What is the process for finding the linear regression equation from a given table of data?

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The process for finding the linear regression equation from a given table of data involves several steps. First, the data must be organized into two columns representing the independent variable (x) and the dependent variable (y). Then, a scatter plot must be created to visualize the relationship between the two variables. Next, a line of best fit must be drawn on the scatter plot, which represents the general trend of the data. This line is determined by calculating the slope and y-intercept using specific formulas. Finally, the linear regression equation can be written in the form of y = mx + b, where m is the slope and b is the y-intercept. This equation can then be used to make predictions and analyze the relationship between the two variables.

Find Linear Regression Equation from a Table

Often you may want to find a linear regression equation from a table of data.

For example, suppose you are given the following table of data:

x	y
4	6
5	8
5	5
6	9
8	15
9	13
10	15
12	16
12	19
14	22

The following step-by-step example explains how to

find a linear regression equation from this table of data.

Step 1: Calculate X*Y, X2, and Y2

First, we'll calculate the following metrics for each row:

x*yx2y2

The following screenshot shows how to do so:

x	y	x*y	x^2	y^2
4	6	24	16	36
5	8	40	25	64
5	5	25	25	25
6	9	54	36	81
8	15	120	64	225
9	13	117	81	169
10	15	150	100	225
12	16	192	144	256
12	19	228	144	361
14	22	308	196	484

Step 2: Calculate ΣX, ΣY, ΣX*Y, ΣX2, and ΣY2

Next, we'll calculate the sum of each column:

	x	y	x*y	x^2	y^2
	4	6	24	16	36
	5	8	40	25	64
	5	5	25	25	25
	6	9	54	36	81
	8	15	120	64	225
	9	13	117	81	169
	10	15	150	100	225
	12	16	192	144	256
	12	19	228	144	361
	14	22	308	196	484
Σ	85	128	1258	831	1926

Step 3: Calculate b0

The formula to calculate the intercept of the regression equation, b0, is as follows:

b0 = ((Σy)(Σx2) - (Σx)(Σxy)) / (n(Σx2) - (Σx)2)b0 = ((128)(831) - (85)(1258)) / (10(831) - (85)2)b0 = -0.518

Note: In the formula, *n* represents the total number of observations. In this example, there were 10 total observations.

Step 4: Calculate b1

b1 = (n(Σxy) - (Σx)(Σy)) / (n(Σx2) - (Σx)2)b1 = (10(1258) - (85)(128)) / (10(831) - (85)2)b1 = 1.5668

Step 5: Write Linear Regression Equation

The final linear regression equation can be written as:

? = b0 + b1x

Thus, our linear regression equation would be written as:

? = -0.518 + 1.5668x

We can double check that this answer is correct by plugging in the values from the table into the :

Predictor values:

4, 5, 5, 6, 8, 9, 10, 12, 12, 14

Response values:

6, 8, 5, 9, 15, 13, 15, 16, 19, 22

CALCULATE

Linear Regression Equation:

$\hat{y} = -0.5180 + (1.5668)^{*}x$

We can see that the linear regression equation from the calculator matches the one that we calculated by hand.

The following tutorials provide additional information about linear regression: