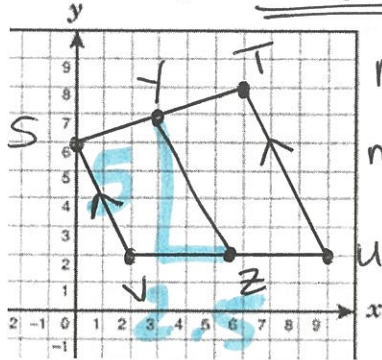


7. Find the length of midsegment $\overline{YZ}$ in trapezoid STUV.



$$\text{mdpt } \overline{ST} = (1.5, 6.5)$$

$$\text{mdpt } \overline{UV} = (4, 2)$$

$$YZ^2 = 5^2 + 2.5^2$$

$$YZ^2 = 5^2 + \left(\frac{5}{2}\right)^2$$

$$YZ^2 = 25 + \frac{25}{4}$$

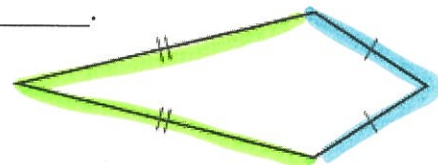
$$YZ^2 = \frac{100}{4} + \frac{25}{4}$$

$$\sqrt{YZ^2} = \sqrt{\frac{125}{4}}$$

$$YZ = \frac{\sqrt{125}}{\sqrt{4}} = \frac{\sqrt{5 \cdot 25}}{2}$$

$$YZ = \frac{5\sqrt{5}}{2}$$

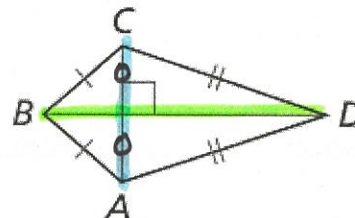
Kite (DEF): A kite is a quadrilateral that has two pairs of consecutive, $\cong$ sides,
BUT opposite sides are not $\cong$.



Kite Diagonals Theorem

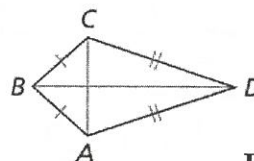
If a quadrilateral is a kite, then its diagonals are perpendicular.

* line of symmetry also bisects the other diag.



PROOF: Given: ABCD is a kite

Prove: $\overline{AC} \perp \overline{BD}$



Statements

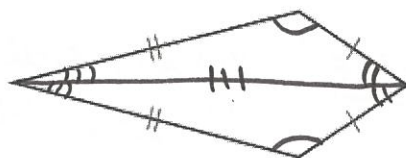
Reasons

- | | |
|---|---|
| ① ABCD is a kite | ① given |
| ② $\overline{AB} \cong \overline{CB}$, $\overline{AD} \cong \overline{CD}$ | ② def of a kite |
| ③ B is on the $\perp$ bisector of $\overline{AC}$
D " " " " " " " " | ③ $\perp$ bisector thm converse (chpt. 6) |
| ④ $\overline{BD}$ is the $\perp$ bisector of $\overline{AC}$ | ④ thru any 2 points there is one line. |
| ⑤ $\overline{AC} \perp \overline{BD}$ | ⑤ $\perp$ bisectors are $\perp$ |

Opposite Angles Theorem

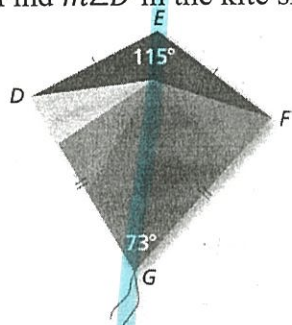
If a quadrilateral is a kite, then exactly one pair of opposite angles are congruent.

* line of symmetry bisects opp. $\angle$ s



Example

8. Find $m\angle D$ in the kite shown.



*quad... $\angle$ s add to 360°
 * $\angle D \cong \angle F$

$$115 + 73 + x + x = 360$$

$$2x = 172$$

$$x = 86$$

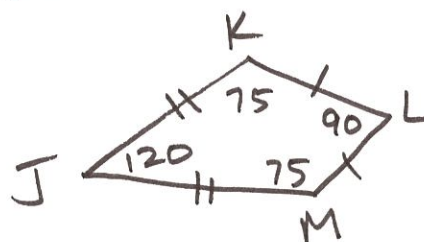
$$m\angle D = 86^\circ$$

9. In a kite, the measures of the angles are $3x^\circ$, 75° , 90° , and 120° . Find the value of x . What are the measures of the angles that are congruent?

$$3x + 75 + 90 + 120 = 360$$

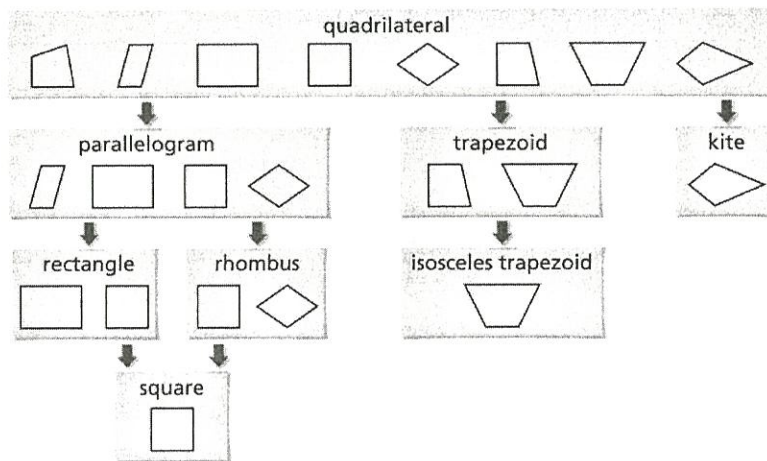
$$\downarrow$$

$$x = 25$$



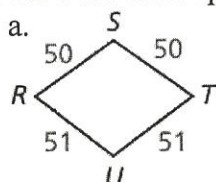
Identifying a Quadrilateral

The following diagram shows the relationships among the special quadrilaterals you studied in the chapter.

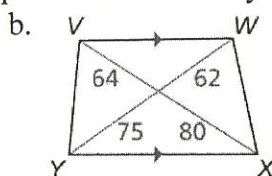


Example:

10. Give the most specific name for the quadrilateral. Briefly explain your reasoning.

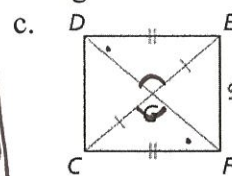


kite! consec. sides
 $\cong$, opp. sides
 not $\cong$



trapezoid
 only one pair
 of $\parallel$ sides

*not isos. since diags not $\cong$



quadrilateral
 need more info to
 say $\parallel$ -gram or
 trapezoid

*not a
 kite
 since
 opp.
 sides $\cong$