LEARNING ◎ **TARGETS**

- I can use coordinate geometry to identify parallelograms.

You can use the following conditions to determine whether a quadrilateral is a parallelogram.

Conditions for Parallelograms
A quadrilateral is a parallelogram if…. • Both pairs of opposite sides are parallel (definition) • Both pairs of opposite sides are congruent. • Both pairs of opposite angles are congruent. • The diagonals bisect each other. • One pair of opposite sides is congruent and parallel.

Example 1: Find the intersections of diagonals.

The diagonals of $\square STUV$ intersect at point W. Find the coordinates of W.
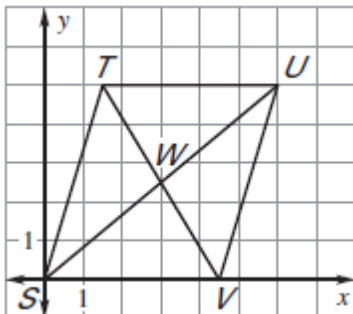
Practice:

a. The vertices of $\square ABCD$ are A(-4, 2), B(3, 2), C(1, -1) and D(-6, -1). The diagonals of $\square ABCD$ intersect at point P. What are the coordinates of P?

b. The vertices of $\square ABCD$ are A(-5, 6), B(1, 6), C(4, 0) and D(-2, 0). The diagonals of $\square ABCD$ intersect at point P. What are the coordinates of P?

Example 2: Find missing coordinate of parallelogram.

If you know the coordinates of three vertices of a parallelogram, you can use slope to find the coordinates of the fourth vertex.
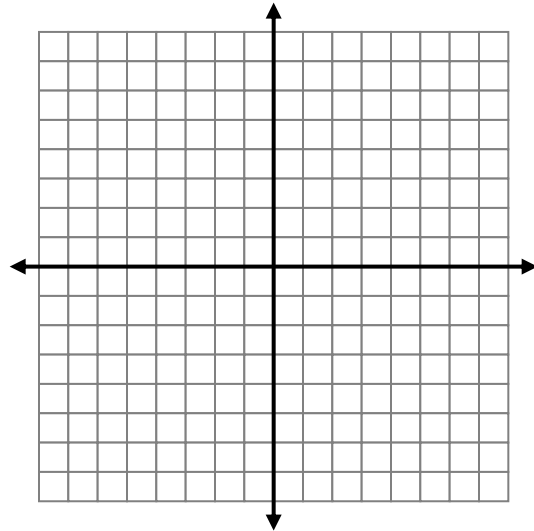
c. Three vertices of $\square RSTV$ are R(3, 1), S(-1, 5), and T(3, 6). Find the coordinates of V.
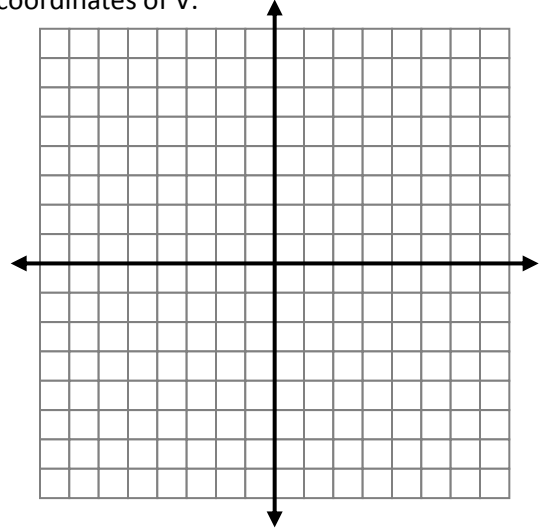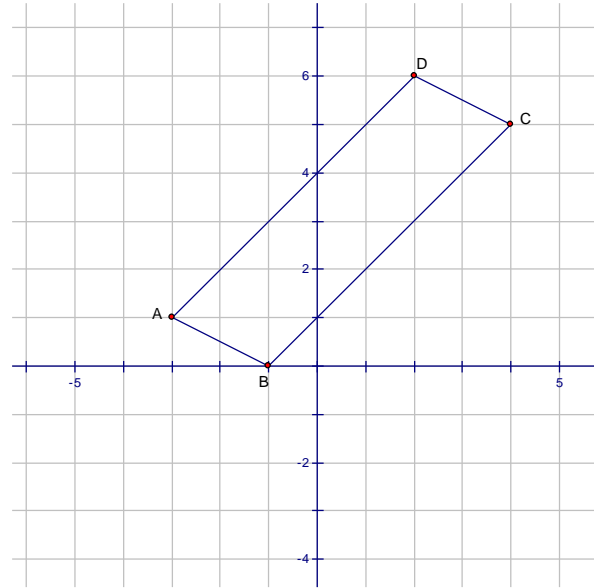
Practice:

The coordinates of three vertices of a parallelogram are given. Find the coordinates of the fourth vertex.

d. $\square ABCD$ with A(0,6), B(5, 8), and C(5, 5)

Example 3: Use coordinate Geometry to identify parallelograms

e. Show that *ABCD* is a parallelogram.

f. The vertices of LMNO are L(-4, 2), M(-5, -2), N(-1, -4) and O(0, 0). Show that LMNO is a parallelogram.