

YOU & MATHS Determine whether the lines

$$L_1: x - 2y = 8, \quad L_2: 2x - y = 3$$

are parallel, perpendicular or neither parallel nor perpendicular.

In order to understand the relationship between lines L_1 and L_2 , we have to determine their slopes first. Recall that the general equation of a line is:

$$ax + by + c = 0.$$

Then line $L_1: x - 2y = 8$ has slope:

$$m_1 = -\frac{a}{b} = -\frac{1}{-2} = \frac{1}{2}.$$

Line $L_2: 2x - y = 3$ has slope:

$$m_2 = -\frac{a}{b} = -\frac{2}{-1} = 2.$$

The two lines would be parallel if $m_1 = m_2$, but since this equality does not hold, let us see if they are perpendicular instead (that is, they have $m_1 = -\frac{1}{m_2}$).

$$-\frac{1}{m_2} = -\frac{1}{2} \neq \frac{1}{2} = m_1.$$

We can thus conclude that the two lines are neither parallel nor perpendicular.