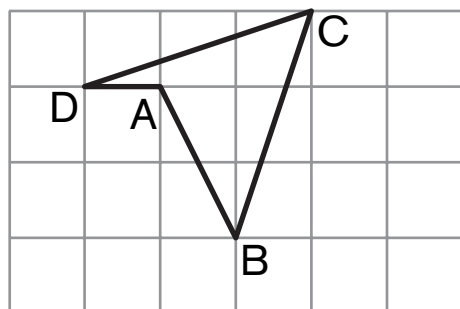


Square coordinates

Problem sheet

We can describe the journey from A to B to C to D and back to A in the diagram below as follows:

$A \rightarrow \downarrow \downarrow B \rightarrow \uparrow \uparrow \uparrow C \leftarrow \leftarrow \leftarrow \downarrow D \rightarrow A$
or $A \overset{1}{\rightarrow} \overset{2}{\downarrow} B \overset{1}{\rightarrow} \overset{3}{\uparrow} C \overset{3}{\leftarrow} \overset{1}{\downarrow} D \overset{1}{\rightarrow} A$



On squared paper, identify a starting point, A. Draw the line AB described as:

$A \rightarrow \rightarrow \rightarrow \downarrow \downarrow B$ or $A \overset{3}{\rightarrow} \overset{2}{\downarrow} B$

Draw at least one square ABCD for which AB is a side.

Draw squares ABCD for which one side is given below:

- $A \overset{1}{\rightarrow} \overset{1}{\uparrow} B$
- $A \overset{2}{\rightarrow} \overset{1}{\uparrow} B$
- $A \overset{3}{\rightarrow} \overset{1}{\uparrow} B$
- $A \overset{2}{\rightarrow} \overset{2}{\uparrow} B$
- $A \overset{3}{\rightarrow} \overset{2}{\uparrow} B$

Complete the arrow notation for each square above.

What do you notice?

Formulate and describe a general instruction for the construction of a square when you are given one of its sides.

Using the rule you developed, decide whether any of the collections of points below form a square. If so, which ones?

- 1 (8, 3), (7, 8), (2, 7), (3, 2)
- 2 (3, 3), (7, 4), (8, 8), (4, 7)
- 3 (16, 19), (18, 22), (21, 20), (19, 17)
- 4 (4, 20), (21, 19), (20, 2), (3, 3)

Explain how you decided.