

# 8 Vectors and Scalars

What is a <b>vector quantity</b> ?	(03 HL) (06 OL)	A quantity that has both magnitude and a direction in space is called a vector quantity.
Give an example of a vector quantity.	(03 HL)	Displacement; velocity; acceleration; momentum; force; electric field strength; magnetic flux density. <b>(Any one)</b>
What is a <b>scalar quantity</b> ?	(03 HL)	A scalar quantity is one that has magnitude only. It has no direction in space.
Give an example of a scalar quantity.	(03 OL)	Distance; volume; time; pressure; work. <b>(Any correct scalar)</b>

**Note:** These are the **ONLY** vector quantities on your course, all other quantities are scalar quantities.

**Note:** The rest of this chapter is for Higher Level Only.

## New formulae this chapter:

If a vector of magnitude  $v$  has two perpendicular components  $x$  and  $y$ , and  $v$  makes an angle  $\theta$  with the component  $x$  (Fig. 8.1), then the magnitudes of the components are:

$$x = v \cos \theta \qquad y = v \sin \theta$$

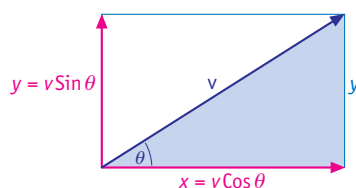


Fig. 8.1

**Note:** To resolve a vector into two perpendicular components proceed as follows.

- ⊗ Through the tail of the vector draw in the two required perpendicular directions.
- ⊗ Complete the rectangle (parallelogram) with the given vector as the diagonal.
- ⊗ The components are the adjacent sides of this rectangle.
- ⊗ Use information given in the question to work out the angle between one of the components and the given vector.
- ⊗ Calculate the magnitude of the components using the following:

$$x = v \cos \theta \text{ and } y = v \sin \theta$$