

## Chapter 2: Cost concepts and behavior (Numerical problems)

1. Bragg & Stratton Company manufactures a specialized motor for chain saws. The company expects to manufacture and sell 30,000 motors in year 2001. It can manufacture an additional 10,000 motors without adding new machinery and equipment. Bragg & Stratton's projected total costs for the 30,000 units are as follows:

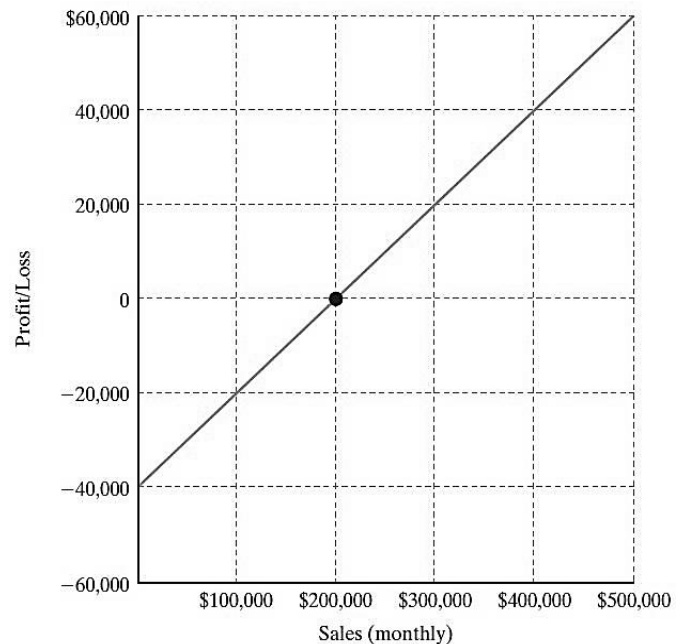
<b>Direct Materials</b>	<b>\$150,000</b>
Direct Labor	300,000
<b>Manufacturing Overhead:</b>	
Variable Portion	100,000
Fixed Portion	80,000
<b>Selling and Administrative Costs:</b>	
Variable Portion	180,000
Fixed Portion	70,000

The selling price for the motor is \$80.

- What is the total manufacturing cost per unit if 30,000 motors are produced?
- What is the total manufacturing cost per unit if 40,000 motors are produced?
- What is the break-even price on the motors?

2. The accompanying chart shows the expected monthly profit or loss of Cypress Manufacturing Company within the range of its monthly practical operating capacity. Using the information provided in the chart, answer the following questions:

- What is the company's break-even sales volume?
- What is the company's marginal contribution rate?
- What effect would a 5% decrease in selling price have on the break-even point in (a)?
- What effect would a 10% increase in fixed costs have on the marginal contribution rate in (b)?
- What effect would a 6% increase in variable costs have on the break-even point in (a)?
- If the chart also reflects \$20,000 monthly depreciation expenses, compute the sale at the break-even point for cash costs.

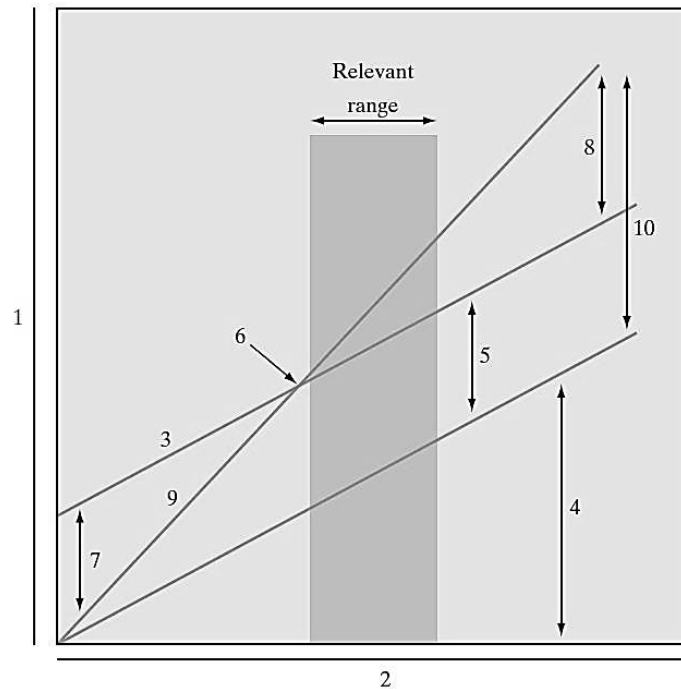


3. A cost-volume-profit (CVP) graph is a useful technique for showing relationships between costs, volume, and profits in an organization.

- Identify the numbered components in the accompanying CVP graph.

No.	Description	No.	Description
1		6	
2		7	
3		8	
4		9	
5		10	

(b) Using the typical CVP relationship shown, fill in the missing amounts in each of the following four situations (each case is independent of the others):



Each case is independent of the others.

Case	Units Sold	Sales	Variable Expenses	Contribution Margin per unit	Fixed Expenses	Net Income (Loss)
A	9,000	\$270,000	\$162,000		\$90,000	
B		\$350,000		\$15	\$170,000	\$40,000
C	20,000		\$280,000	\$6		\$35,000
D	5,000	\$100,000			\$82,000	(\$12,000)

4. The Morton Company produces and sells two products: A and B. Financial data related to producing these two products are summarized as follows:

	Product A	Product B
<b>Selling Price</b>	\$10.00	\$12.00
<b>Variable Costs</b>	\$5.00	\$10.00
<b>Fixed Costs</b>	\$600	\$2000

- If these products are sold in the ratio of 4A for 3B, what is the break-even point?
- If the product mix has changed to 5A for 5B, what would happen to the break-even point?
- In order to maximize the profit, which product mix should be pushed?
- If both products must go through the same manufacturing machine and there are only 30,000 machine hours available per period, which product should be pushed? Assume that product A requires 0.5 hour per unit and B requires 0.25 hour per unit.

5. Pearson Company manufactures a variety of electronic printed circuit boards (PCBs) that go into cellular phones. The company has just received an offer from an outside supplier to provide the electrical soldering for Pearson's Motorola product line (Z-7 PCB, slim-line). The quoted price is \$4.80 per unit. Pearson is interested in this offer, since its own soldering operation of the PCB is at its peak capacity.

• **Outsourcing option:** The company estimates that if the supplier's offer were accepted, the direct labor and variable overhead costs of the Z-7 slim-line would be reduced by 15% and the direct material cost would be reduced by 20%.

• **In-house production option:** Under the present operations, Pearson manufactures all of its own PCBs from start to finish. The Z-7 slim-lines are sold through Motorola at \$20 per unit. Fixed overhead charges to the Z-7 slim-line total \$20,000 each year. The further breakdown of producing one unit is as follows:

Direct Materials	\$7.50
Direct Labor	\$5.00
Manufacturing Overhead	\$4.00
Total Cost	\$16.00

The manufacturing overhead of \$4.00 per unit includes both variable and fixed manufacturing overhead, based on a production of 100,000 units each year.

(a) Should Pearson Company accept the outside supplier's offer?

(b) What is the maximum unit price that Pearson Company should be willing to pay the outside supplier?

6. The Hamilton Flour Company is currently operating its mill six days a week, 24 hours a day, on three shifts. At current prices, the company could easily obtain a sufficient volume of sales to take the entire output of a seventh day of operation each week. The mill's practical capacity is 6,000 hundredweight of flour per day. Note that:

• Flour sells for \$12.40 a hundredweight (cwt.) and the price of wheat is \$4.34 a bushel. About 2.35 bushels of wheat are required per cwt. of flour. Fixed costs now average \$4,200 a day, or \$0.70 per cwt. The average variable cost of mill operation, almost entirely wages, is \$0.34 per cwt.

• With Sunday operation, wages would be doubled for Sunday work, which would bring the variable cost of Sunday operation to \$0.66 per cwt. Total fixed costs per week would increase by \$420 (or \$29,820) if the mill were to operate on Sunday.

(a) Using the information provided, compute the break-even volumes for six-day and seven-day operation.

(b) What are the marginal contribution rates for six-day and seven-day operation?

(c) Compute the average total cost per cwt. for six-day operation and the net profit margin per cwt. before taxes.

(d) Would it be economical for the mill to operate on Sundays? (Justify your answer numerically.)