

## Q Calculating Karl Pearson's Coefficient of Correlation by Actual mean method}

1st

Means are actual not in fractions  
{for both X & Y}      decimals

X	$x = x - \bar{x}$	Y	$y = y - \bar{y}$	$x^2$	$y^2$	$xy$
1	-2	2	-3	4	9	6
2	-1	5	0	1	0	0
3	0	7	2	0	4	0
4	1	6	1	1	1	1
5	2	5	0	4	0	0
$N=5$	$\sum x=0$	$\sum Y=25$	$\sum y=0$	$\sum x^2=10$	$\sum y^2=14$	$\sum xy=7$

$$\bar{X} = \frac{\sum X}{N} = \frac{15}{5} = 3$$

$\uparrow N$

$\bar{Y} = \frac{\sum Y}{N} = \frac{25}{5} = 5$

{Mean of Y}  $N$

Formula:  $r = \frac{\sum xy}{\sqrt{\sum x^2 \sum y^2}}$

Step 1:

Obtain the total of column X and column Y. { $\sum X$  and  $\sum Y$ }

Step 2: Calculate the mean values for column X and column Y.

Step 3: Calculate  $x(x-\bar{x})$  and  $y(y-\bar{y})$  respectively to obtain  $\sum x$  and  $\sum y$ . {NOTE:  $\sum x$  and  ~~$\sum y$~~  will always be zero in actual mean}

Step 4: Calculate  $x^2$  and  $y^2$  respectively to obtain  $\sum x^2$  and  $\sum y^2$ .

Step 5: Calculate  $xy$  to obtain  $\sum xy$ .

Step 6: Put all values in the formula:

$$r = \frac{7}{\sqrt{10 \times 14}}$$

$$= \frac{7}{\sqrt{140}} = \frac{7}{11.832}$$

$$r = 0.592$$

Positive Moderate correlation  
between X and Y.