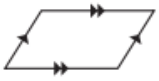
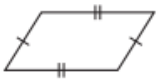
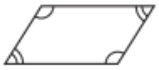
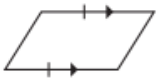
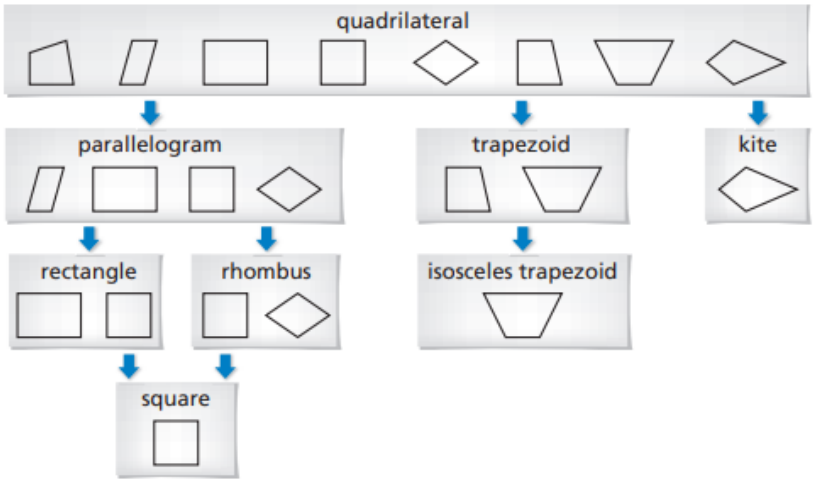
Concept Summary

Ways to Prove a Quadrilateral Is a Parallelogram

1. Show that both pairs of opposite sides are parallel. *(Definition)*	
2. Show that both pairs of opposite sides are congruent. *(Parallelogram Opposite Sides Converse)*	
3. Show that both pairs of opposite angles are congruent. *(Parallelogram Opposite Angles Converse)*	
4. Show that one pair of opposite sides are congruent and parallel. *(Opposite Sides Parallel and Congruent Theorem)*	
5. Show that the diagonals bisect each other. *(Parallelogram Diagonals Converse)*	

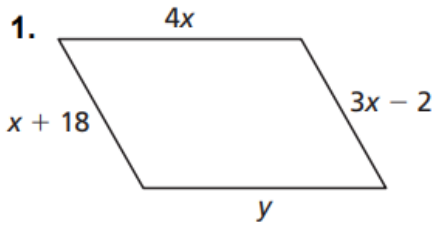
Identifying Special Quadrilaterals

The diagram shows relationships among the special quadrilaterals you have studied in this chapter. Each shape in the diagram has the properties of the shapes linked above it. For example, a rhombus has the properties of a parallelogram and a quadrilateral.

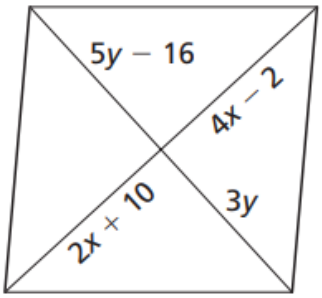


Find the value of x and y, and then find the lengths.

1.

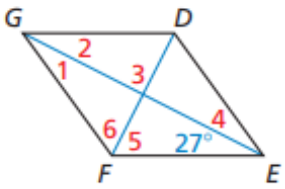


3.

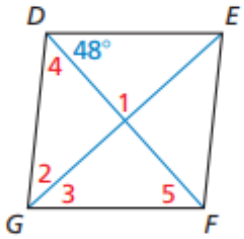


In Exercises 13–16, find the measures of the numbered angles in rhombus *DEFG*. *(See Example 3.)*

13.

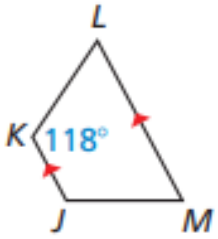


14.

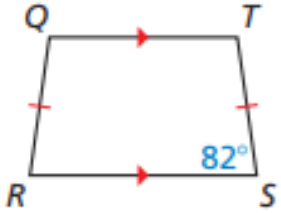


In Exercises 7 and 8, find the measure of each angle in the isosceles trapezoid. *(See Example 2.)*

7.

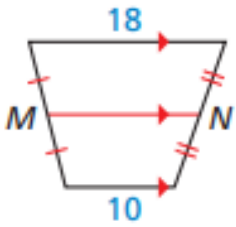


8.

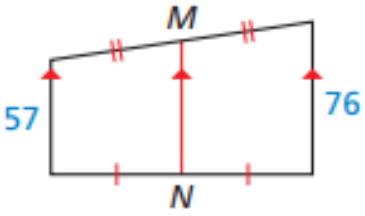


In Exercises 9 and 10, find the length of the midsegment of the trapezoid. *(See Example 3.)*

9.

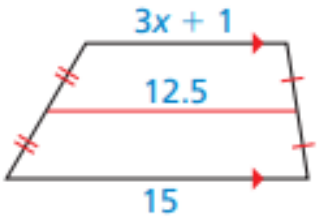


10.

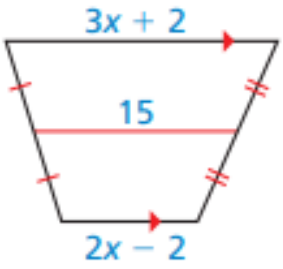


MATHEMATICAL CONNECTIONS **In Exercises 27 and 28, find the value of x.**

27.

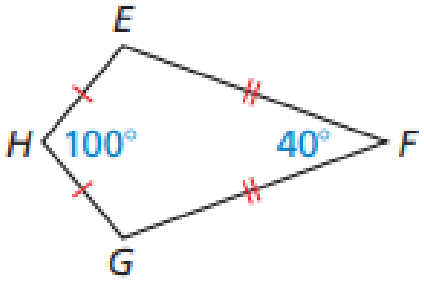


28.

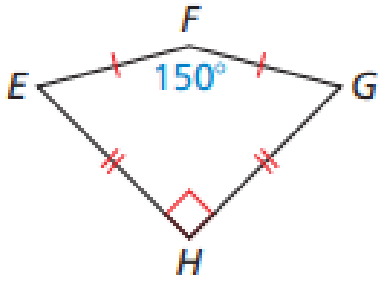


In Exercises 15–18, find $m\angle G$. *(See Example 5.)*

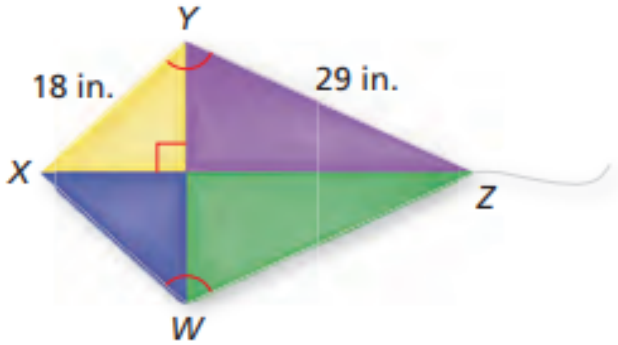
15.



16.



30. PROBLEM SOLVING You and a friend are building a kite. You need a stick to place from X to W and a stick to place from W to Z to finish constructing the frame. You want the kite to have the geometric shape of a kite. How long does each stick need to be? Explain your reasoning.



CRITICAL THINKING **In Exercises 65–70, complete each statement with *always*, *sometimes*, or *never*. Explain your reasoning.**

65. A square is _____ a rhombus.

66. A rectangle is _____ a square.

67. A rectangle _____ has congruent diagonals.

68. The diagonals of a square _____ bisect its angles.

69. A rhombus _____ has four congruent angles.

70. A rectangle _____ has perpendicular diagonals.