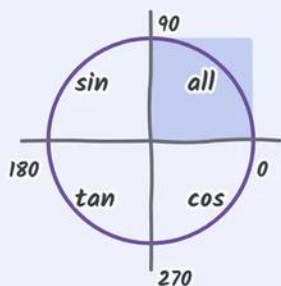


naming a point by two numbers, the quadrants, and the lines parallel to the axes

Building the plane

- two perpendicular number lines are drawn, the horizontal X axis and the vertical Y axis
- they meet at the origin, the point O with co-ordinates (0, 0)
- a point is named by an ordered pair (x, y), and the order is what makes (3, 5) different from (5, 3)
- x is called the abscissa, measured from the Y axis, and y the ordinate, measured from the X axis
- each is carried with its sign, positive to the right and upward, negative to the left and downward
- the two axes together are called the co-ordinate axes, and the plane they set up is the Cartesian plane



the plane cut into four regions by the two axes, the first of them highlighted: numbering runs anticlockwise from that one, and the pattern of signs is what identifies each region

Signs in the four quadrants

Quadrant	x	y
First	+	+
Second	-	+
Third	-	-
Fourth	+	-

the numbering runs anticlockwise starting from the region where both are positive. Only the second and fourth quadrants have one sign of each, and they are the two most often mixed up

Points on the axes themselves *

- a point on the X axis has ordinate zero, so it looks like (a, 0)
- a point on the Y axis has abscissa zero, so it looks like (0, b)
- the origin (0, 0) lies on both axes at once
- a point on an axis belongs to no quadrant, since the quadrants are the open regions between the axes
- so the answer to which quadrant does (4, 0) lie in is none, it lies on the X axis
- these conditions are how a question turns lies on the Y axis into the equation $x = 0$

Plotting and reading points

- to plot (a, b), move a units along the X axis first, then b units parallel to the Y axis
- the order is fixed: across before up, and reversing it plots a different point
- choose a scale that fits every point on the page, and mark the same scale on both axes unless there is a reason not to
- label each plotted point with its name and co-ordinates
- to read a point off, drop perpendiculars to both axes and read the two values with their signs
- a rough plot is worth doing even when the question is purely algebraic, since it catches sign errors instantly



several points plotted on one grid: each is fixed by going along the horizontal axis first and then parallel to the vertical one, and reversing that order would land on a completely different point