# Probability and Random Variables Assignment 1

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## QUESTION 8 (B)
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The vertices of a triangle ABC are A(3,8), B(-1,2) and C (6,-6). Find:
(i) Slope of BC
(ii) Equation of a line perpendicular to BC and passing through A.

## ANSWER

*PART 1:*

Let $(x_2, y_2)$ be the co-ordinates of point B(-1,2), So,
$x_2 = -1$
$y_2 = 2$

Let $(x_3, y_3)$ be the co-ordinates of point C(6,-6), So,
$x_3 = 6$
$y_3 = -6$

To find the slope between two points, we use the slope point formula. For two points, $(x_2, y_2)$ and $(x_3, y_3)$, the point-slope formula is given by:

$$\text{Slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

Therefore, the slope of line BC will be given as:

$$\text{Slope} = \frac{(-6) - 2)}{(6 - (-1))}$$
$$= \frac{-8}{7}$$

> **The slope of line BC is -8/7.**

*PART 2:*

Let slope of line perpendicular to BC be Slope(2), and let slope of line BC be Slope(1) we know that,

$$\text{Slope(2)} = -\frac{1}{\text{Slope(1)}}$$
$$= -\frac{1}{(-8/7)}$$
$$= \frac{7}{8}$$

In general case, for a line passing through a point $(x_1, y_1)$ and having a slope m can be given by the equation :

$$(y - y_1) = m(x - x_1)$$

Therefore, the equation of a line passing through the point A(3,8) and having a slope of 7/8 will be given as :

$$(y–8) = 7/8(x–3)$$
$$8(y - 8) = 7(x–3)$$
$$8y–64 = 7x - 21$$
$$8y–7x = 43$$

> **The equation of line perpendicular to B and passing through A(3,8) is**
> **8y − 7x = 43**