1. Fit the regression plane for the data below:

x	5	4	3	2	1
y	3	-2	-1	4	0
z	15	-8	-1	26	8

Hint: - Let y = a + bx + cz ------------------ $\textcircled{i}$

<u>Normal 3-Equations:</u>

$$\sum y = a * n + b * \sum x + c * \sum z$$

$$\sum xy = a * \sum x + b * \sum x^2 + c * \sum xz \qquad \textcircled{A}$$

$$\sum zy = a * \sum z + b * \sum xz + c * \sum z^2$$

Calculating required quantities below:

x	y	z	x^2	xz	z^2	xy	yz
5	3	15	25	75	225	15	45
4	-2	-8	16	-32	64	-8	16
3	-1	-1	9	-3	1	-3	1
2	4	26	4	52	676	8	104
1	0	8	1	8	64	0	0
$\sum x = 15$	$\sum y = 4$	$\sum z = 40$	$\sum x^2 =$ 55	$\sum xz =$ 100	$\sum z^2 =$ 1030	$\sum xy =$ 12	$\sum yz =$ 166

Substituting these values in equation 'A', we get
$$5a + 15b + 40c = 4$$

$$15a + 55b + 100c = 12$$

$$40a + 100b + 1030c = 166$$

Solving these equation, we get

$$a = -2$$

$$b = 2/5 = 0.4$$

$$c = 1/5 = 0.2$$

Therefore, the equation 'i' becomes

$$y = -2 + 0.4x + 0.2z$$