2 Chapter

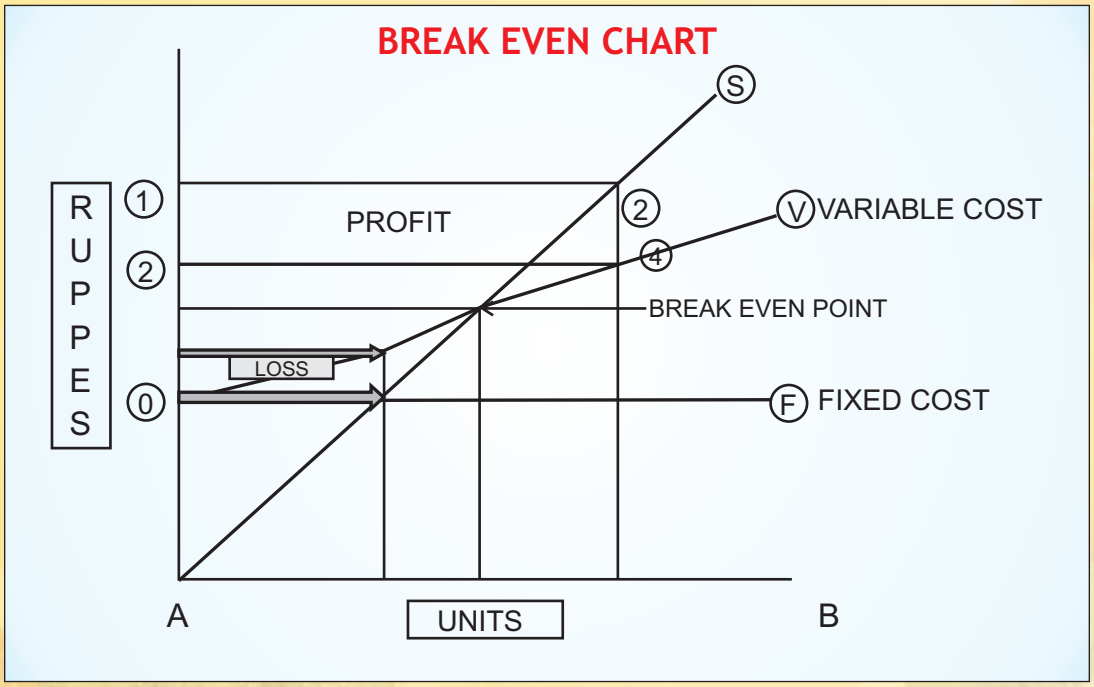
Learning objectives : At the end of the unit learners would be able to :

(a) Understand concept of break even part.

(b) Calculate & understand concept Food lost, Margin of Safety & Break even point.

Break Even Point

Break Even Point is the point of sale at which one makes neither profit nor loss. In other words it means that the sale is equal to the total cost. This can be explained in the chart below.



Break Even Point is that volume of sales or production where there is neither profit nor loss

Sale - Food Cost (Variable Cost) = Contribution

Contribution is also termed as Gross Profit.

P/V Ratio:

The ratio of contribution to sales is the P/V Ratio. The fixed cost remains constant in the short term. The P/V ratio will measure the rte of change of profit due to change in sales. The P/V ratio can be expressed in the following way.

$$\text{Profit Volume Ratio (P/V Ratio)} = \frac{\text{Contribution}}{\text{Sale}} \times \frac{100}{1}$$

Where Contribution = Sale - Variable cost (cost of sales or marginal cost)

Sales = Sale X P/V Ratio

$$\text{Sales} = \frac{\text{Contribution}}{\text{P/V Ratio}}$$

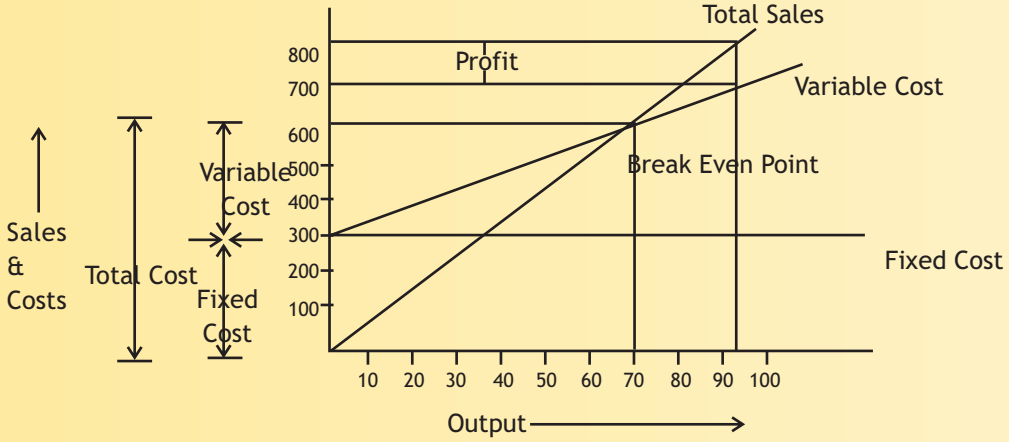
$$\text{Break Even Point (in units)} = \frac{\text{Total Fixed Cost}}{\text{Contribution (per unit)}}$$

$$\text{Break Even Point (sale)} = \frac{\text{Total Fixed Cost}}{\text{P/V Ratio}}$$

$$\text{Volume of Sale at Desired Profit} = \frac{\text{Total Fixed Cost + Desired Profit}}{\text{P/V Ratio}}$$

$$\text{Total Units of Sale at Desired Profit} = \frac{\text{Total Fixed Cost +Desired Profit}}{\text{Contribution (per unit)}}$$

Break Even Profit can also be expressed in the form of chart:



If the restaurant serves 70 covers then its total sale and total cost is ₹ 600. That means ₹ 600 sale is B.E.P. sale. 70 covers sale I B.E.P. (in units) sales. At this sale volume the restaurant will neither make profit nor loss. The fixed cost of the restaurant is ₹ 300 and variable cost is ₹ 300 at B.E.P. sale of ₹ 600. Thus Sale = Fixed Cost + Variable Cost

i.e. ₹ 600 = ₹ 300 + ₹ 300

If the restaurant makes sale of more than ₹ 600 then it will make a profit as explained in the chart above, the restaurant when makes the sale of ₹ 800 then it makes a net profit of ₹ 100. Thus Net Profit = Sale - Variable Cost + Fixed Cost

i.e. ₹ 100 = ₹ 800 - ₹ 400 + ₹ 300

The sale of ₹ 200 over and above the B.E.P. sale is called the 'Margin of Safety'. In case, the restaurant is having a large margin of safety that means the restaurant business is very sound. Margin of safety can also be improved lowering fixed cost and variable cost, without affecting or deteriorating the quality of product, increasing volume of sales.

Margin of Safety = Actual Sales - Sales at B.E.P.

Illustration:

A restaurant sale varies from 20,000 to 25,000 covers in a month. The fixed cost for the restaurant is ₹ 9,00,000 a month. The average sale per cover is ₹ 120 and the food cost is 50%.

You are require to find out

a) Break Even Point in Unit

b) Break Even Sales

c) Margin of Safety in units at 20,000 covers and at 25,000 cover ale.

d) Profit at Maximum level

Solution:

Food Cost = $\frac{50 \times 120}{100}$ = ₹ 60

Break Even Point (in units) = $\frac{\text{Fixed Cost}}{\text{Contribution (per unit)}}$

Where, Contribution (per unit) = Sale (per unit) - Food Cost (variable cost)

= 120 - 60 ₹ 60

Break Even Point (in units) = $\frac{9,00,000}{60}$ = 15,000 covers

Break Even Sales = B.E.P. (in units) X Sale Per Cover

= 15,000 X 120 = ₹ 18,00,000

The other formula to find out Break Even Sales is as follows:

Break Even Sales = $\frac{\text{Total Fixed Cost}}{\text{P/V Ratio}}$

Where, P/V Ratio = $\frac{\text{Contribution}}{\text{Sale}} \times \frac{100}{1}$

Contribution = Sale - Variable Cost

= 120 - 60 = ₹ 60

P/V Ratio = $\frac{60}{120} \times \frac{100}{1}$ = 50%

Therefore, Break Even Sales = $\frac{9,00,000 \times 100}{50}$ = ₹ 18,00,000

Margin of Safety (in units) = actual sale (in units) - B.E.P. (in units)

(i) 20,000 units - 15,000 covers = 5000

(ii) 25,000 units - 15,000 covers = 10,000

Margin of Safety at 20,000 cover's sale = 5,000 units

Margin of Safety at 25,000 cover's sale = 10,000 units

Profit at Maximum Level:

Total Sale = 25,000 units X 120 = ₹ 30,00,000

Variable Cost = 50% of Sale

$$= \frac{30,00,000 \times 50}{100} = ₹\ 15,00,000$$

Fixed Cost = ₹ 9,00,000

Total Cost = Variable Cost + Fixed Cost

15,00,000 + 9,00,000 = ₹ 24,00,000

Profit at Maximum Level = Sale - Total Cost

= 30,00,000 - 24,00,000 = ₹ 6,00,000

Illustration:

Mr. X has opened a restaurant and his total investment is ₹ 4,00,000. His fixed cost for the month of December is:

Salaries and Wages	₹ 64,000
Office Expenses	₹ 5,000
Interest @ 2% of total investment	
Insurance	₹ 4,000
Advertisement	₹ 9,000

Variable cost is 70% of unit's sales value. Average selling price per unit is ₹ 30 and the total sale is ₹ 6,00,000 for the month

Find out

a) Break Even Point (in units)

b) Break Even Sales

c) Net Profit.

Solution:

Total Fixed Cost :

	₹
Salaries and Wages	64,000
Office Expenses	5,000
Interest @ 2% on ₹ 4,00,000	8,000
Insurance	4,000
Advertisement	9,000
Total Fixed Cost	90,000

Contribution = Sale - Food Cost (variable cost)

Where, Food Cost = $\frac{70 \times 30}{100}$ = ₹ 21

Contribution = 30 - 21 = ₹ 9

Break Even Point (in units)

= $\frac{\text{Fixed Cost}}{\text{Contribution (per unit}}$

= $\frac{90,000}{9}$ = 10,000 covers

Break Even Sales = Break Even Point (in units) X Sale per cover

= 10,000 X 30 = ₹ 3,00,000

The other way to find Break Even Sales is as follows:

Break Even Sales = Total Fixed Cost / P/V Ratio

Where, P/V Ratio = Contribution (per unit) X 100 / Sale (per unit) 1

Contribution = Sale - Variable Cost

= 30 - 21 = ₹ 9

P/V Ratio = 9 X 100 / 30 1 = 30%

Therefore, Break Even Sales = $\frac{90,000 \times 100}{30}$ = ₹ 3,00,000

Net Profit = Sale - Total Cost

Where, Total Cost = Variable Cost + Fixed Cost

Variable Cost = $\frac{70 \times 6,00,000}{100}$ = ₹ 4,20,000

Fixed Cost = ₹ 90,000

Total Cost = 4,20,000 + 90,000 = ₹ 5,10,000

Net Profit = 6,00,000 - 5,10,000 = ₹ 90,000

Illustration

A restaurant sale is 15,000 covers in a month and it operates t a food cost of 50%. Average sale per cover is ₹ 200. The total fixed cost is ₹ 6,00,000.

You are required to

a) Draw a Break Even Chart

b) Find Break Even Point (in units)

c) Find Break Even Sales

d) Find Margin of Safety (in units)

e) Margin of Safety (in Sales)

Solution:

Break Even Point (in units) = Fixed Cost / Contribution (per unit)

Where, Contribution = Sale - Food Cost

= 200 - 100 = ₹ 100

Break Even Point (in units) = 6,00,000 / 100 = 6,000 covers

Break Even Sales = Break Even Point (in units) X Sale per cover

= 6,000 X 200 = ₹ 12,00,000

Break Even Sales = Total Fixed Cost / P/V Ratio

Where P/V Ratio = Contribution / Sale X 100

= 50 / 100 X 100 / 1 = 50%

Therefore, Break Even Sales = 6,00,000 X 100 / 50 = ₹ 12,00,000

Margin of Safety (in units) = Total Sale (in units) - B.E.P. (in units)

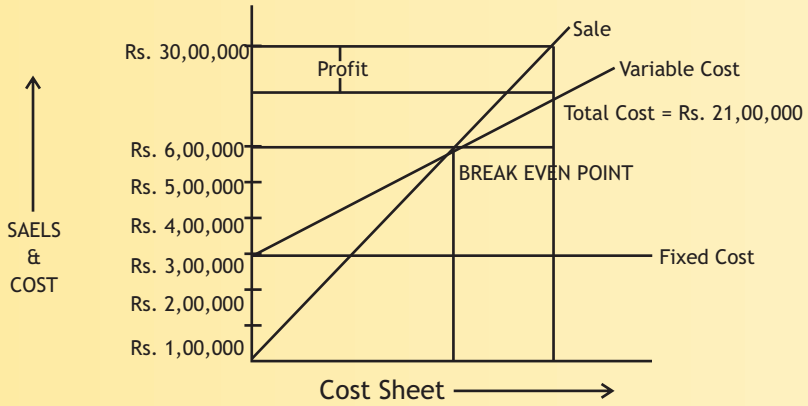
= 15,000 - 6,000 = 9,000 covers

Margin of safety (in Sales) = Total Sale - Break Even Sales

Where, Total Sale = 15,000 X 200 = ₹ 30,00,000

Therefore, Margin of Safety (in sales) = 30,00,000 - 12,00,000 = ₹ 18,00,000

Break Even Chart



ANSWERS AND QUESTIONS:

Q. 1. What is Break Even Point? How it helps management in knowing the financial position of the hotel?

Q. 2. Explain Break Even Point with the help of chart.

Q. 3. What do you mean by Margin of Safety? Explain in detail with examples.

Q. 4. What are P/V ratio, contribution and volume of sale at desired profit.

Q. 5. Calculate as given under:

a) Cost Percentage, when Cost is ₹ 500 and Sale is ₹ 2,000

b) Cost, when Cost Percentage is 30% and Sale is ₹ 1,500

c) Sale, when Cost Percentage is 25% and Cost is ₹ 750

(Answers a) 40%, b) ₹ 450 c) ₹ 3,000)

Q. 6 Calculate as given under:

a) Food Cost, when Food Cost Percentage is 30% and Total Sale is ₹ 900

b) Gross Profit Percentage, when Total Sale is ₹ 5,000 and Food Cost is ₹ 3,000

c) Net Profit Percentage, when Total Sale I ₹ 6,000 and Total Cost is ₹ 4,000

(Answers a) Rs. 270 b) 40% c) 33.33%)

Q. 7. The following figures were extracted from ABC Hotel, Food Cost ₹ 5,000; Labour and Overhead ₹ 2,500; Sales ₹ 15,000. Find as a percentage of sales

a) Net Profit

b) Gross Profit

Answers a) 50% b) 66.67%

Q. 8. The total cost of the restaurant is ₹ 15,00,000. The fixed cost is as under : Salaries and Wages ₹ 75,000; Office Expenses ₹ 25,000; Insurance ₹ 10,000; Interest ₹ 5,000; Depreciation ₹ 70,000; Rent ₹ 25,000. Variable Cost will be30% of Sale. Average Selling Price will be ₹ 30 and the total sale will be ₹ 9,00,000.

Calculate:

a) Break Even Sales

b) Net Profit at desired sale

Answers

a) ₹ 3,00,000

b) ₹ 4,20,000

Q. 9. The total fixed cost is ₹ 4,00,000. The food cost is 60% of sale and the average selling price per guest is ₹ 50.

Find out

a) B.E.P.

b) Sale at a desired profit of ₹ 2,00,000

Answer a) 20,000 units / guests b) ₹ 15,00,000

Q. 10. A restaurant's sales varies from 25,000 to 30,000 covers in a month and the food cost of the restaurant is 30% and average sale per cover / guest is ₹ 50. The total fixed cost is ₹ 7,00,000.

Find out

a) B.E.P

b) B.E. Sales

c) Profit at the sale of 30,000 covers

Answers: a) 2,000 covers b) ₹ 10,00,000 c) ₹ 3,50,000

Q. 11. The following information is related to a 150 cover buffet. The food cost and labour cost will be ₹ 8,000 and ₹ 3,000 respectively. The management wants to recover 20% of sales towards overhead.

You are required to calculate:

a) Selling price to make a net profit of 25%

b) Net profit per cover

c) Gross profit per cover

d) Average selling price.

Q. 12. The following information was extracted from the books of a restaurant in respect of June.

	₹
Sales	30,000
Opening Stock - Ist June	2,500
Closing Stock - 30th June	3,200
Purchases	13,000
Wages and Salaries	5,600
E.S.I.	300
Gas and Electricity	800
Repair and Renewals	1,000
Rent and Rates	1,800
Insurance	400
Postage and Telephone	200
Printing and Stationery	300
Depreciation	2,000

You are required:

a) To calculate the elements of cost and to express each as a percentage of sales, assuming that ₹ 800 of the food has been used for staff meals and ₹ 500 of the food as complementary.

b) To calculate the gross profit, after wage profit and net profit

c) To calculate the average spending power per customer, assuming that 6,000 customers were served in June.

Q. 13. A business man plans to open a new restaurant. His equity investment for equipment, furniture and remodeling will be ₹ 3,00,000. Fixed costs per year will be:

Management and other Salaries	₹ 43,000
Administrative and General Expenses	₹ 7,500
Marketing Expenses	₹ 5,000
Insurance	₹ 2,500
Rent	₹ 24,000
Depreciation	₹ 29,600

Variable cost will be 70% of unit's sales value. Average selling price per unit will be ₹ 30. Annual revenue is expected to be ₹ 5,00,000

a) Calculate the Break Even Sales level of the restaurant

b) What will be the Net Income at the expected sale?

Q. 14. The following information is related to a 200 cover restaurant. The fixed cost of the restaurant is

Rent	₹ 800
Interest	₹ 500
Salary	₹ 800
Depreciation	₹ 900

You are required to calculate the following assuming the food cost is ₹ 800.

a) Selling price to make a net profit of 25%

b) Net profit per cover

c) Gross profit per cover

d) Average selling price.

Q. 15. Calculate s give under

a) Cost percentage, when cost is ₹ 300 and sale is ₹ 1,000

b) Cost, when cost percentage is 40% and sales is ₹ 800

c) Sales, when cost percentage is 30% and cot is ₹ 120

Q. 16. The following information was extracted from the book of a restaurant in respect of December.

Sales	Rs. 60,000
Opening Stock	Rs. 5,000
Closing Stock	Rs. 6,400
Purchases	Rs. 26,000
Wages and Salaries	Rs. 11,200
Medical	Rs. 600
Power and Fuel	Rs. 1,600
Repairs and Renewals	Rs. 2,000
Rent and Rates	Rs. 3,600
Insurance	Rs. 800
Postage and Telephone	Rs. 400
Printing and Stationery	Rs. 600
Depreciation	Rs. 4000

You are required:

a) To calculate the elements of cost and to express each as a percentage of sales assuming that ₹ 1,600 of the food as complementary.

b) To calculate the gross profit, after wage profit and net profit and their percentage

c) To calculate the average spending power per customer, assuming that 6,000 customers were served in December.

Q. 16. Find out a) Break Even Point b) Break Even Sales c) Margin of Safety t the sale of ₹ 40,000. The total fixed cost is ₹ 9,000 and the food cost is 70% and the selling price is ₹ 30.