Corresponding Parts of Congruent Triangles are Congruent

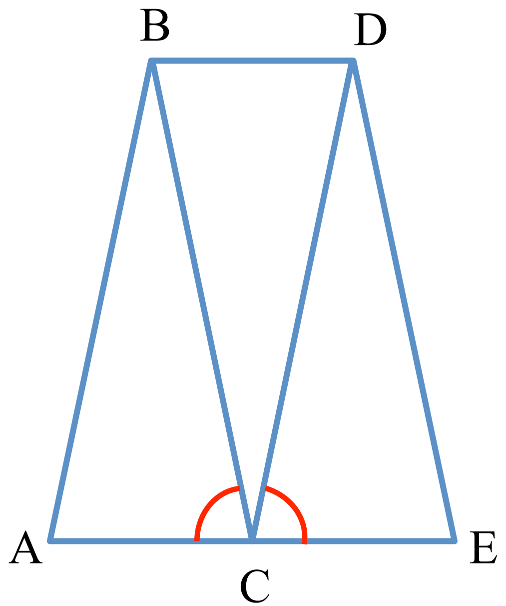
CPCTC

Given $\triangle BCD$ is an isosceles triangle (with $\overline{BD}$ as the base)

$\angle ACB \cong \angle ECD$

C is the midpoint of $\overline{AE}$

Prove $\triangle ABC \cong \triangle EDC$



$\angle ACB \cong \angle ECD$	Given
$\overline{BC} \cong \overline{DC}$	Congruent sides of an isosceles triangle
$\overline{AC} \cong \overline{CE}$	Definition of midpoint
$\triangle ABC \cong \triangle EDC$	SAS

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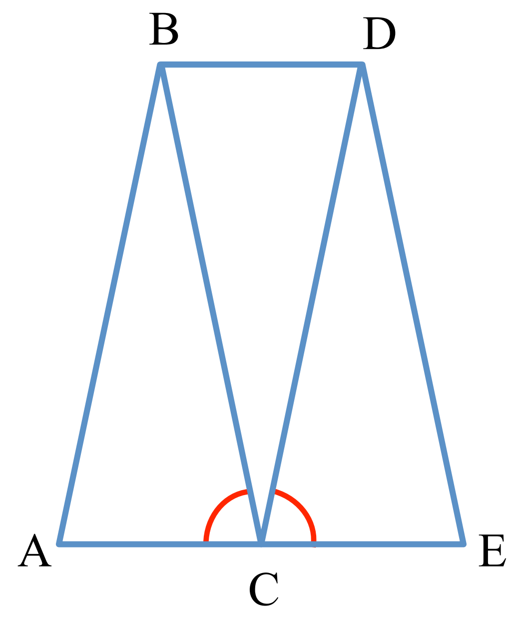
Prove $\overline{AB} \cong \overline{DE}$



We already have proven congruent triangles.

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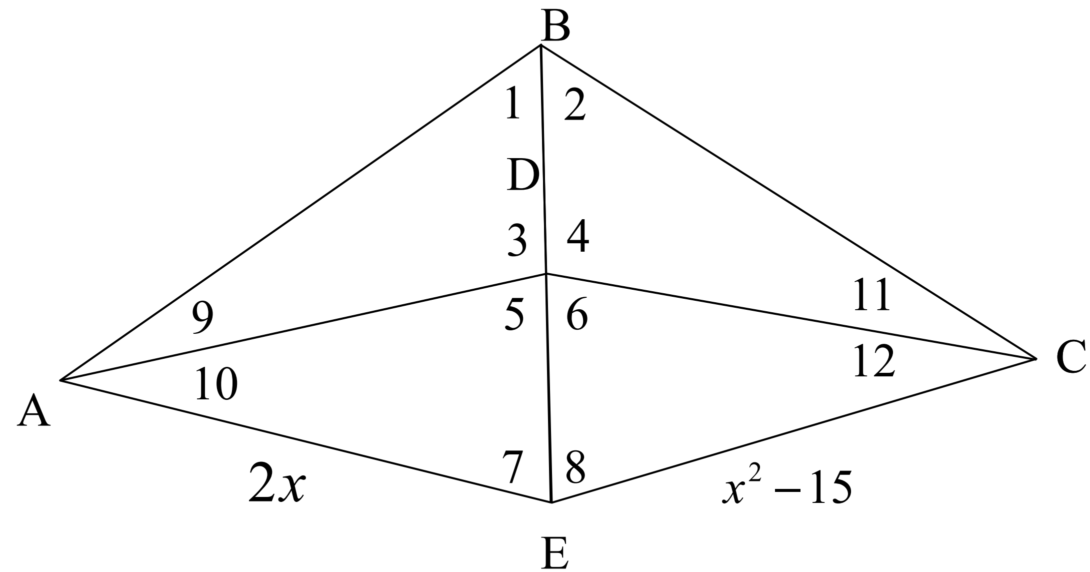
$\overline{BC} \cong \overline{DC}$	Congruent sides of an isosceles triangle
$\overline{AC} \cong \overline{CE}$	Definition of midpoint
$\triangle ABC \cong \triangle EDC$	SAS
$\overline{AB} \cong \overline{DE}$	CPCTC This step is all we have to add

Given $\angle 3 \cong \angle 4$

$\overline{AD} \cong \overline{DC}$

Prove $\overline{AB} \cong \overline{CB}$

Solve for x

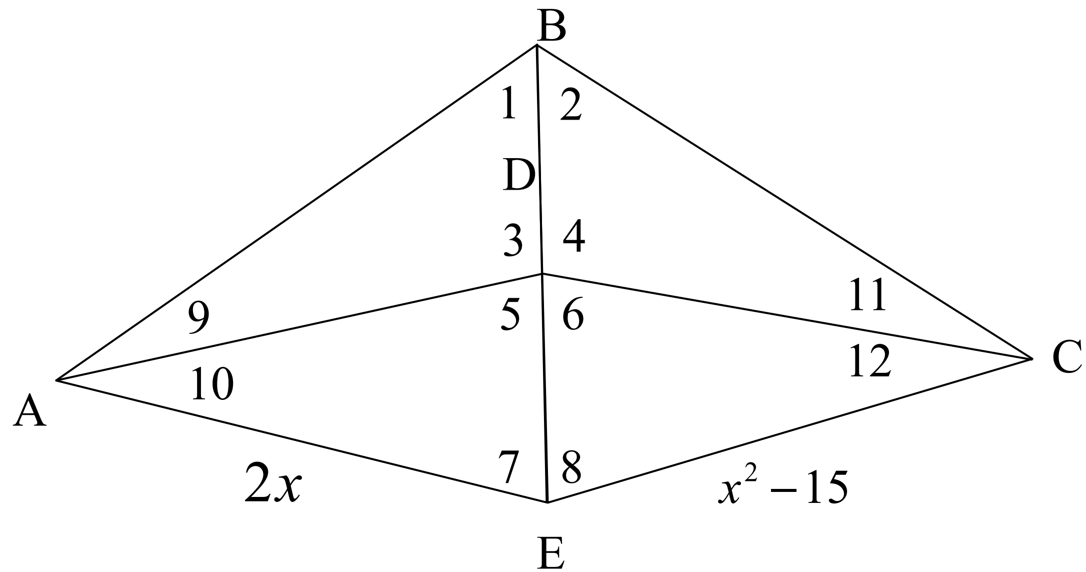


$\angle 3 \cong \angle 4$ $\overline{AD} \cong \overline{DC}$	Given

Before we can solve for x, we have to prove that $\overline{AE} \cong \overline{CE}$

Given $\angle 3 \cong \angle 4$

$\overline{AD} \cong \overline{DC}$

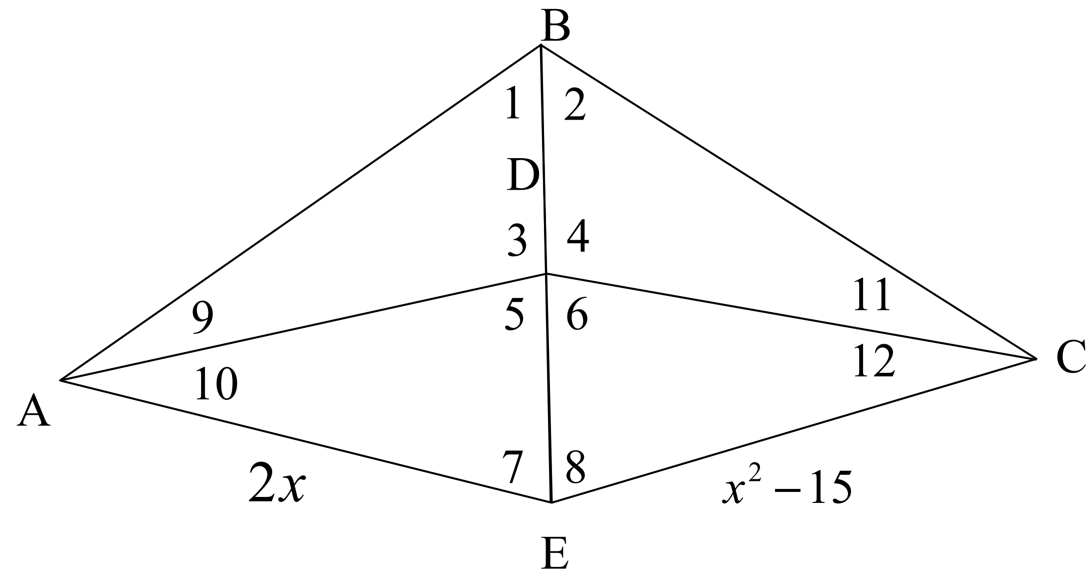


Solve for x

$\angle 3 \cong \angle 4$ $\overline{AD} \cong \overline{DC}$	Given

Given $\angle 3 \cong \angle 4$

$\overline{AD} \cong \overline{DC}$



Solve for x

We've just proved that $\triangle ADE \cong \triangle CDE$

By CPCTC we know that $\overline{AE} \cong \overline{CE}$

Make sure that you test **both** values!

$$AE = CE$$

$$2x = x^2 - 15$$

$$0 = x^2 - 2x - 15$$

$$0 = (x-5)(x+3)$$

$$x = -3, 5$$

$$x = 5$$

A (–1, 3)   P (2, –3)

B (3, 3)   Q (4, 2)

C (1, –2)   R (6, –3)

Prove $\angle ABC \cong \angle RPQ$

Using the distance formula

$$AB = 4$$

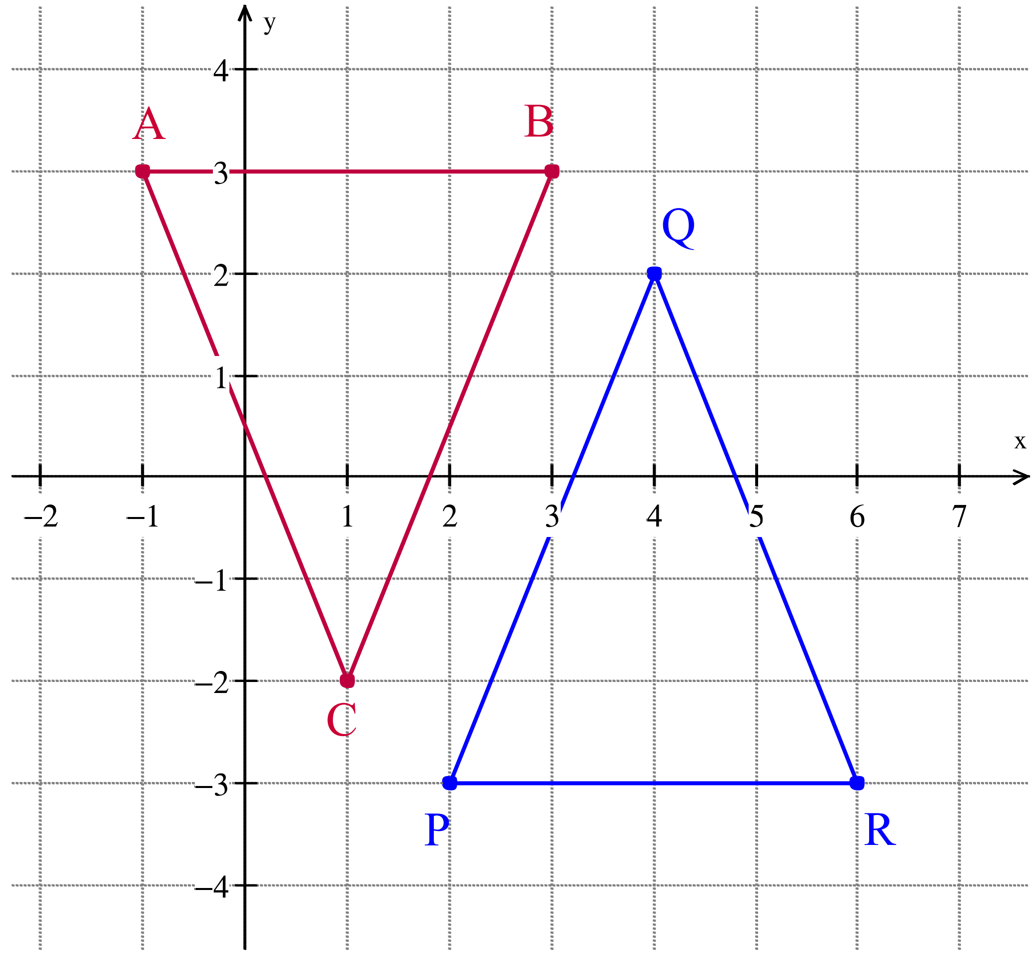
$$BC = \sqrt{(3+2)^2 + (3-1)^2} = \sqrt{29}$$

$$CA = \sqrt{(-2-3)^2 + (1+1)^2} = \sqrt{29}$$

$$RP = 4$$

$$PQ = \sqrt{(4-2)^2 + (2+3)^2} = \sqrt{29}$$

$$QR = \sqrt{(6-4)^2 + (-3-2)^2} = \sqrt{29}$$



$\triangle ABC \cong \triangle RPQ$ by SSS

$\angle ABC \cong \angle RPQ$ by CPCTC