Geometry

7.3 Proving that a Quadrilateral is a Parallelogram

....

If we can show any of these things in a _____, then it is a _____.

> **If opposite _____ of a quad are _____, then it is a parallelogram (definition of parallelogram)**
> **If both pairs of opposite _____ of a quad are _____, then it is a parallelogram.**
> **If both pairs of opposite _____ of a quad are _____, then it is a parallelogram.**
> **If the _____ of a quad _____ each other, then it is a parallelogram.**
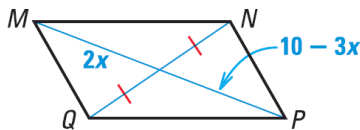> **If _____ pair of opposite _____ of a quad is both _____ and _____, then it is a parallelogram.**
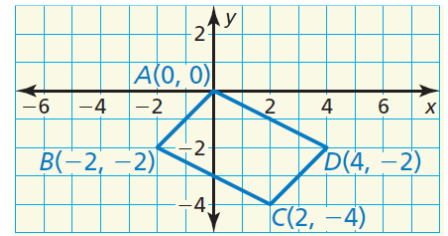

Is it a parallelogram?

6 cm

6 cm
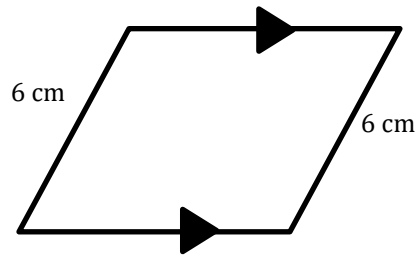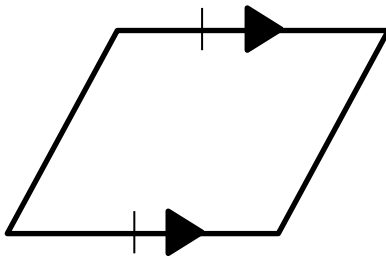
For what values of x and y is quadrilateral $STUV$ a parallelogram?

T $2x + 3$ U

$24 - x$

$x + 6$

S y V
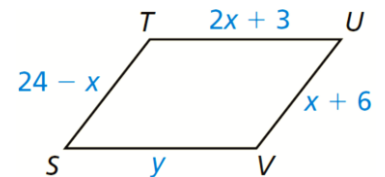
Find x so that $MNPQ$ is a parallelogram.

M N

$2x$ $10 - 3x$

Q P

Show that quadrilateral $ABCD$ is a parallelogram.

A(0, 0)

−6 −4 −2   2 4 6 x

B(−2, −2)   −2   D(4, −2)
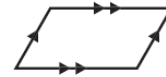
−4   C(2, −4)

CONCEPT SUMMARY   *For Your Notebook*

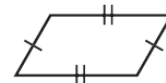### Ways to Prove a Quadrilateral is a Parallelogram

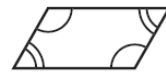1. Show both pairs of opposite sides are parallel.
   (DEFINITION)

2. Show both pairs of opposite sides are congruent.
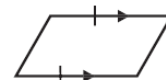   **(THEOREM 8.7)**

3. Show both pairs of opposite angles are congruent.
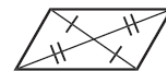   **(THEOREM 8.8)**

4. Show one pair of opposite sides are congruent and parallel.
   (THEOREM 8.9)

5. Show the diagonals bisect each other.
   (THEOREM 8.10)

Assignment: 369 #2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 28, 34, 43, 50, 53, 54, 59, 61 = 20