PROBLEM : 1

Perform Regression Analysis for the given data to identify how the money spent on Marketing , Research &Development, and Administration is affecting the company's Profit.

SOLUTION : 1

Independent variables = Research & Development_Spend (X1), Administration_Spend (X2) and Marketing_Spend (X3)
Dependent variables = Profit

Line of Regression ---> y = m1x1 + m2x2 + m3x3 + c
i.e Profit = m1 (R&D_Spend) + m2 (Administration_Spend) -----> (1)
+ m3 (Marketing_Spend) + c

where, m1 , m2 , m3 are slopes
& c is the intercept .

After using Regression we got ,

m1 = 0.80571505
m2 = -0.02681597
m3 = 0.027228065
&
c = 50122.19299

Now,
Putting all the values in equation (1) we get,

Profit = 0.80571505 (R&D_Spend) + (-0.02682) (Administration_Spend) + 0.027228 (Marketing_Spend) + 50122.19

which is the relationship between R&D_Spend , Administration_Spend, Marketing_Spend with the Profit.

PROBLEM : 2 & 3

2) What will be the Profit if R&D_Spend is $21892.92 , Administration_Spend is $81910.77 & Marketing_Spend is $164270.7 ?

3) What will be the Profit if R&D_Spend is $23940.93 , Administration_Spend is $96489.63 & Marketing_Spend is $137001.1 ?

SOLUTION : 2 & 3

BY using the above relation we get,

R&D_Spend(X1)	Administration_Spend(X2)	Marketing_Spend(X3)	Profit
21892.92	81910.77	164270.7	70037.90477
23940.93	96489.63	137001.1	70554.57256

Insight

a) Here, R-square is 0.95 which means that our model is 95% accurate.
b) Spending more money on Research & Development will give us a high profit.
c) Spending more on Administration is not a good practice .
d) Spending more on Marketing will generate little profit.
Therefore it is advisable to spend more on Research & Development in order to achieve maximum profit for the company.

SUMMARY OUTPUT

Regression Statistics

Multiple R	0.975062046
R Square	0.950745994
Adjusted R Sq	0.947533776
Standard Erro	9232.334837
Observations	50

ANOVA

	df	SS	MS	F	Significance F
Regression	3	7.57E+10	2.52E+10	295.98	4.53E-30
Residual	46	3.92E+09	85236007		
Total	49	7.96E+10			

	Coefficients	Standard E	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0	Upper 95.0
Intercept	50122.19299	6572.353	7.626218	######	36892.73	63351.65	36892.73	63351.65
X Variable 1	0.80571505	0.045147	17.84637	######	0.714838	0.896592	0.714838	0.896592
X Variable 2	-0.02681597	0.051029	-0.52551	0.6018	-0.12953	0.0759	-0.12953	0.0759

X Variable 3	0.027228065	0.016451	1.655077	0.1047	-0.00589	0.060343	-0.00589	0.060343

R&D Spend	dministrati	rketing Spe	Profit
21892.92	81910.77	164270.7	
23940.93	96489.63	137001.1	