More axes and coordinates

We can extend the number plane to include all integers by introducing negative numbers.

The axes of a Cartesian number plane splits the grid into four sections called quadrants.

The quadrants are numbered as shown above.
The coordinates in each quadrant have different combinations of positive and negative values.

Coordinate combinations

<table>
<thead>
<tr>
<th>Quadrant</th>
<th>Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd quadrant</td>
<td>negative, positive (−, +)</td>
</tr>
<tr>
<td>1st quadrant</td>
<td>positive, positive (+, +)</td>
</tr>
<tr>
<td>3rd quadrant</td>
<td>negative, negative (−, −)</td>
</tr>
<tr>
<td>4th quadrant</td>
<td>positive, negative (+, −)</td>
</tr>
</tbody>
</table>

Points on the horizontal axis (←→) have a second coordinate value of 0 eg: (3, 0).
Points on the vertical axis (↑) have a first coordinate value of 0 eg: (0, 2).
Write down the coordinates of the points A, B, C and D shown on the number plane below:

2nd quadrant: $x$ negative, $y$ positive  
- Point B: $(-4, 5)$

1st quadrant: $x$ positive, $y$ positive  
- Point A: $(5, 3)$

3rd quadrant: $x$ negative, $y$ negative  
- Point C: $(-6, -4)$

4th quadrant: $x$ positive, $y$ negative  
- Point D: $(3, -2)$
What else can you do?

Remember, when plotting points the first number is always the \(x\)-value (or horizontal value).

Plot and label these points on the same number plane:

\[
\begin{align*}
E & (0, 5) & F & (-2, 1.5) & G & (-7, 0) \\
H & (2.5, -5) & I & (-4, -6) & O & (0, 0)
\end{align*}
\]
More axes and coordinates

Put the letter for the coordinates below into the correct group where they would be found if plotted. There may be one or two that fit into more than one group.

A (-2, 1)    B (8, 0)    C (5, 5)    D (-2, 0)    E (4, -5)    F (0, -1)    G (-3, -6)
H (2, 7)    I (-4, 0)    J (4, 1)    K (-5, 1)    L (-1, -1)    M (3, 9)    N (7, -3)
O (0, 0)    P (-6, -1)    Q (9, -8)    R (0, 4)    S (9, 2)    T (6, -7)    U (0, -8)
V (-2.5, -1.5)    W (-1.5, 3.5)    X (0, -4.5)    Y (-8, 0)    Z (-0.5, 0.5)
2 More axes and coordinates

What does a Penrose Triangle look like? Follow the instructions below to find out!

Plot and join the following sets of coordinates together with straight lines using a ruler.

1\textsuperscript{st} Line: \textbf{start} (0, -4) \rightarrow (2, 2) \rightarrow (-4, 0) \rightarrow (0, -4) \textbf{stop}

2\textsuperscript{nd} Line: \textbf{start} (-6, 2) \rightarrow (9, 7) \rightarrow (3, -11) \rightarrow (0, -12) \rightarrow (5, 3) \rightarrow (-4, 0) \rightarrow (-6, 2) \textbf{stop}

Colour in the “7” shape formed by the second line.

3\textsuperscript{rd} Line: \textbf{start} (0, -4) \rightarrow (-1, -7) \rightarrow (-11, 3) \rightarrow (-12, 0) \rightarrow (0, -12) \textbf{stop}

Colour in the “V” shape formed by the third line a different colour.

4\textsuperscript{th} Line: \textbf{start} (-11, 3) \rightarrow (7, 9) \rightarrow (9, 7) \textbf{stop}