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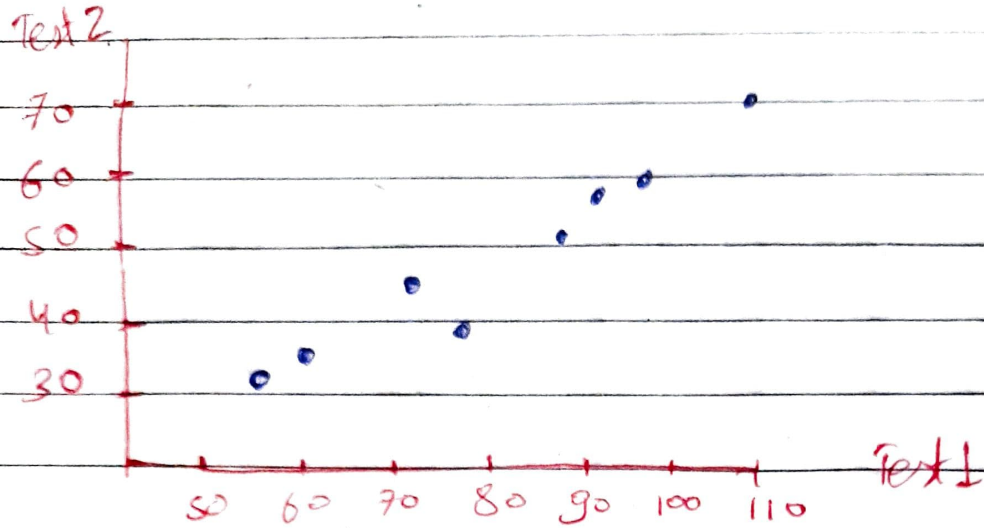
(2)



Direction → Positive, because the pattern in the scatterplot slopes upwards.

Strength → Strong, ~~bec~~ because the points in the scatterplot do not deviate much from the general pattern in the points.

Form → Linear, ~~bca~~ because the scatterplot does not contain a lot of curvature.

Thus there is a strong, positive, linear relationship b/w the variable.

(5)

X	x_i	y_i	x_i^2	x_i^3	x_i^4	$x_i y_i$	$x_i^2 y_i$
1	-4	2	16	-64	256	-8	32
2	-3	6	9	-27	81	-8	54
3	-2	7	4	-8	16	-14	28
4	-1	8	1	-1	1	-8	8
5	0	10	0	0	0	0	0
6	1	11	1	1	1	11	11
7	2	11	4	8	16	22	44
8	3	10	9	27	81	30	90
9	4	9	16	64	256	36	144
N = 9	$\Sigma x_i = 0$	= 74	= 60	= 0	= 708	= 51	= 411

eq $\Rightarrow y = a + bx + cx^2$

$\Sigma y_i = Na + b\Sigma x_i + c\Sigma x_i^2$

$\Sigma x_i y_i = a\Sigma x_i + b\Sigma x_i^2 + c\Sigma x_i^3$

$\Sigma x_i^2 y = a\Sigma x_i^2 + b\Sigma x_i^3 + c\Sigma x_i^4$

$\therefore 74 = 9a + b(0) + 60(c)$

$\therefore 9a + 60c = 74$ — (i)

$411 = 60a + 0b + 708c$ $\therefore 60a + 708c = 411$ — (ii)

Solving (1) & (2) $a = 10.004$

$c = -0.267$

The eqⁿ of parabola is,

$$y = 10.004 + 0.85X - 0.267X^2$$

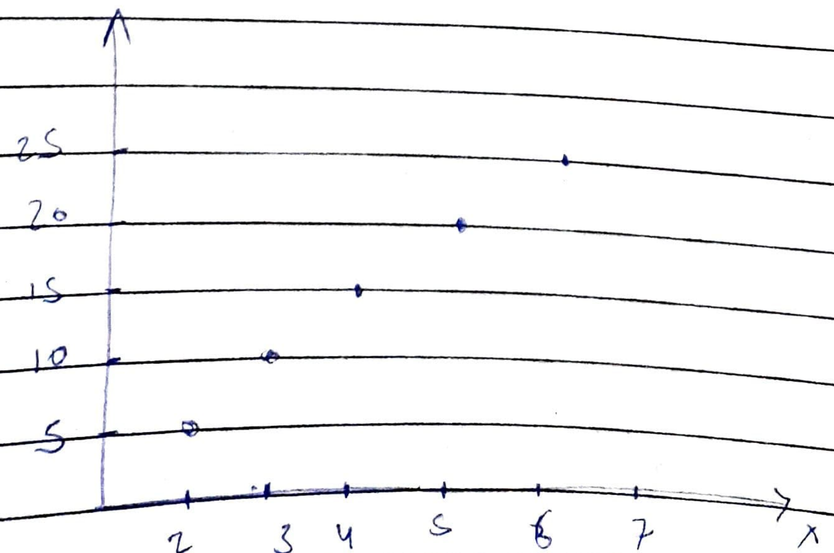
$$= 10.004 + 0.85(x-5) - 0.267(x-5)^2$$

$$= 10.004 + 0.85x - 4.25 - 0.267 + 2.67x - 6.675$$

$$y = -0.921 + 0.52x - 0.267x^2$$

Q1

X	Y	x^2	y^2	XY
2	6	4	36	12
3	7.5	9	56.25	22.5
4	8	16	64	32
5	12	25	144	60
6	13	36	169	78
7	15.5	49	240.25	108.5
Σx 27	62	139		Σxy. 313



$x = \cancel{b}$, $y = a + b$, x is the best within line

$\sum y = ax + b\sum x$

$62 = 6a + 27b$ — ①

$313 = 27a + 139b$ — ②

$a = 1.5904$, $b = 1.9428$

Best fitting line is

$$y = 1.5904 + 1.9428x$$

Q3. $f(x,y) = \frac{12}{7}(x^2 + xy)$,

a) $P(X > Y) = \iint_{x>y} f(x,y)\,dx\,dy$

$$= \int_0^1 \int_y^1 \frac{12}{7}(x^2 + xy)\,dx\,dy$$

$$= \int_0^1 \frac{12}{7}\left(\frac{x^3}{3} + \frac{x^2 y}{2}\right)\Bigg|_y^1 dy$$

$$= \int_0^1 \left(\frac{12}{21} + \frac{12}{14}y - \frac{12}{21}y^3 - \frac{12}{14}y^3\right) dy$$

$$= \frac{9}{4}$$

b) $f_X(x) = \int_0^1 \frac{12}{7}\left(x^2 + xy\right) dy = \frac{12}{7}x^2 + \frac{6x}{7}$