Linear Regression

Basic Formula: -

y=mx+c

$$m=\sum \frac{(x-x')(y-y')}{(x-x')^2}$$

c = y-mx

x' = mean of x

y'= mean of y

x	y	$x - x'$	$y - y'$	$(x - x')^2$	$(x - x')(y - y')$
2	17	-1	-9.75	1	9.75
4	35	1	8.25	1	8.25
5	46	2	19.25	4	38.5
1	9	-2	-17.75	4	35.5
x'= 3	y'= 26.75			∑=10	∑=92

M= 92/10 = 9.2

C = 26.75 – (9.2*3) = 26.75-27.6 = 0.85

Best fit line: y=mx+c

Y=9.2X+0.85

Error: -

$$R^2 = \sum \frac{(y_p - y')^2}{(y - y')^2}$$

y_p = predicted y

y' = mean of y

x	y	y_p	$y - y'$	$y_p - y'$	$(y - y')^2$	$(y_p - y')^2$
2	17	17.55	-9.75	-9.2	95.06	84.64
4	35	35.95	8.25	9.2	68.06	84.64
5	46	45.15	19.25	18.4	370.56	338.56
1	9	8.35	-17.75	-18.4	315.06	338.56
x'= 3	y'= 26.75				∑=848.72	∑=846.40

R^2 = 846.40/848.72 = 0.997

R^2 $\propto$ Model Quality