

## Answer on Question #82894 – Math – Analytic Geometry

### Question

A line AB passes through the point  $P(3, -2)$  with gradient 2, determine the equation of the line CD through  $P$  perpendicular to AB.

### Solution

If gradient (slope) of line AB is  $m = 2$ , then gradient of the line CD perpendicular to AB is

$$m_1 = -\frac{1}{m} = -\frac{1}{2}$$

So, the equation of the line CD:

$$y = m_1x + b$$

$$y = -\frac{1}{2}x + b$$

Substitute the coordinates of the point  $P$  which lies in the line CD:

$$-2 = -\frac{1}{2} \cdot 3 + b$$

$$b = -\frac{1}{2}$$

Thus, the equation of the line CD is

$$y = -\frac{1}{2}x - \frac{1}{2}$$

**Answer:**  $y = -\frac{1}{2}x - \frac{1}{2}$ .