Multilinear Regression using Excel

HOW MUCH TO BID FOR A HOUSES TAKING INTO ACCOUNT 20% MARGIN

square feet	bedrooms	bathrooms	price
3000	4	5	564690
2000	3	3	413996
2100	4	1	338508
2000	4	2	376080
1800	2	3	263242
1600	3	2	357143
1400	3	2	319515
2000	3	4	488566
1200	2	2	281820
1666	1	2	162210
2002	4	4	439121
2964	3	2	349978
1400	3	1	252145
2564	4	3	557706
1959	2	2	245174
2350	3	2	573047
2963	4	4	504483
884	1	2	242894
1858	3	3	390974
1953	3	3	478307
805	1	3	171205
1746	3	3	275979
2026	2	3	318641
2011	4	2	500742
2200	2	3	395052
2214	4	4	441065
1000	1	1	199032
954	2	2	121742
1286	4	3	251042
1893	2	2	550580
1729	4	3	567282
1000	1	1	138890
2592	2	3	196739
1635	4	2	534725
1939	4	3	538782
1723	4	3	277557
1784	4	1	114029
2904	2	4	318603
2900	2	2	459486

Training dataset with 3 predictors - 60 rows

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.654689778
R Square	0.428618706
Adjusted R Squa	0.397452454
Standard Error	104365.8977
Observations	59

Price = 51880.41 + 44.72*square feet + 52613.90*bedrooms + 27513.48*bathrooms

Click OPTION, click ADD-IN, add ANALYSIS TOOLPAK. Then, in Excel worksheet, click Analysis, choose regession with label checked.

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	4.49392E+11	1.49797E+11	13.75265465	8.3043E-07
Residual	55	5.99073E+11	10892240595		
Total	58	1.04846E+12			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	51880.41082	51628.18018	1.004885523	0.319352666	-51584.77434	155345.596	-51584.77434	155345.596
square feet	44.72088536	26.34570537	1.69746396	0.095261306	-8.077088054	97.51885877	-8.077088054	97.51885877
bedrooms	52613.90248	14352.31171	3.665883486	0.000556395	23851.22707	81376.57788	23851.22707	81376.57788
bathrooms	27513.47562	14093.92085	1.952151989	0.056018314	-731.3729409	55758.32419	-731.3729409	55758.32419

Step 1 - Understanding the Model

- If a house has 1 more bedroom than another with the same square footage and the same number of bathrooms, how much more should I expect to pay? Why?
    - The one additional bedroom would result in an additional $52613.90 in price. The formula created by the regression determined that the coefficient for a bedroom is 52,613.90, so for every increase in the number of bedrooms the price will increase by the amount of the coefficient.

square feet	bedrooms	bathrooms	Predicted Prices
1500	3	1	304315.59
1300	2	2	270271.17
2300	5	2	472832.87
2000	4	2	406802.97
1000	2	2	256855.17
1100	3	2	313941.07
1400	3	2	327357.07
2700	5	3	518234.35
900	1	1	172255.79
1000	2	1	229341.69

Predicted Price = 51880.41 + 44.72*square feet + 52613.90*bedrooms + 27513.48*bathrooms

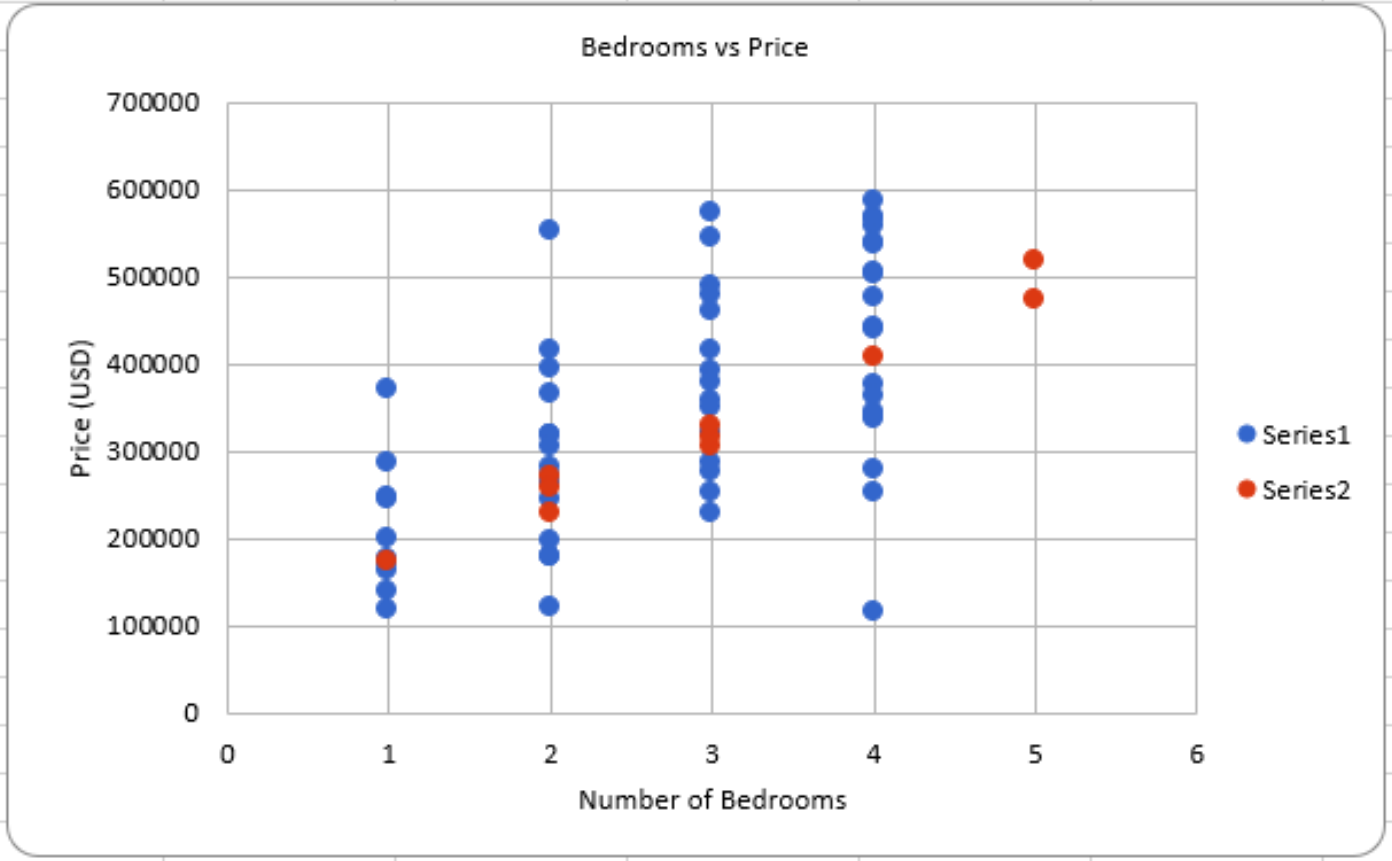
Example: 51880.41 + 44.72*1500 + 52613.90*3 + 27513.48*1 = $304315.59

Sum of predicted price for a group of 10 houses:	$3,272,207.74
Price to bid with 20% margin:	$2,617,766.19

Step 3: Make a Recommendation

Answer the following questions:

- What price do you recommend the investment company to bid? Please explain how you arrived at that number.
    - I recommend a bid of $2,617,766.19. I arrived at this number by using a formula from the regression model provided that was based on previous home sales and applied it to the houses that were up for bid. I then factored in the margin the investors were looking for which was 20% so I multiply the predicted amount 3272207.74 by .80 to get the final predicted bid of $2,617,766.19



The predicted prices are more compact than the actual data is. This is because we are not accounting for everything that affects prices. There are many other things than bedrooms that affect it. We had bathrooms and sqft factored into our formula but not even that will account for all the variation. For instance, this formula might look quite different depending on the city you are training the model on.

The model above appears to correctly predict prices, but it can be very off for certain houses. There appears to be an outlier - a home with only 2 bedrooms sold for almost $600,000.00. While the formula may not be accurate for an individual house, it should do a decent job at predicting the price we should pay for several houses at once since on average looks representative of the situation at hand.

2257	2	1	269516		
2265	4	2	474744		
2278	4	4	336544		
1505	1	1	175421		
1397	1	2	117189		
2658	2	2	179611		
2861	4	4	587000		
1371	2	1	415906		
1518	2	2	304315		
1044	1	1	369733		
1852	2	1	365441		
2202	3	3	378771		
2671	4	1	343231		
1798	3	1	285813		
2466	1	1	246789		
1107	3	3	228610		
1319	1	4	284970		
1578	4	3	363098		
1110	3	4	542853		
	3			304315.59	
	2			270271.17	
	5			472832.87	
	4			406802.97	
	2			256855.17	
	3			313941.07	
	3			327357.07	
	5			518234.35	
	1			172255.79	
	2			229341.69	

Left empty to support required data for chart only!