

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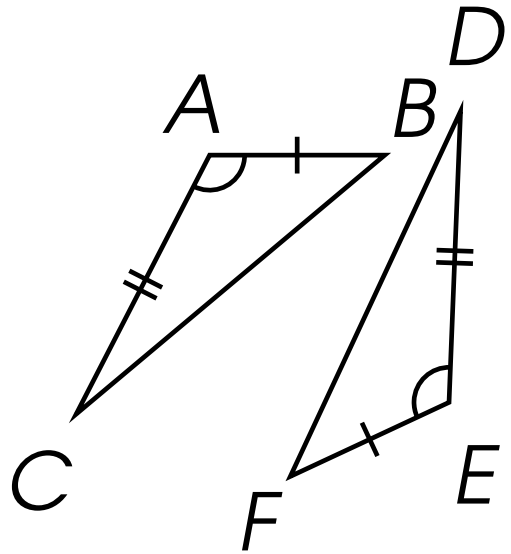


| Statements | Reasons |
|---|---|
| 1. $\overline{AB} \cong \overline{EF}$ | 1. Given |

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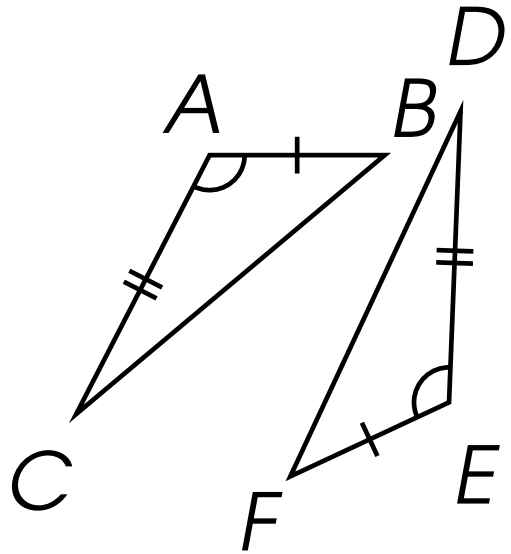


| Statements | Reasons |
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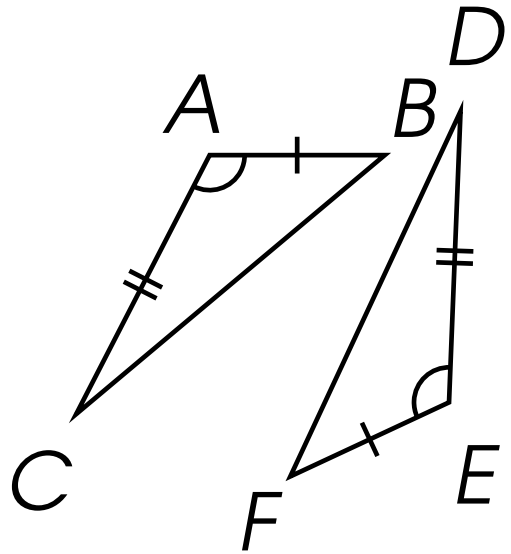


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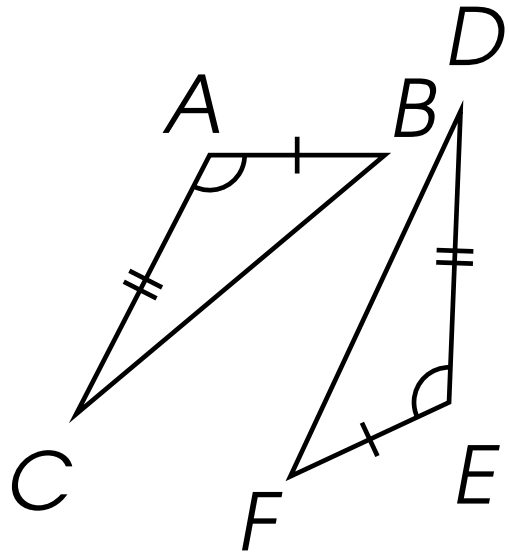
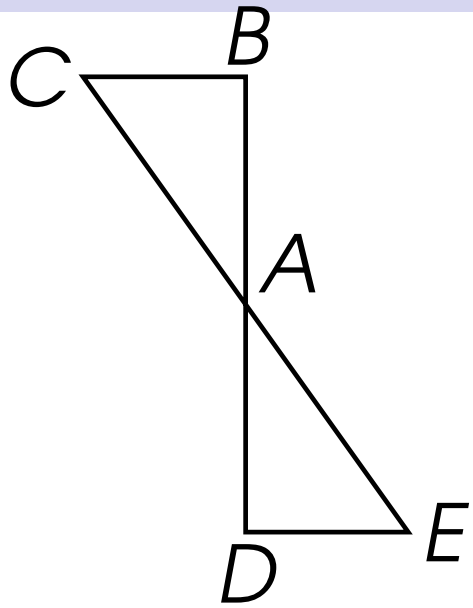



| Statements | Reasons |
|---|---|
| 1. $\overline{AB} \cong \overline{EF}$ | 1. Given |
| 2. $\overline{AC} \cong \overline{ED}$ | 2. Given |
| 3. $\angle A \cong \angle E$ | 3. Given |
| 4. $\triangle ABC \cong \triangle EFD$ | 4. SAS Triangle Congruence Postulate |

# Example 2

Given: $\overline{AB} \cong \overline{AD}$
$\angle B \cong \angle D$

Prove: $\triangle ABC \cong \triangle ADE$



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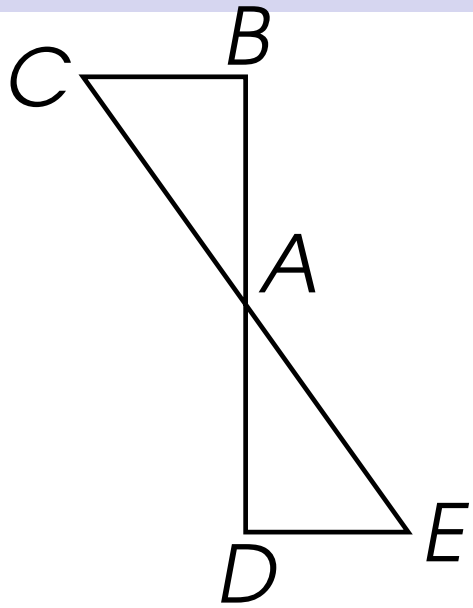
Given: $\overline{AB} \cong \overline{AD}$
$\angle B \cong \angle D$

Prove: $\triangle ABC \cong \triangle ADE$



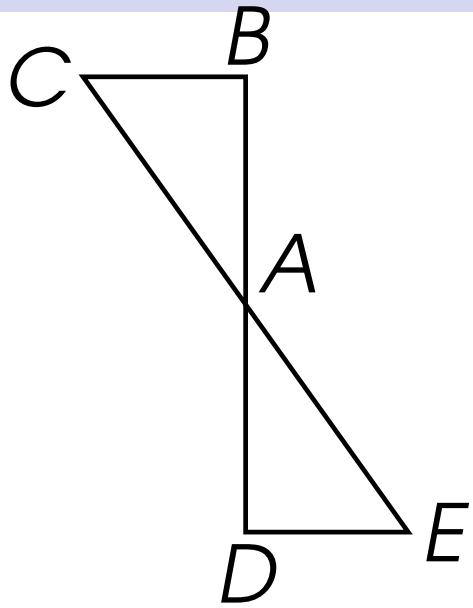

Proof:

| Statements | Reasons |
| --- | --- |

# Example 2

Given: $\overline{AB} \cong \overline{AD}$
$\angle B \cong \angle D$

Prove: $\triangle ABC \cong \triangle ADE$




Proof:

| Statements | Reasons |
|---|---|
| 1. $\overline{AB} \cong \overline{AD}$ | 1. Given |

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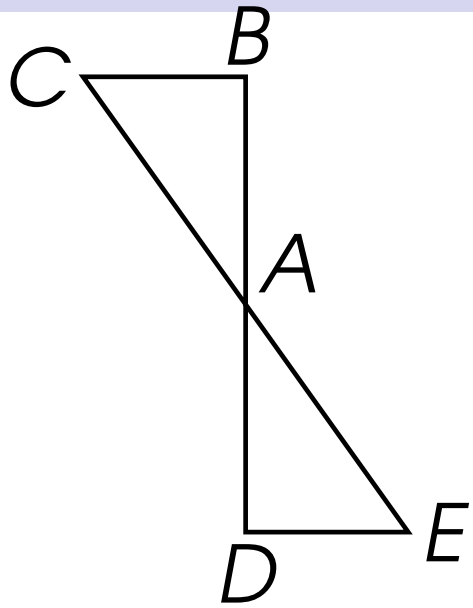
Given: $\overline{AB} \cong \overline{AD}$
$\angle B \cong \angle D$

Prove: $\triangle ABC \cong \triangle ADE$




Proof:

| Statements | Reasons |
|---|---|
| 1. $\overline{AB} \cong \overline{AD}$ | 1. Given |
| 2. $\angle B \cong \angle D$ | 2. Given |

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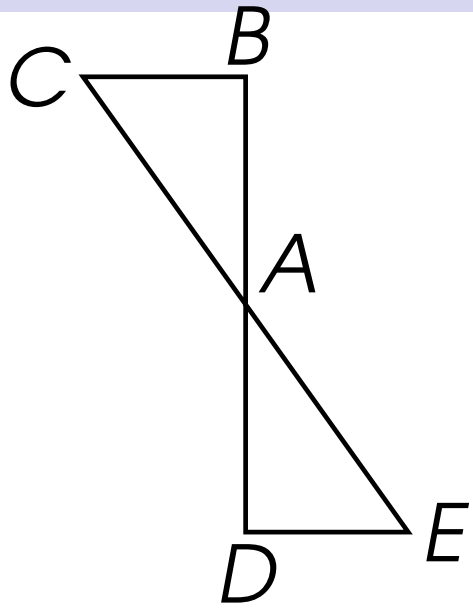
Given: $\overline{AB} \cong \overline{AD}$
$\angle B \cong \angle D$

Prove: $\triangle ABC \cong \triangle ADE$




Proof:

| Statements | Reasons |
|---|---|
| 1. $\overline{AB} \cong \overline{AD}$ | 1. Given |
| 2. $\angle B \cong \angle D$ | 2. Given |
| 3. $\angle BAC \cong \angle DAE$ | 3. Vertical Angle Theorem |

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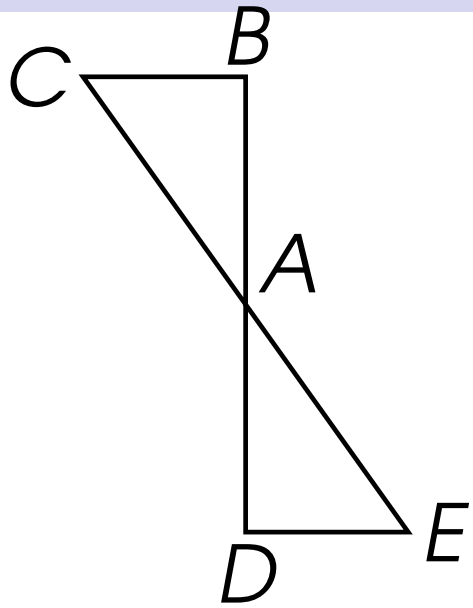


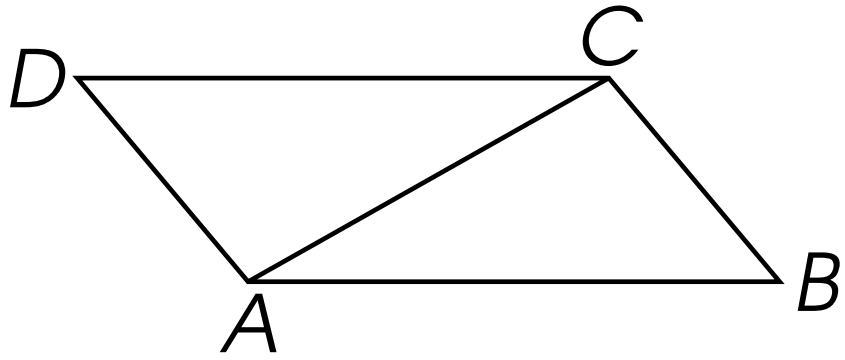

Proof:

| Statements | Reasons |
|---|---|
| 1. $\overline{AB} \cong \overline{AD}$ | 1. Given |
| 2. $\angle B \cong \angle D$ | 2. Given |
| 3. $\angle BAC \cong \angle DAE$ | 3. Vertical Angle Theorem |
| 4. $\triangle ABC \cong \triangle ADE$ | 4. ASA Triangle Congruence Postulate |

# Example 3

Given: $\overline{AB} \cong \overline{CD}$
$\overline{AD} \cong \overline{CB}$

Prove: $\triangle ABC \cong \triangle CDA$



# Example 3

Given: $\overline{AB} \cong \overline{CD}$
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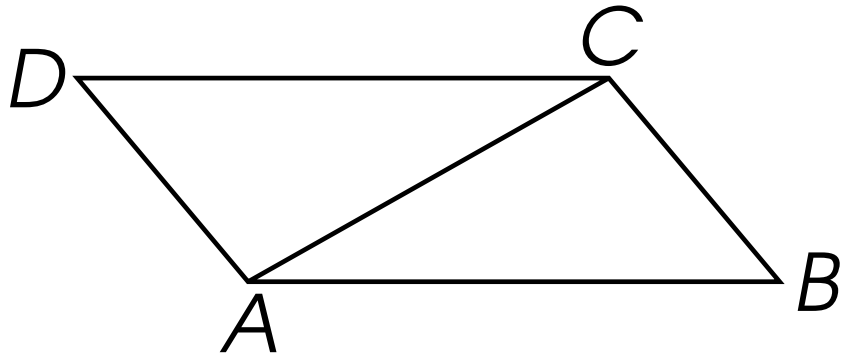


Prove: $\triangle ABC \cong \triangle CDA$

Proof:

| Statements | Reasons |
| --- | --- |

# Example 3

Given: $\overline{AB} \cong \overline{CD}$
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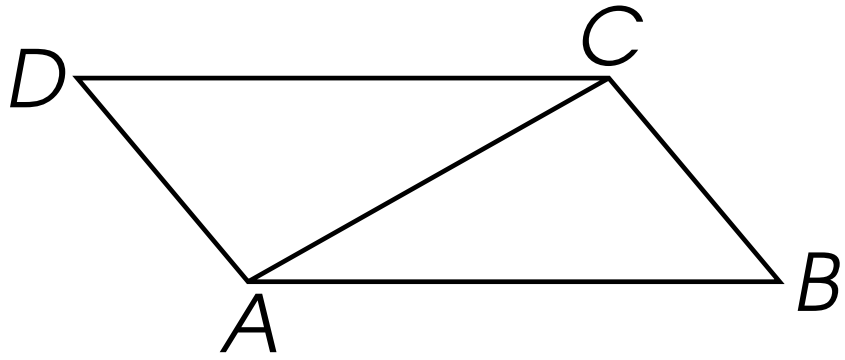


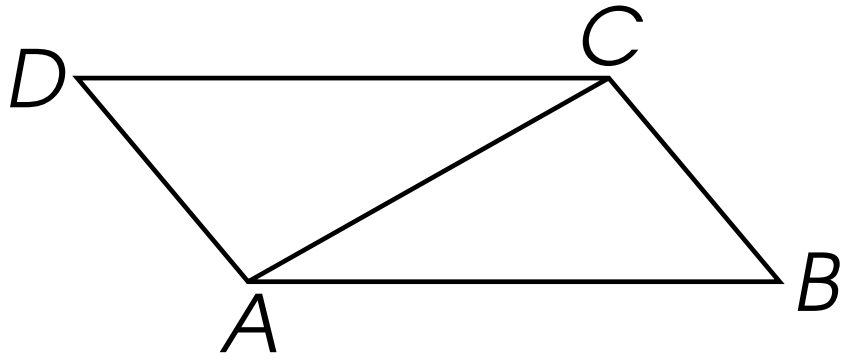

Prove: $\triangle ABC \cong \triangle CDA$

Proof:

| Statements | Reasons |
|---|---|
| 1. $\overline{AB} \cong \overline{CD}$ | 1. Given |

# Example 3

Given: $\overline{AB} \cong \overline{CD}$
$\overline{AD} \cong \overline{CB}$




Prove: $\triangle ABC \cong \triangle CDA$

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| 1. $\overline{AB} \cong \overline{CD}$ | 1. Given |
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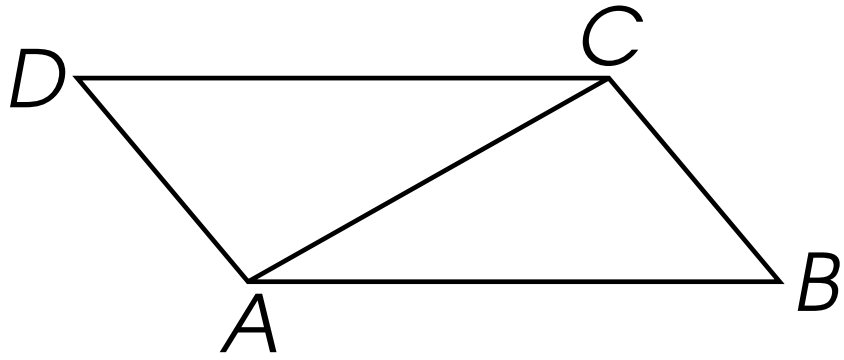


Prove: $\triangle ABC \cong \triangle CDA$

Proof:

| Statements | Reasons |
|---|---|
| 1. $\overline{AB} \cong \overline{CD}$ | 1. Given |
| 2. $\overline{AD} \cong \overline{CB}$ | 2. Given |
| 3. $\overline{AC} \cong \overline{CA}$ | 3. Reflexive Property |

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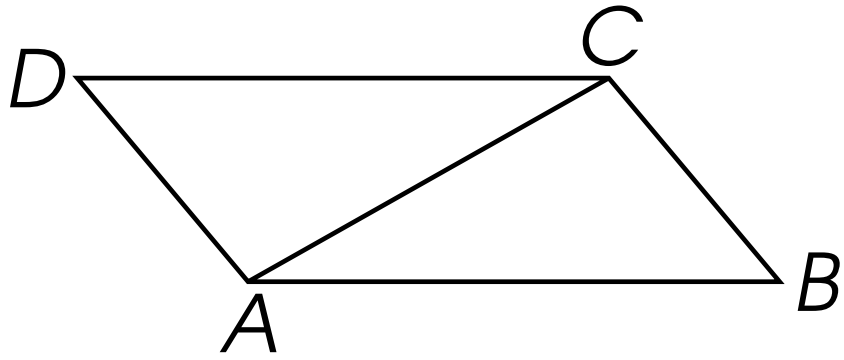


Prove: $\triangle ABC \cong \triangle CDA$

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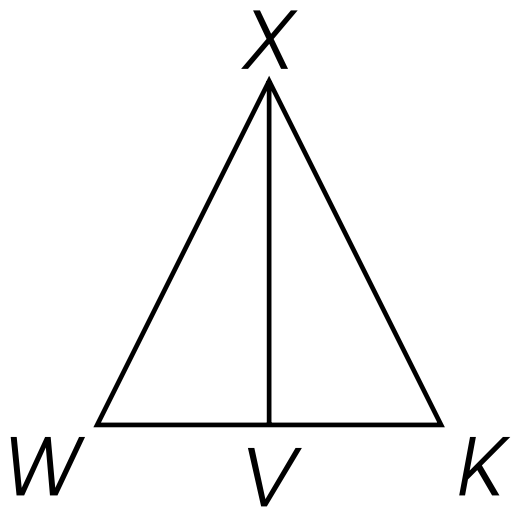
| 3. $\overline{AC} \cong \overline{CA}$ | 3. Reflexive Property |
| 4. $\triangle ABC \cong \triangle CDA$ | 4. SSS Triangle Congruence Postulate |

# Example 4

Given: $\overline{WX} \cong \overline{KX}$

$V$ is the midpoint of $\overline{WK}$

Prove: $\triangle WXV \cong \triangle KXV$



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Given: $\overline{WX} \cong \overline{KX}$

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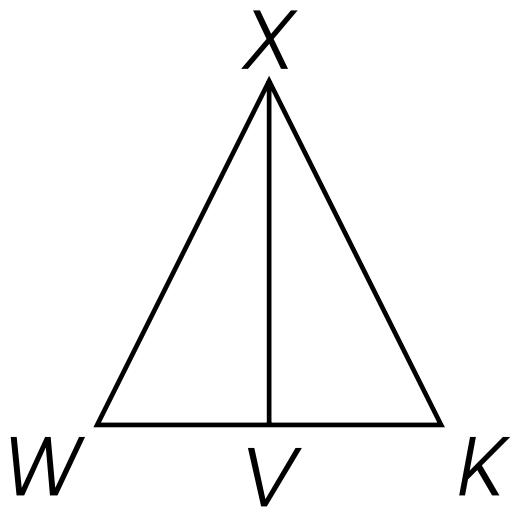


Proof:

| Statements | Reasons |
| --- | --- |

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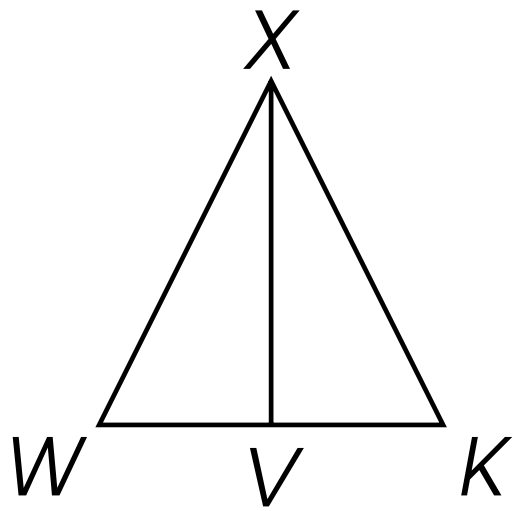


Proof:

| Statements | Reasons |
|---|---|
| 1. $\overline{WX} \cong \overline{KX}$ | 1. Given |

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Given: $\overline{WX} \cong \overline{KX}$

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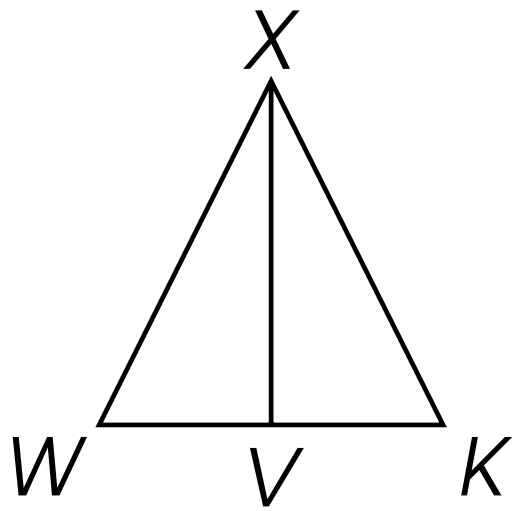


Proof:

| Statements | Reasons |
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| 1. $\overline{WX} \cong \overline{KX}$ | 1. Given |
| 2. $V$ is the midpoint of $\overline{WK}$ | 2. Given |

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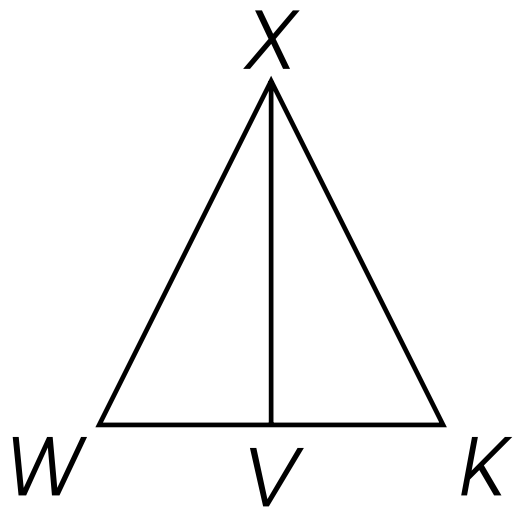


Proof:

| Statements | Reasons |
|---|---|
| 1. $\overline{WX} \cong \overline{KX}$ | 1. Given |
| 2. $V$ is the midpoint of $\overline{WK}$ | 2. Given |
| 3. $\overline{WV} \cong \overline{KV}$ | 3. Definition of Midpoint |

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Given: $\overline{WX} \cong \overline{KX}$

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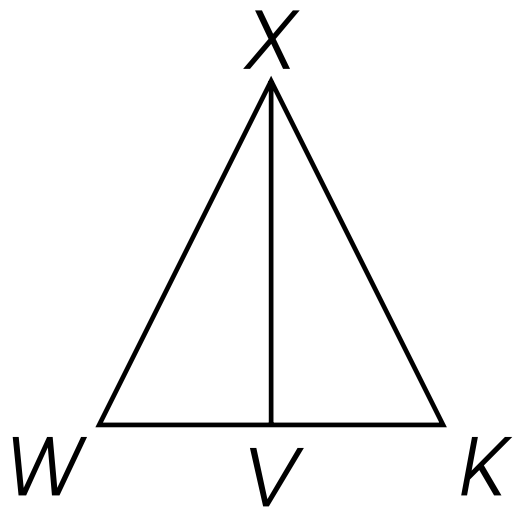
Prove: $\triangle WXV \cong \triangle KXV$

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| 3. $\overline{WV} \cong \overline{KV}$ | 3. Definition of Midpoint |
| 4. $\overline{XV} \cong \overline{XV}$ | 4. Reflexive Property |

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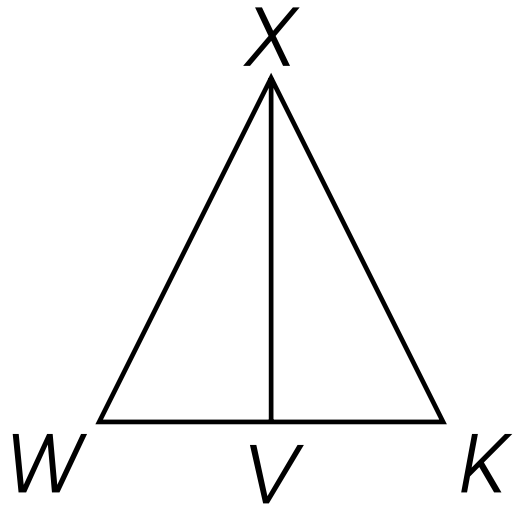



Prove: $\triangle WXV \cong \triangle KXV$

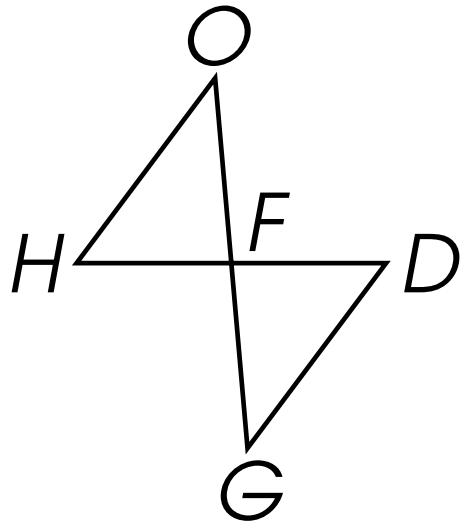
Proof:

| Statements | Reasons |
|---|---|
| 1. $\overline{WX} \cong \overline{KX}$ | 1. Given |
| 2. $V$ is the midpoint of $\overline{WK}$ | 2. Given |
| 3. $\overline{WV} \cong \overline{KV}$ | 3. Definition of Midpoint |
| 4. $\overline{XV} \cong \overline{XV}$ | 4. Reflexive Property |
| 5. $\triangle WXV \cong \triangle KXV$ | 5. SSS Triangle Congruence Postulate |

# Example 5

Given: $\overline{HD}$ and $\overline{OG}$ bisect each other at $F$

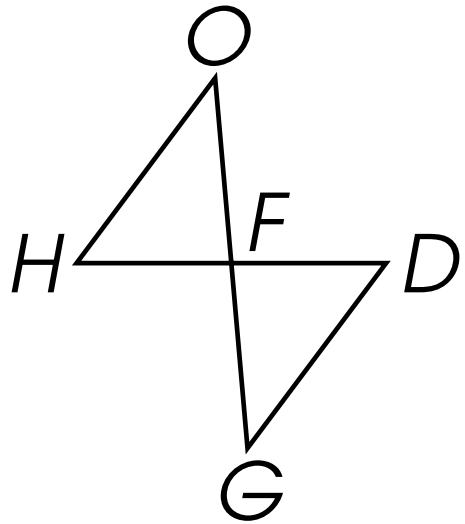
Prove: $\triangle OFH \cong \triangle GFD$



# Example 5

Given: $\overline{HD}$ and $\overline{OG}$ bisect each other at $F$

Prove: $\triangle OFH \cong \triangle GFD$




Proof:

| Statements | Reasons |
|---|---|

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Given: $\overline{HD}$ and $\overline{OG}$ bisect each other at $F$

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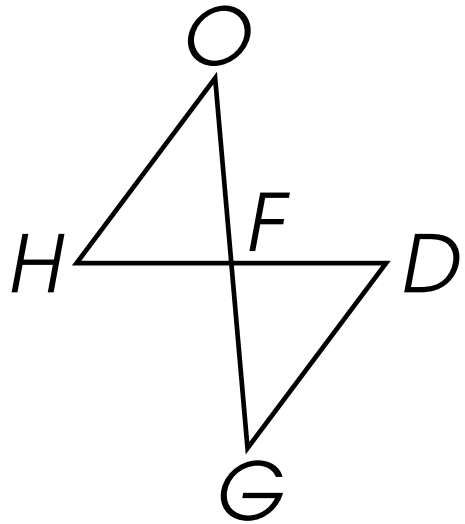


Proof:

| **Statements** | **Reasons** |
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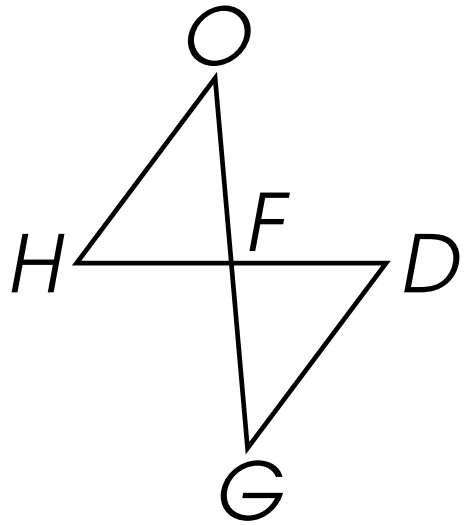


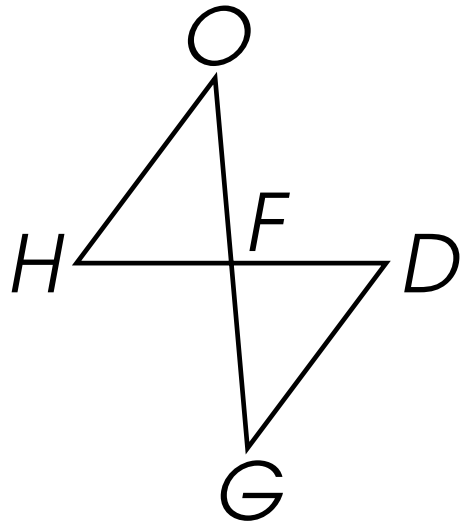

Proof:

| **Statements** | **Reasons** |
|---|---|
| 1. $\overline{HD}$ and $\overline{OG}$ bisect each other at $F$ | 1. Given |
| 2. $\overline{HF} \cong \overline{DF}, \overline{OF} \cong \overline{GF}$ | 2. Definition of Segment Bisector |

# Example 5

Given: $\overline{HD}$ and $\overline{OG}$ bisect each other at $F$

Prove: $\triangle OFH \cong \triangle GFD$



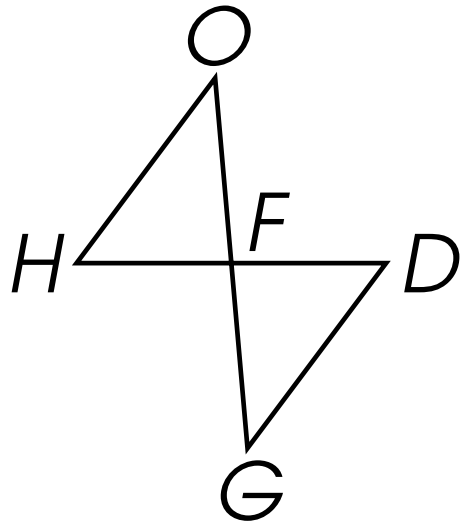

Proof:

| Statements | Reasons |
|---|---|
| 1. $\overline{HD}$ and $\overline{OG}$ bisect each other at $F$ | 1. Given |
| 2. $\overline{HF} \cong \overline{DF}, \overline{OF} \cong \overline{GF}$ | 2. Definition of Segment Bisector |
| 3. $\angle OFH \cong \angle GFD$ | 3. Vertical Angle Theorem |

# Example 5

Given: $\overline{HD}$ and $\overline{OG}$ bisect each other at $F$

Prove: $\triangle OFH \cong \triangle GFD$



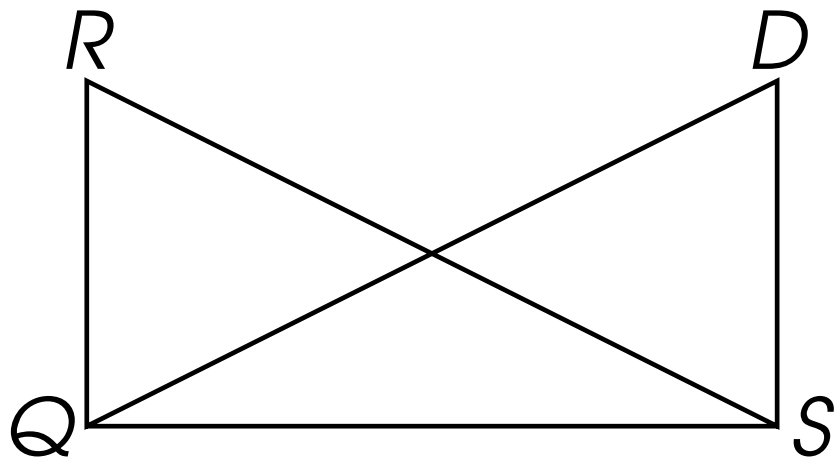

Proof:

| Statements | Reasons |
|---|---|
| 1. $\overline{HD}$ and $\overline{OG}$ bisect each other at $F$ | 1. Given |
| 2. $\overline{HF} \cong \overline{DF}, \overline{OF} \cong \overline{GF}$ | 2. Definition of Segment Bisector |
| 3. $\angle OFH \cong \angle GFD$ | 3. Vertical Angle Theorem |
| 4. $\triangle OFH \cong \triangle GFD$ | 4. SAS Congruence Postulate |

# Example 6

Given: $\overline{QR} \perp \overline{QS}$
$\overline{SD} \perp \overline{SQ}$
$\overline{RQ} \cong \overline{DS}$

Prove: $\triangle RQS \cong \triangle DSQ$



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Given: $\overline{QR} \perp \overline{QS}$
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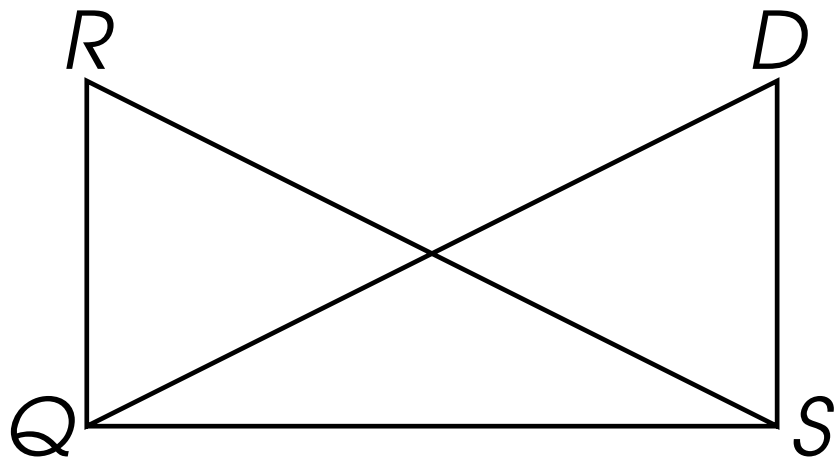


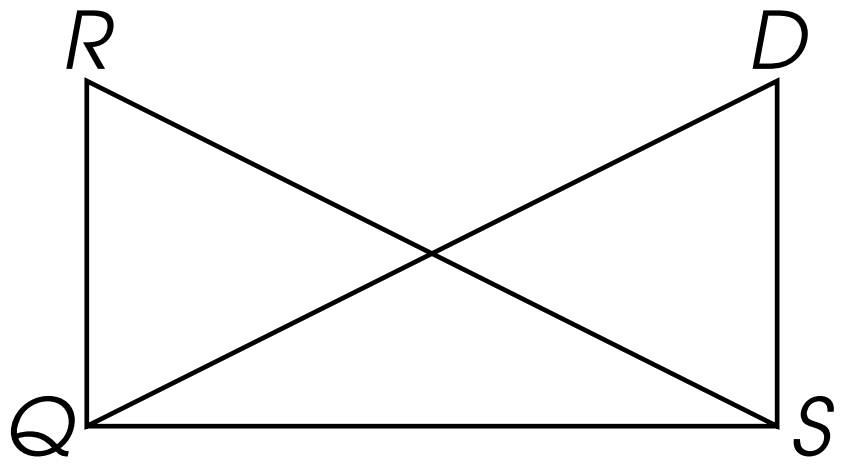

Prove: $\triangle RQS \cong \triangle DSQ$

Proof:

| Statements | Reasons |
| --- | --- |

# Example 6

Given: $\overline{QR} \perp \overline{QS}$
$\overline{SD} \perp \overline{SQ}$
$\overline{RQ} \cong \overline{DS}$



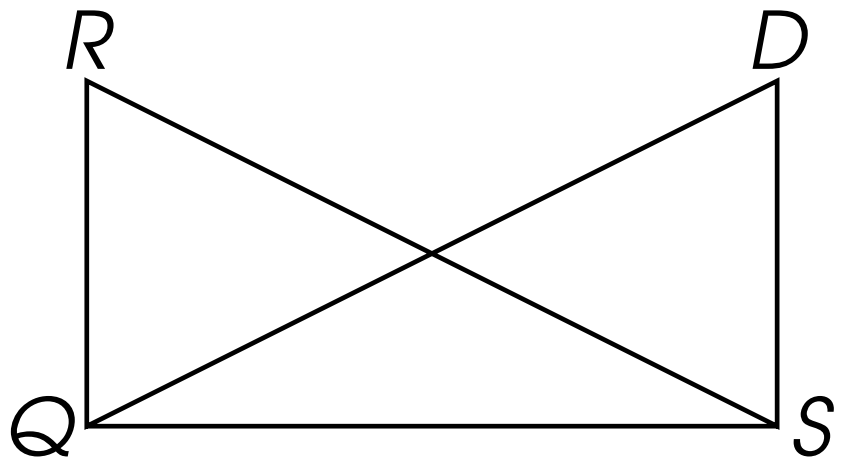

Prove: $\triangle RQS \cong \triangle DSQ$

Proof:

| Statements | Reasons |
|---|---|
| 1. $\overline{QR} \perp \overline{QS}, \overline{SD} \perp \overline{SQ}, \overline{RQ} \cong \overline{DS}$ | 1. Given |

# Example 6

Given: $\overline{QR} \perp \overline{QS}$
$\overline{SD} \perp \overline{SQ}$
$\overline{RQ} \cong \overline{DS}$



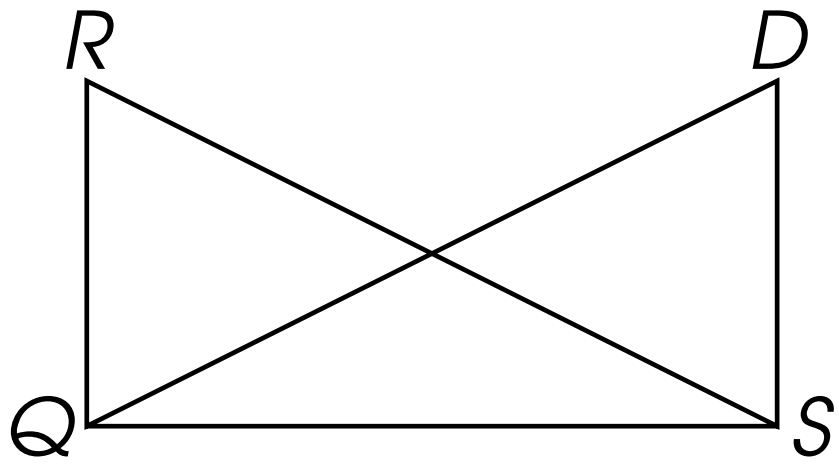

Prove: $\triangle RQS \cong \triangle DSQ$

Proof:

| Statements | Reasons |
|---|---|
| 1. $\overline{QR} \perp \overline{QS}, \overline{SD} \perp \overline{SQ}, \overline{RQ} \cong \overline{DS}$ | 1. Given |
| 2. $m\angle RQS = 90°, m\angle DSQ = 90°$ | 2. Definition of Perpendicular Line Segments |

# Example 6

Given: $\overline{QR} \perp \overline{QS}$
$\overline{SD} \perp \overline{SQ}$
$\overline{RQ} \cong \overline{DS}$



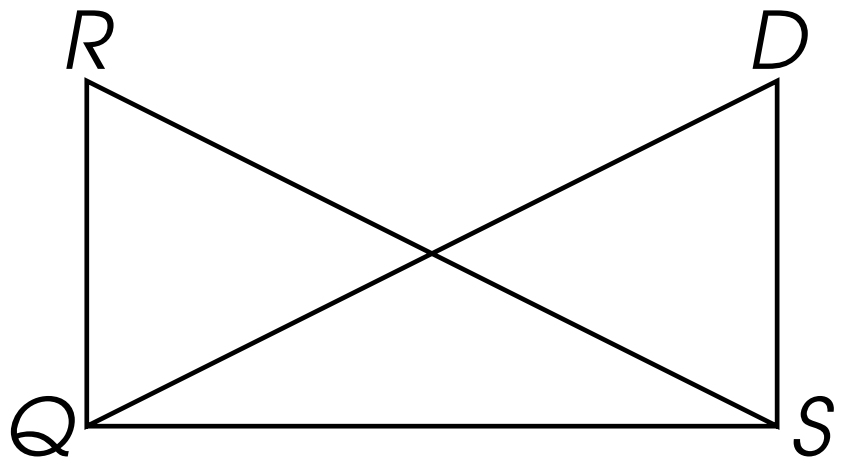

Prove: $\triangle RQS \cong \triangle DSQ$

Proof:

| Statements | Reasons |
|---|---|
| 1. $\overline{QR} \perp \overline{QS}, \overline{SD} \perp \overline{SQ}, \overline{RQ} \cong \overline{DS}$ | 1. Given |
| 2. $m\angle RQS = 90°, m\angle DSQ = 90°$ | 2. Definition of Perpendicular Line Segments |
| 3. $\overline{QS} \cong \overline{SQ}$ | 3. Reflexive Prop. |

# Example 6

Given: $\overline{QR} \perp \overline{QS}$
$\overline{SD} \perp \overline{SQ}$
$\overline{RQ} \cong \overline{DS}$




Prove: $\triangle RQS \cong \triangle DSQ$

Proof:

| Statements | Reasons |
|---|---|
| 1. $\overline{QR} \perp \overline{QS}, \overline{SD} \perp \overline{SQ}, \overline{RQ} \cong \overline{DS}$ | 1. Given |
| 2. $m\angle RQS = 90°, m\angle DSQ = 90°$ | 2. Definition of Perpendicular Line Segments |
| 3. $\overline{QS} \cong \overline{SQ}$ | 3. Reflexive Prop. |
| 4. $\triangle RQS \cong \triangle DSQ$ | 4. SAS Triangle Congruence Postulate |

# Thank you for watching.