1 The equation of line $\mathbf{L_1}$ is $y = 2x - 5$
The equation of line $\mathbf{L_2}$ is $6y + kx - 12 = 0$

$\mathbf{L_1}$ is perpendicular to $\mathbf{L_2}$

Find the value of k.
You must show all your working.

rewrite both lines in $y = mx + c$ form

$L_1 \Rightarrow \quad y = 2x - 5$ $\qquad$ $L_2 \Rightarrow \quad 6y + kx - 12 = 0$

$-kx \quad +12 \qquad -kx + 12$

$\div 6 \quad 6y = -kx + 12 \quad \div 6$

$y = -\frac{k}{6} + 2$ ✓(1)

Perpendicular Lines : gradients are negative reciprocals

L_1 gradient $= 2$

L_2 gradient has to be $-\frac{1}{2}$

$-\frac{1}{2} = -\frac{k}{6}$ $\quad \times 6 \quad \times 6$ ✓(1)

$-3 = -k$

$3 = k$

$k =$ 3 ✓(1)

(Total for Question 1 is 3 marks)