Chapter 05
Cost Estimation

1. The following manufacturing costs were incurred by the RST Company in 2011:

Direct materials	$112,500
Direct labor	175,000
Manufacturing overhead	235,000

These costs were incurred to produce 25,000 units of product. Variable manufacturing overhead was 80% of the direct materials cost.
In 2012, the direct material and variable overhead costs per unit will increase by 15%, but the direct labor costs per unit are not expected to change. Fixed manufacturing costs are expected to increase by 7.5%.
Required:
(a) Prepare a cost estimate for an activity level of 20,000 units of product in 2012.
(b) Determine the total product costs per unit for 2011 and 2012.

2. Hagler's Toupees has the following machine hours and production costs for the last six months of last year:

Month	Machine Hours	Production Cost
July	15,000	$12,075
August	13,500	10,800
September	11,500	9,580
October	15,500	12,080
November	14,800	11,692
December	12,100	9,922

If Hagler expects to incur 14,000 machine hours in January, what will be the estimated total production cost using the high-low method?

A. $8,750.00
B. $11,142.50
C. $22,400.00
D. $10,889.10

3. The Teal Company's total overhead costs at various levels of activity are presented below:

Month	Direct Labor Hours	Total Overhead
July	7,500	$272,000
August	6,000	234,000
September	9,000	319,000
October	10,500	340,500

Assume that the overhead costs above consist of utilities, supervisory salaries, and maintenance. The breakdown of these costs at the 9,000 direct labor hour level of activity is as follows:

Utilities (V)	$137,700
Supervisory Salaries (F)	80,000
Maintenance (M)	101,300
	319,000

Required:
(a) Using the high-low method, determine the cost formula for maintenance.
(b) Express the company's total overhead costs in linear equation form.

4. A company ran a regression analysis using direct labor hours as the independent variable and manufacturing overhead costs as the dependent variable. The results are summarized below:

Intercept	$14,600
Slope	$ 12.55
Correlation coefficient	.931
R-squared	.867

The company is planning on operating at a level that would require 12,000 direct labor hours per month in the upcoming year.
Required:
(a) Use the information from the regression analysis to write the cost estimation equation for the manufacturing overhead costs.
(b) Compute the estimated manufacturing overhead costs per month for the upcoming year.

5. The Grind Company has been having some difficulties estimating their manufacturing overhead costs. In the past, manufacturing overhead costs have been related to production levels. However, some production managers have indicated that the size of their production lots might also be having an impact on the amount of their monthly manufacturing overhead costs. In order to investigate this possibility, the company collected information on their monthly manufacturing overhead costs, production in units, and average production lot size for 2011.

Month	Production (Units)	Manufacturing Overhead Cost	Average Monthly Production Lot Size
1	75,000	$ 925,800	20
2	90,000	843,875	19
3	65,000	910,125	24
4	80,000	946,000	19
5	55,000	879,000	24
6	50,000	825,000	18
7	85,000	960,000	22
8	105,000	1,053,500	25
9	102,000	1,020,000	23
10	68,000	905,000	20
11	75,000	938,000	22
12	95,000	995,000	24

Regression analysis results of the information presented above are as follows:
Ordinary regression:
Equation: $691,741 + $3.0692 x units
r-square: .628
Multiple regression:
Equation: $482,171 + $2.4918 x units + $11,770.939 x lot size
r-square: .777

Required:
(a) Use the results from the ordinary regression and estimate next month's manufacturing overhead costs, assuming the company is planning to produce 92,000 units.
(b) Use the results from the multiple regression and estimate the next month's manufacturing costs, assuming the company is planning to produce 92,000 units with an average lot size of 21.
(c) Comment on which regression seems to be more appropriate under these circumstances. What additional information would you like to see? Be specific.

6. Cameron Company is interested in establishing the relationship between utility costs and machine hours. Data has been collected and a regression analysis prepared using Excel. The monthly data and the regression output follow:

Month	Machine Hours	Electricity Costs				
January	3,250	22,080				
February	3,770	25,200				
March	2,470	16,200				
April	4,030	27,600				
May	4,940	33,900				
June	4,290	26,400				
July	5,330	29,700				
August	4,550	27,300				
September	2,600	18,600				
October	4,810	31,200				
November	6,110	37,200				
December	5,460	33,300				
SUMMARY OUTPUT						
Regression Statistics						
Multiple R	96.5%					
R Square	93.2%					
Adjusted R-Square	92.5%					
Standard Error	1,710.21					
Observations	12.00					
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	4,472.26	2,019.39	2.21	0.051	-27.23	8971.74
Machine Hours	5.329	0.455	11.70	3.69E-07	4.314	6.343

Required:
a. What is the equation for utility costs using the regression analysis?
b. Does the variable "machine hours" have statistically significance? Explain.
c. Prepare an estimate of utility costs for a month when 3,000 machine hours are worked.