Worked Examples – Cross Product

We are given 2 vectors, $\boldsymbol{A}$ and $\boldsymbol{B}$:

$$A = (9, -4, 7)$$

$$B = (-3, -2, 1)$$

We have to calculate:

$$\boldsymbol{C = A \times B}$$

The first step is to write out our table:

	x	y	z
A	9	-4	7
B	-3	-2	1

We'll start with our x value for our final equation, to find what values we need to look at we need to cover the x column.

	y	z
A	-4	7
B	-2	1

We then draw out our cross table for these two columns.

	y	z
A	-4	7
B	-2	1

From this table we write out our equation:

$$x = \big((-4 * 1) - (-2 * 7)\big) = \big((-4) - (-14)\big) = 10$$

Next, we'll move onto the y value for our final equation, to find what values we need to look at we need to cover the y column.

	x		z
A	9		7
B	-3		1

This may look confusing and hard to draw the cross on, however if we rearrange the columns, it can make it slightly easier to understand

	z	x	
A	7	9	
B	1	-3	

From this table we write out our equation:

$$y = \big((7 * -3) - (1 * 9)\big) = \big((-21) - (9)\big) = -30$$

Next, we'll move onto the z value for our final equation, to find what values we need to look at we need to cover the z column.

	x	y	
A	9	-4	
B	-3	-2	

Then we'll draw out the cross table again but for these columns:

	x	y	
A	9	-4	
B	-3	-2	

Then we'll write out the last equation from that table:

$$z = \big((9 * -2) - (-3 * -4)\big) = \big((-18) - (12)\big) = -30$$

Finally we combine our 3 values into a new vector:

$$x = 10$$

$$y = -30$$

$$z = -30$$

$$\boldsymbol{C} = \boldsymbol{A} \times \boldsymbol{B} = (10, -30, -30)$$