

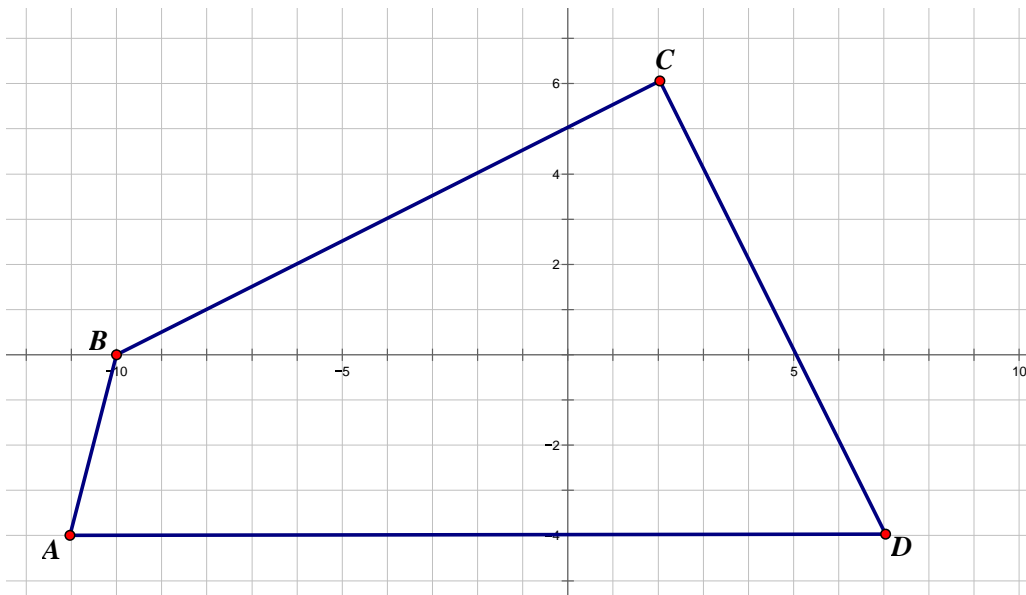
COORDINATE GEOMETRY #2

Launch:

When you walk into a house you've never been in before, are you ever surprised by what you find inside? Think and share about an experience you've had when you found out cool stuff about something you just thought was ordinary.

Explore:

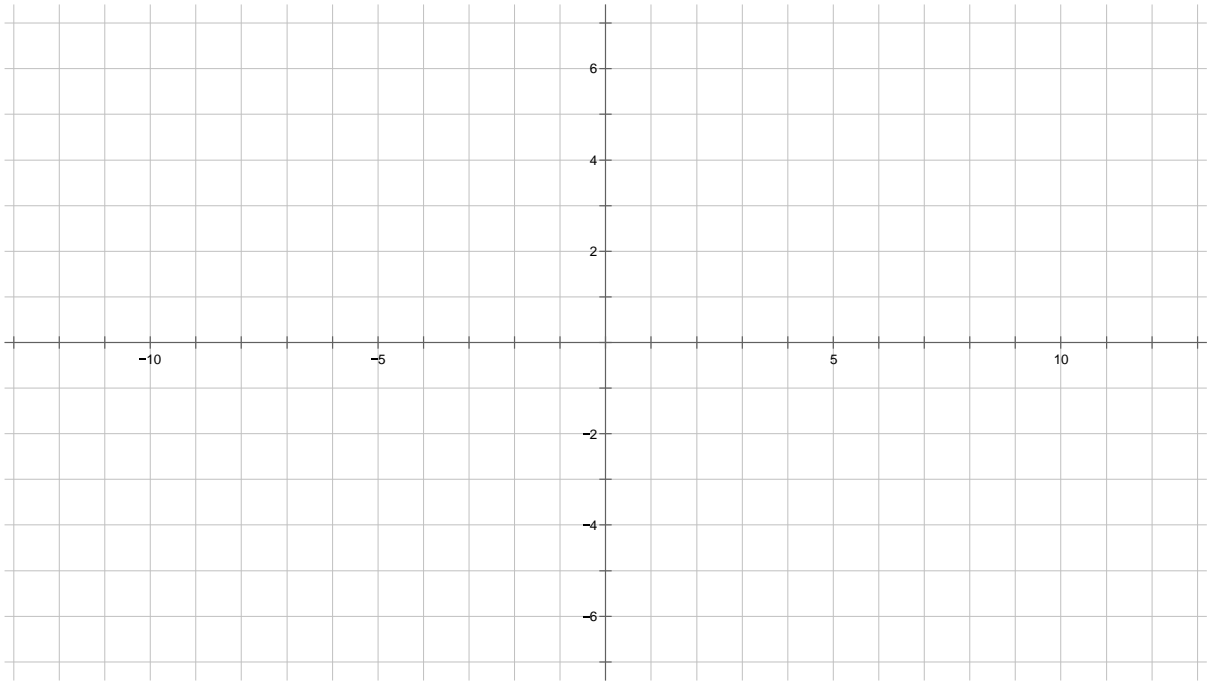
1. Consider quadrilateral $ABCD$ as shown in the graph below.



- a. Label the coordinates of points A , B , C , and D .
- b. Find and label the coordinates of the midpoints of each side of quadrilateral $ABCD$. Call them M , N , P , and Q , in order.
- c. Connect the consecutive midpoints, forming quadrilateral $MNPQ$. (These segments are called the "midsegments" of quadrilateral $ABCD$.)
- d. Make a conjecture about what type of shape you think $MNPQ$ is.
- e. Use your understanding of coordinates and lines to justify your conjecture (or find a counter-example and make a new conjecture).

2. Does this conjecture work for every quadrilateral? Let's test a different one:

a. Draw your own quadrilateral. Find and label the coordinates of the vertices.



b. Find and label the midpoints.

c. Draw in the midsegments of your quadrilateral. (That is, connect the midpoints to create another quadrilateral.)

d. What type of quadrilateral do you think is this new quadrilateral?

e. Use your understanding of coordinates and lines to justify your conjecture (or find a counter-example and make a new conjecture).

3. Write a conjecture that you think is true for the midpoints of *any* quadrilateral.

Explain:

It's cool to believe something is true. It's even cooler to be able to explain why it's true. Try to explain why this conjecture *must be* true. (Hint: Remember the triangle mid-segment exploration. What did you learn about the relationship of a triangle mid-segment to the 3rd side of the triangle?)

Write your ideas for explaining why your conjecture must be true: