

TRAPEZOIDS

A **TRAPEZOID** is a quadrilateral with exactly one pair of parallel sides.

Is a trapezoid a parallelogram? NO

why or why not? only 1 pair of parallel sides

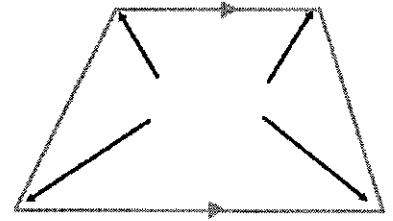
The parallel sides are called the bases.

* These segments are Never congruent.

The nonparallel sides are called the legs.

* These segments MAY or MAY NOT be congruent.

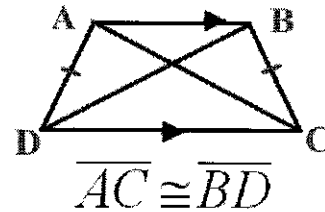
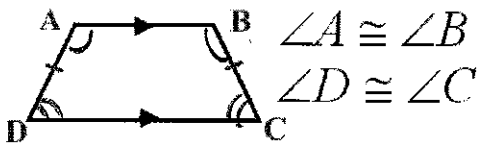
If the legs of a trapezoid are congruent, then the trapezoid is an ISOSCELES trapezoid.



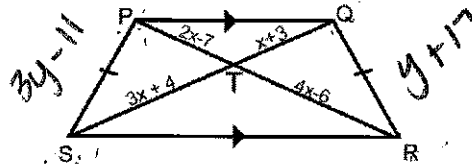
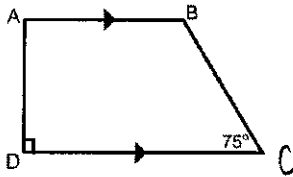
* **Properties of Isosceles Trapezoids**

Each pair of base angles is congruent.

The diagonals are congruent.



Which trapezoid is isosceles? PQRS



1. \overline{AD} is called a leg and \overline{AB} is a base.

2. What would you call \overline{PR} ? diagonal

3. In ABCD $m\angle A = 90^\circ$ and $m\angle B = 105^\circ$.

Why? same side \angle 's are supplementary

4. If $m\angle PSR = 65^\circ$, then $m\angle SPQ = 115^\circ$ and $m\angle QRS = 65^\circ$.

5. If $PS = 3y - 11$ and $QR = y + 17$, then what is the length of PS? 31

6. In PQRS, $PR \cong \overline{QS}$ so, $x = 10$.

$$3y - 11 = y + 17$$

$$2y = 28$$

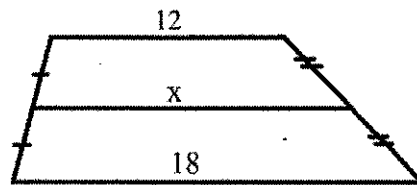
$$y = 14$$

$$6x - 13 = 4x + 7$$

$$2x = 20$$

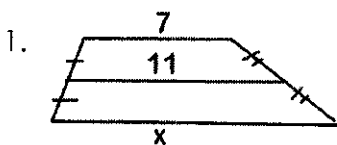
$$x = 10$$

A Midpant of a trapezoid joins the midpoints of the legs. The midsegment is parallel to the bases and its length is half the sum of the lengths of the bases. $x = \underline{15}$



$$x = \frac{12+18}{2}$$

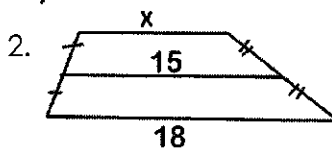
Find x.



$$\frac{7+x}{2} = 11$$

$$7+x = 22$$

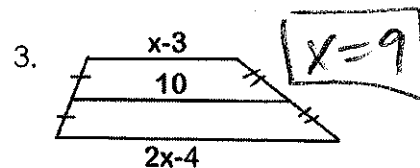
$$x = 15$$



$$\frac{x+18}{2} = 15$$

$$x = 12$$

Quick Practice!



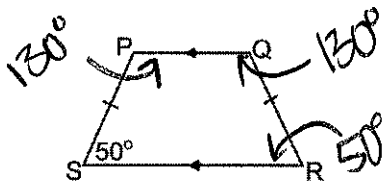
$$\frac{x-3+2x-4}{2} = 10$$

$$3x-7 = 20$$

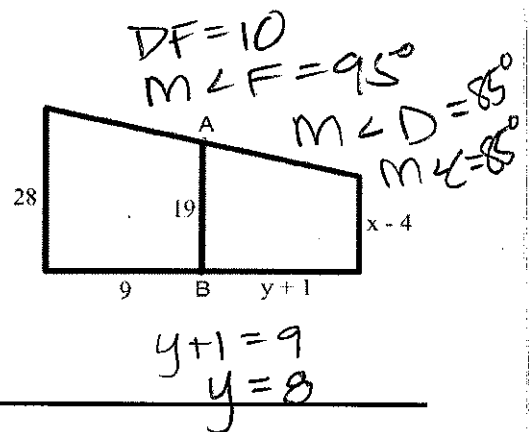
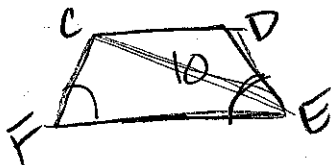
$$3x = 27$$

$$x = 9$$

1. Find the $m\angle P$, $m\angle Q$, and $m\angle R$.



2. CDEF is an isosceles trapezoid with $CE = 10$ and $m\angle E = 95^\circ$. Find DF, $m\angle C$, $m\angle D$, and $m\angle F$.



3. \overline{AB} is a midsegment of the trapezoid. $x = \underline{14}$; $y = \underline{8}$;

$$\frac{x-4+28}{2} = 19$$

$$\frac{x+24}{2} = 19$$

KITES

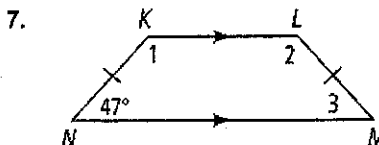
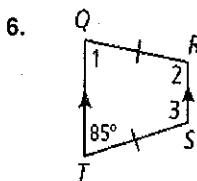
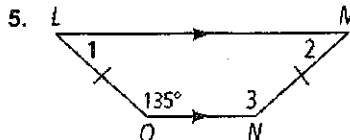
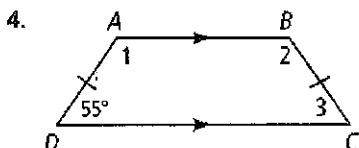
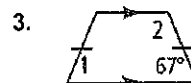
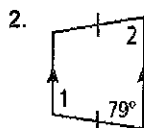
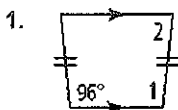
A Kite is a quadrilateral that has two pairs of congruent sides **BUT** opposite sides are **not** congruent

The diagonals are perpendicular.	
Exactly one pair of opposite angles are congruent.	

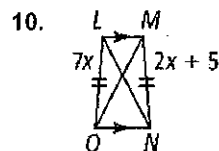
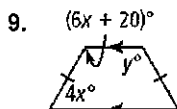
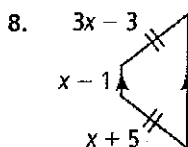


The sum of all angles in a quadrilateral = 360°.

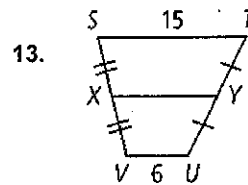
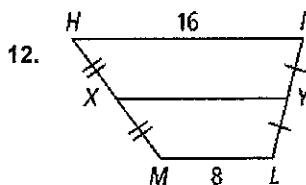
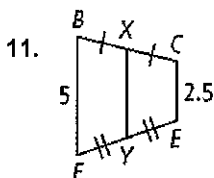
Find the measures of the numbered angles in each isosceles trapezoid.



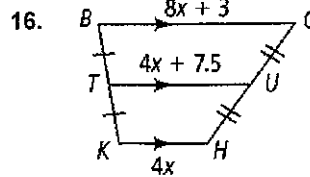
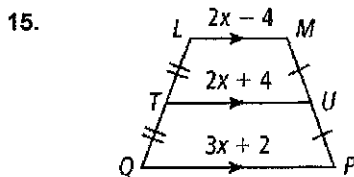
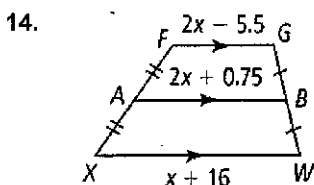
Algebra Find the value(s) of the variable(s) in each isosceles trapezoid.



Find XY in each trapezoid.

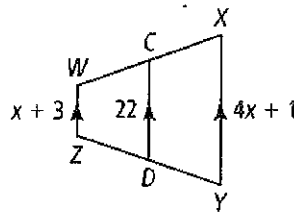


Algebra Find the lengths of the segments with variable expressions.



17. \overline{CD} is the midsegment of trapezoid $WXYZ$.

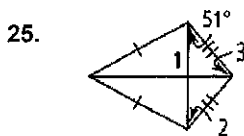
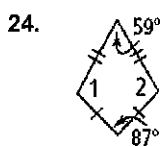
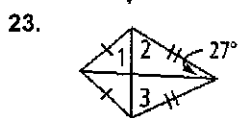
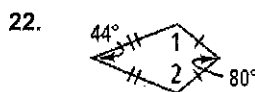
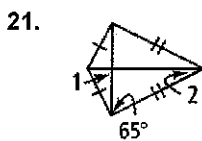
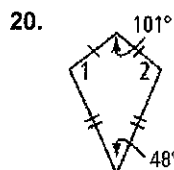
- What is the value of x ?
- What is XY ?
- What is WZ ?



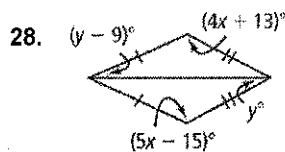
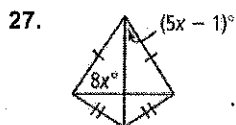
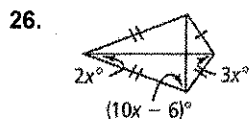
18. **Reasoning** The diagonals of a quadrilateral form two acute and two obtuse angles at their intersection. Is this quadrilateral a kite? Explain.

19. **Reasoning** The diagonals of a quadrilateral form right angles and its side lengths are 4, 4, 6, and 6. Could this quadrilateral be a kite? Explain.

Find the measures of the numbered angles in each kite.



Algebra Find the value(s) of the variable(s) in each kite.



For which value of x is each figure a Kite?

