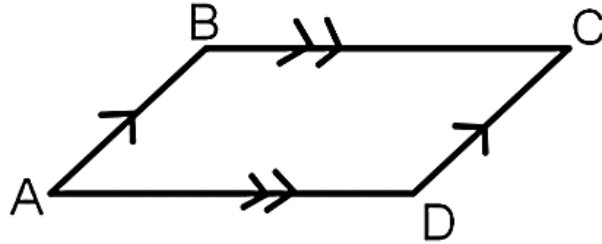


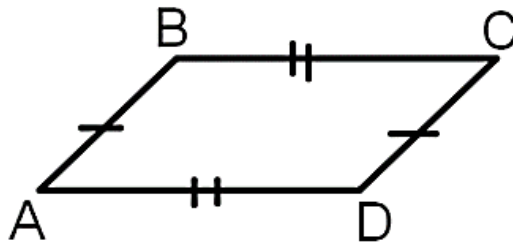
## Properties of Parallelograms

Parallelogram – A quadrilateral with both pairs of opposite sides parallel.

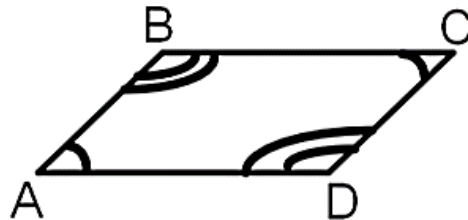


Parallelogram Theorems – If a quadrilateral is a parallelogram, then:

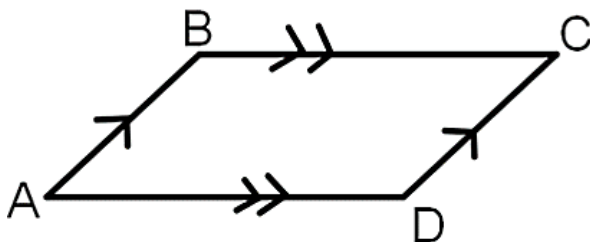
- Its opposite sides are congruent.



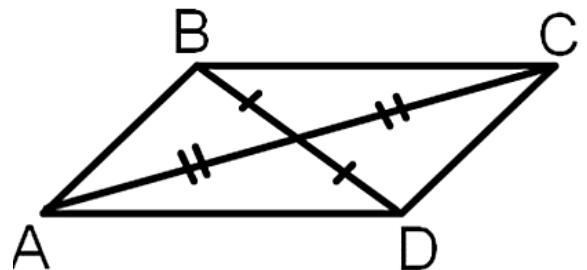
- Its opposite angles are congruent.



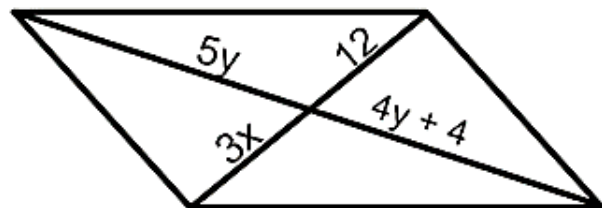
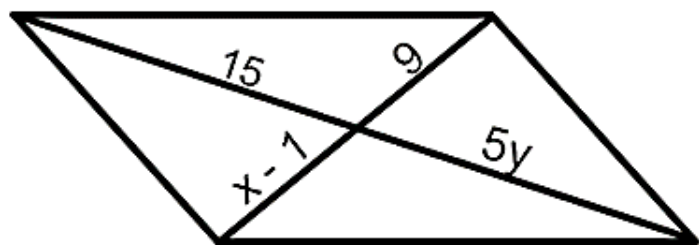
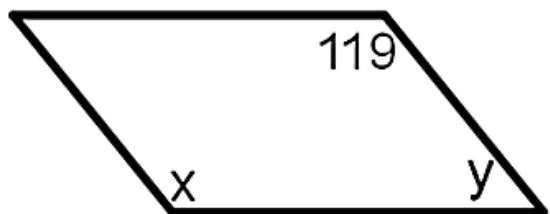
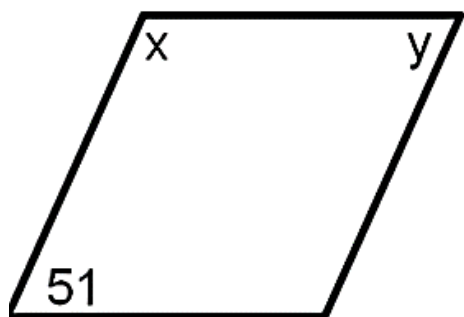
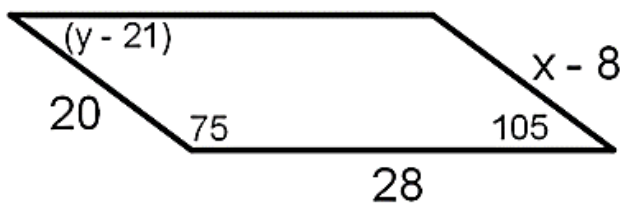
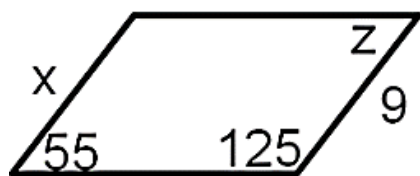
Its consecutive angles are supplementary.



Its diagonals bisect each other.

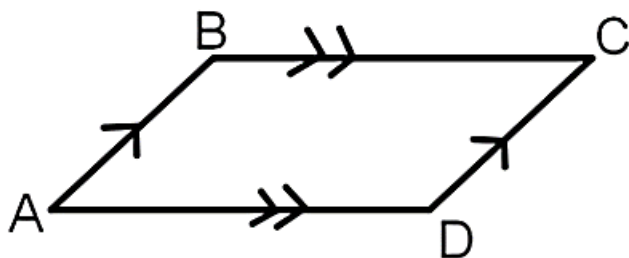


Examples: Find the value of each variable in the parallelogram.

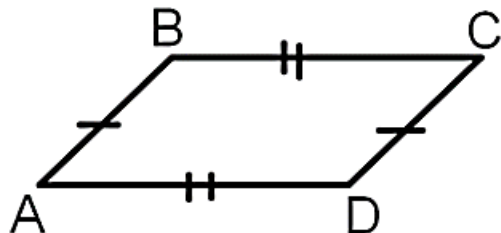


Ways to Prove a Quadrilateral is a Parallelogram – In a proof, you can use the short phrase in parentheses for your reasons.

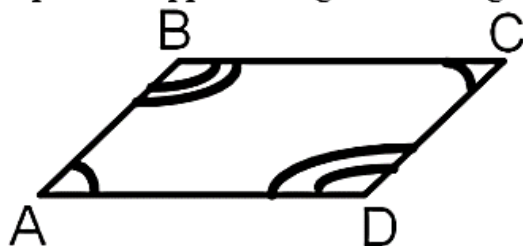
- 1) Show both pairs of opposite sides are parallel (definition of parallelogram).



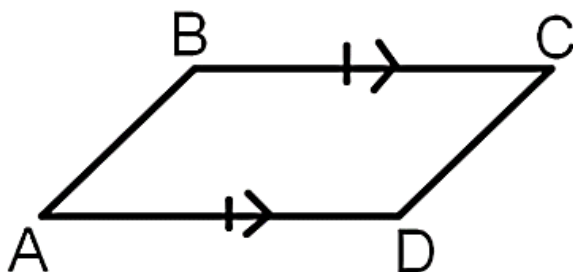
- 2) Show both pairs of opposite sides are congruent (opposite sides congruent).



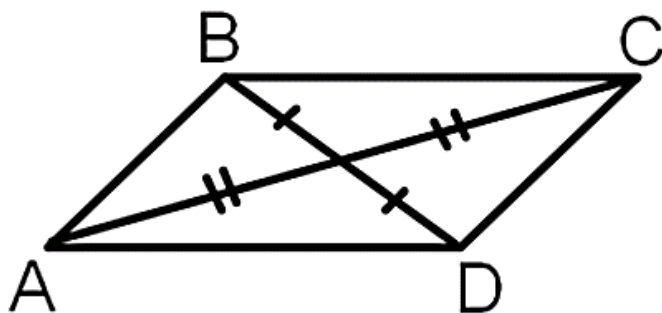
- 3) Show both pairs of opposite angles are congruent (opposite angles congruent).



- 4) Show one pair of opposite sides are congruent and parallel (opposite sides congruent and parallel).



- 5) Show the diagonals bisect each other (bisecting diagonals).



Examples: For what value of  $x$  is the quadrilateral a parallelogram?

