

## MARGINAL COSTING

Marginal costing as a technique of costing is applied on the basis of behaviour of cost items. On analysing the behaviour of costs in relation to changes in volume of output, it can be divided into fixed cost, variable cost and semi-variable Cost.

**Fixed costs** are those costs which *remain fixed or constant* at any level of activity or up to a given range of activity. These costs do not change with changes in the volume or level of activity within the limits of plant capacity. The fixed cost in total remains to be the same. These are **period costs** such as rent, insurance, wages of skilled workers, etc.

**Variable cost** is that part of the total cost which tends to vary directly with variation in the volume of output. It varies in direct proportion to the volume of production. It varies in total, but cost per unit remains to be the same. It can also be called as marginal cost or **product cost**. Cost of materials, cost of labour, etc. form variable cost.

Semi-variable cost is that part of the total cost which is partly fixed and partly variable. It varies at certain levels and remains fixed at other levels of activity. ‘Supervisor’s salary, advertising charges, telephone charges, etc. are semi-variable in nature.

In marginal costing, the costs are divided only into fixed and variable and an attempt is made to study their effect on profit of changes in the volume and type of output. It is a technique of costing which helps the management in decision making.

Statement showing the effect on profit of changes in level of output.

	Level of output	
	100 units (R)	200 units (O)
Sales @ 100	10,000	20,000
Less: Variable cost @ 50	5,000	10,000
Less: Fixed cost	5,000	10,000
	<b>3,000</b>	<b>3,000</b>
Profit	2,000	7,000

On analysing the statement, it can be seen that the increase in profit is not proportionate to the increase in output, but it is much higher. When the output has instead of doubling the profit to 4,000, it has increased to 7,000. Such disproportionately higher amount of profit is the contribution made by the fixed cost to war profit by remaining it at the same amount 3,000.

### **Marginal Cost - Meaning and Definition**

Marginal cost is the cost of producing one additional unit of output. It is the amount by which total cost increases when one extra unit is produced, or the amount of cost which can be avoided by producing one unit less Marginal cost, variable cost, product cost, etc. are often used to mean the same.

ICMA England defines Marginal Cost as "*the amount at any given volume of output by which the aggregate costs are changed if the volume of output is increased or decreased by one unit.*"

### **Marginal Costing - Meaning and Definition**

Marginal costing is a technique of costing which studies the effect on profit of changes in the volume and type of output. Under marginal costing, only variable costs are charged to operations, processes or products, leaving all fixed costs to be written off against profits in the period in which they arise.

ICMA England, defines Marginal Costing as "*the ascertainment of marginal costs and of the effect on profits of changes in volume or type of output by differentiating between fixed costs and variable costs.*"

### *Features of Marginal Costing*

1. **Technique of costing:** Techniques of costing are the different methods and ways of analysing and presenting costs for the purpose of decision making. Marginal costing acts as a technique which helps the management in taking decisions.
2. **Division of cost:** In marginal costing the costs are divided only into fixed cost and variable cost.
3. **Charges on product:** The variable costs are charged to the cost of the products or process.
4. **Charge on Profit and Loss Account:** Fixed costs are treated as period costs and are charged to Profit and Loss Account of the period for which they are incurred.
5. **Valuation of stock:** The stock of finished goods and work-in-progress are valued at marginal costs only. As fixed cost is charged against the profit, it does not form a part of the value of the stock.
6. **Price determination:** Prices are determined on the basis of marginal cost by adding “**contribution**” which includes fixed cost and profit.

### **Assumption of Marginal Costing**

The technique of marginal costing is based on the following assumptions:

1. All elements of cost can be divided into fixed and variable.
2. Variable cost per unit remains constant irrespective of level of output and fluctuates directly in proportion to changes in the volume of output.
3. The selling price per unit remains unchanged at all levels of activity.
4. Fixed costs remain unchanged or constant for the entire volume of production.

5. Volume of production is the only factor which influences the costs.
6. Semi variable cost is totally ignored.

### **Justification for Exclusion of Fixed Costs from products and processes in marginal costing**

Under marginal costing technique, fixed costs are exempted fully from product costs as it is incurred even if there is no production during a particular period. It is only a period cost and has no direct relation with the number of units produced. Hence, it is exempted from the product and process cost. It forms only a part of contribution.

#### ***Contribution***

Contribution is the benefit derived from production and sales activities or it is the amount *contributed* by the activities of the organisation.

*Contribution is the difference between sales and marginal cost of sales or it is the total of fixed cost and profit.* It is the amount that the activities of a business contributes to it. It is the total of profit earned from the business activities plus the fixed cost recovered from revenue. Even if there is no business activities for a particular period, the fixed costs have to be incurred which in effect becomes a loss to the business. Contribution is also known as '**Contribution Margin**' or '**Gross Margin**'. In marginal costing, contribution is the basis of decision making.

### **Significance of Contribution**

1. It helps the management in the fixation of selling price.
2. It helps the management in selecting the most profitable product mix.
3. It helps in choosing from among alternative methods of production.
4. It helps in deciding whether to purchase or manufacture a product or a component.

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5. It assists in determining the break-even-point.

$$\text{Contribution} = \text{Sales} - \text{Variable cost} \text{ Or } \text{Contribution} = \text{Fixed cost} + \text{Profit}$$

Example:

Calculate contribution of the following.

Sales 2,00,000

Variable cost 80,000,

Fixed cost 20,000

### Contribution Statement

Sales	2,00,000
Less : variable cost	80,000
<b>Contribution</b>	<b>1,20,000</b>
Less : fixed cost	20,000
<b>profit</b>	<b>1,00,000</b>

Contribution as per the statement is 120,000.

$$\underline{\text{Contribution} = \text{Sales} - \text{Variable cost} = 200000 - 80000 = 120000}$$

$$\underline{\text{Contribution} = \text{Fixed cost} + \text{Profit} = 20,000 + 100000 = 120000}$$

## Marginal Cost Equation

For convenience, the elements of cost statement can be written in the form of an equation as given below:

$$\text{Sales} - \text{Variable cost} = \text{Contribution}$$

$$\text{or Sales} = \text{Variable cost} + \text{Contribution}$$

$$\text{or Sales} = \text{Variable cost} + \text{Fixed cost} \pm \text{Profit/Loss}$$
$$\text{Sales} - \text{Variable cost} = \text{Fixed cost} \pm \text{Profit/Loss}$$

If there is profit, contribution must be more than fixed cost.

If there is no profit or loss, contribution must be equal to fixed cost.

If there is only loss, contribution must be less than fixed cost.

### Example 1

From the following, calculate the amount of contribution and profit.

Sales 8,00,000, Variable cost 4,00,000, Fixed cost 2,00,000

$$\begin{aligned} \text{Contribution} &= \text{Sales} - \text{Variable cost} \\ &= 800000 - 400000 = \mathbf{400000} \end{aligned}$$

$$\begin{aligned} \text{Profit} &= \text{Contribution} - \text{Fixed Cost} \\ &= 400000 - 200000 = \mathbf{200000} \end{aligned}$$

### Example 2

Determine the amount of fixed cost from the following

Sales 1000000 variable cost 500000 profit 150000

$$\text{Sales} = \text{Variable cost} + \text{Fixed cost} + \text{Profit}$$

$$1000000 = 500000 + \text{Fixed cost} + 150000$$

$$\text{Fixed cost} = 1000000 - 500000 - 150000$$

$$= \mathbf{350000}$$

### Advantages of Marginal Costing

1. **Effective cost control:** Effective cost control is possible by the division of total cost into variable cost and fixed cost. The fixed cost in the normal course is constant and is not controllable, whereas variable cost can be controlled by taking effective measures.
2. **Treatment of overhead is simplified:** It reduces chance of over recovery and under recovery overhead through the separation of fixed cost from the product cost.
3. **Helpful to management:** It helps management in taking many managerial decisions such as make or buy decisions, determination of the most profitable product mix etc.
4. **Proper valuation of stock:** As fixed cost is excluded from production cost valuation of work in progress and product become more realistic. .
5. **It helps in fixing selling prices:** Fixation of selling price is a very crucial task of the management in conditions of cut-throat competition over production etc. In such conditions marginal cost is very helpful to the management.

6. **It helps in production planning:** It shows the amount of profit at every level of output with the help of cost, volume, profit relationship. Here the break-even chart is made use of
7. **Helpful in budgetary control:** The classification of expensively variable and fixed helps the management in preparing flexible budget for different levels of production.
8. **Helps in preparing tenders:** Tenders are to be submitted at very competent prices. The separation of total into fixed and variable helps the management in fixing tender price.
9. **Better results:** If marginal costing is used into standard costing is gives better results and efficiency of the concern can be improved.
10. **Better presentation of information:** The statements and graphs prepared under marginal costing are easily understandable to the management executives. The break-even analysis presents the behaviour of cost, sales contribution etc. in terms of charts and graphs. Thus the results can be easily be grasped.
11. **Comparative study made easy:** The comparative planned efficiency of the business can be studied, which is very useful for taking decisions.
12. **Forecasting:** Break even chart is very useful for forecasting the cost, profit, etc.

## **Disadvantages of marginal costing**

- 1. Unrealistic assumption:** Marginal costing is based on certain assumptions such as variable cost per unit will remain to the same at all levels of activities, fixed cost in total will remain to be same for a particular period, the total cost can be divided into fixed and variable are unrealistic.
- 2. Semi variable overhead:** The division of total cost into fixed and variable is not realistic. Some portion of the overhead is semi variable in nature, which is ignored in marginal costing.
- 3. Unreliable stock valuation:** Under marginal costing stock is valued only at variable cost, no portion of the fixed cost is added to the value of stock. Therefore the stock is always valued at less than total cost.
- 4. Difficulty in fixation of price:** Under marginal costing selling price is fixed on the basis of the contribution. In cost plus contract it is difficult to fixed the price.
- 5. Time element is ignored:** Fixed cost and variable cost are different in the short run; but in the long run all cost are variable. In the long run all costs change at varying levels of operation. When new plants and equipments are introduced, fixed cost and variable cost are vary.
- 6. Claim for loss of stock:** Insurance claim for damage or loss of stock on the basis of valuation under marginal costing will be unfavourable to the business.
- 7. Problem of under or over recovery of overhead:** Although the technique of marginal costing overcomes the problem of under or over recovery of

fixed over heads, the problem still exist in regard to the under or over recovery of variable overheads.

## Break-Even Analysis

*Break-even analysis is a method of cost-volume-profit analysis* widely used in practice. Break-even analysis is used in two senses - in narrow sense and in broad sense. In narrow sense, it refers to a technique of determining the break even point where total revenue equals the total cost. In its broad sense, break-even analysis refers to the study of relationship of cost-volume and profit at different levels of activities.

### Break-Even Point

Break-even point is that point of sales volume at which total revenue is equal to total cost. It is a point of no profit or no loss to a concern. It is that level of output which evenly breaks the costs and revenues. At this point, contribution equals the fixed costs and hence, this point is also known as 'Critical Point' or 'Equilibrium Point'. If sale is increased beyond this level, there shall be profit and if it is decreased from this level, there shall be loss to the organisation.

Break-even point can be stated in the form of an equation:

$$\text{Sales revenue at break even point} = \text{Fixed cost} + \text{Variable cost}$$

*Break-even point may be expressed in terms of -*

- (i) Amount or money value of sales (Break-even sales)

(ii) Volume or units of sales (Break-even units)

Break even point can be computed by:-

(I) Algebraic Method

(II) Graphic or Chart Method

## I. Algebraic Method

### (i) Amount of Break-even Sales (Money value of sales)

It is the amount of sales at which the concern is in break-even. It is expressed in money value. There are two commonly used formulae for it.

#### 1. Amount of break-even sales

$$\frac{\text{Contribution at break—even point}}{\text{P/V ratio}} = \frac{\text{Fixed cost}}{\text{P/V ratio}}$$

#### 2. Amount of break-even sales

$$\frac{\text{Fixed cost} \times \text{Sales}}{\text{Sales} - \text{Marginal cost}} = \frac{\text{Fixed cost} \times \text{Sales}}{\text{Contribution}}$$

### (ii) Break-even units or output

It is the units or volume of output at which the concern earns no profit or incurs any loss. It is not expressed in money value, but is expressed in terms of quantity or number.

$$1. \text{ Break-even unit} = \frac{\text{Fixed cost}}{\text{Selling price per unit} - \text{Variable cost per unit}} = \frac{\text{Fixed cost}}{\text{Contribution Per unit}}$$

$$2. \text{ Break-even unit} = \frac{\text{Break even sales}}{\text{Selling price}}$$

## Margin of safety

*Margin of safety is the excess of sales over break-even sales.* It is the margin or range at which the concern is safe from the point of view of profit. The size of margin of safety measures the degree of profitability of an organisation. The higher is the margin of safety, the more is the profitability of the concern. A low margin indicates low profitability.

Margin of safety = Sales - Break-even sales or  $\frac{\text{profit}}{\text{P / V ratio}}$

Margin of safety ratio =  $\frac{\text{Margin of safety} \times 100}{\text{Sales}}$

## 1.1. *Graphic Method of Break-Even Analysis or Break-Even Chart*

A break-even chart is a graphical representation of marginal costing. It depicts relationship between cost-volume and profit. It gives the point of production at which there is neither profit nor loss (break-even point) and also shows the estimated profit or loss at different levels of activities.

### Construction of Break-Even Chart

There are two most popular methods of drawing a break-even chart.

#### **First method:**

The following steps are taken to draw the break-even chart.

1. Volume of output or sales is plotted on the horizontal axis. i.e., x-axis. It may be expressed in terms of rupees, units or as a percentage of capacity.
2. Costs and sales revenue are shown on the y-axis.
3. Fixed cost line is drawn parallel to the x-axis. The line indicates that fixed expenses remain constant at all levels of activity.

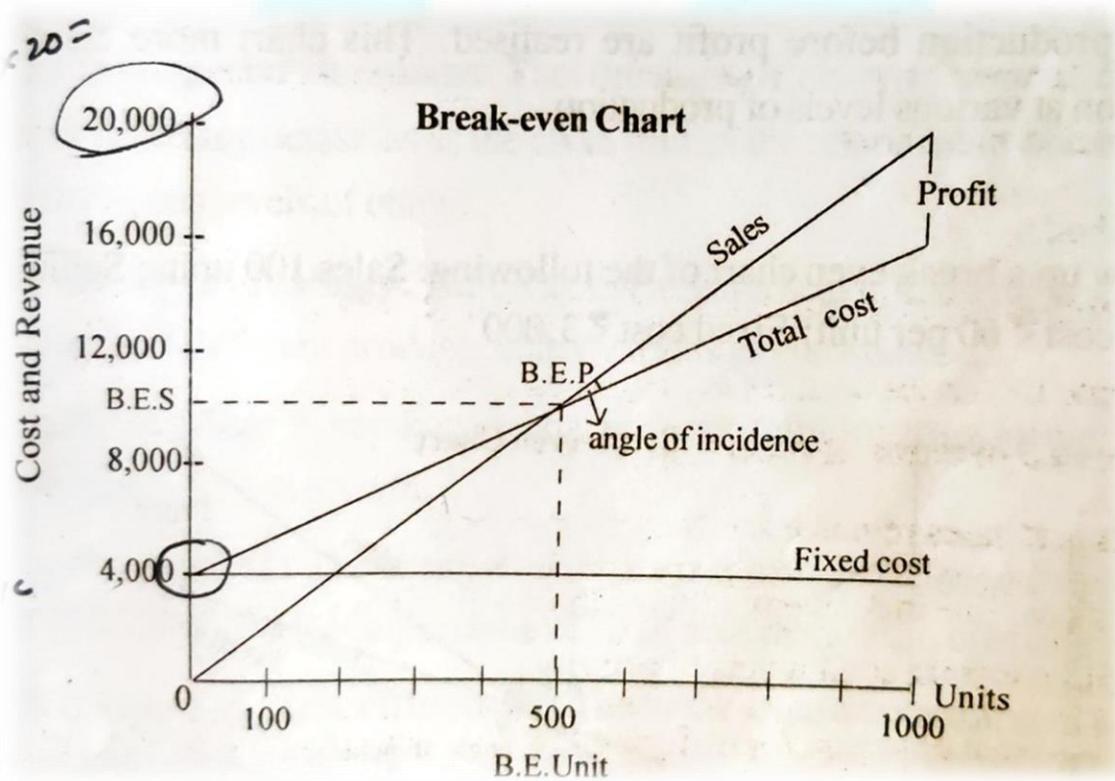
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4. The variable cost line for different levels of activity are plotted over the fixed cost line. The variable cost line starts from the fixed cost line at zero level of activity. As the variable cost line is drawn above the fixed cost line, it represents total cost at various levels of activity.
5. A sales line is plotted at various levels of output. It starts from zero.
6. The point of intersection of total cost line and sales line is called break-even point.
7. On drawing a perpendicular to the x-axis from the break-even point, the break-even output can be determined.
8. Break-even sales can be determined by drawing a perpendicular to the y-axis from the break even point
9. The area below the break-even point represents the loss area as the total cost exceeds total sales and the area above break-even point represents profit as the sales revenue exceeds the total cost.

**Chart 1**

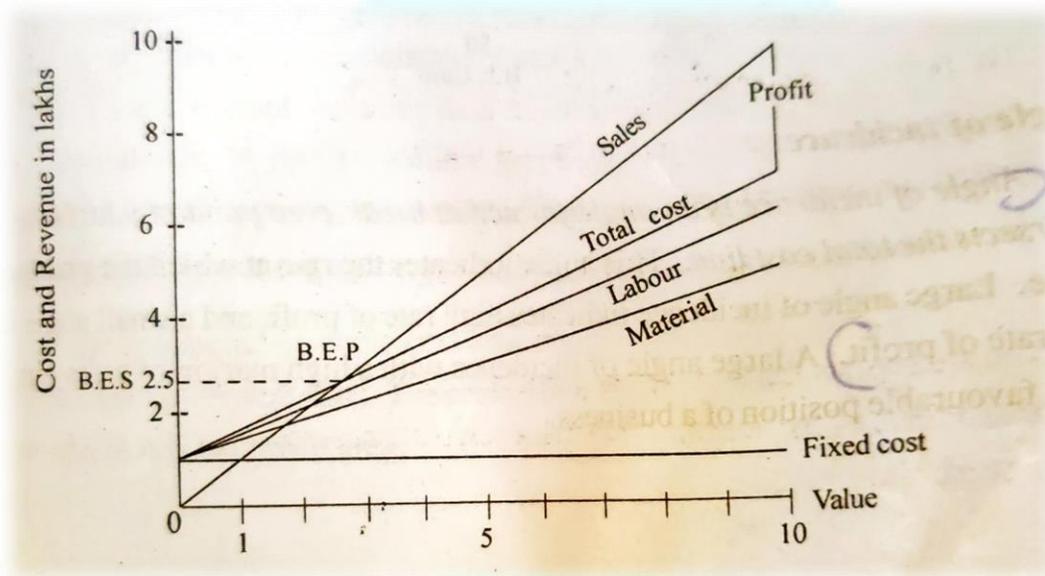
From the following draw up a break even chart to find out the break even point:

*Sales 1,000 units @ 20, Variable Cost 12 per unit, Fixed Cost 4000*



### Chart 2

*Sales: 10 lakhs; Direct material 4 lakhs; direct labour 1.5 lakhs; Variable expenses 0.5 lakh; fixed cost 1 lakh, Draw a B.E. Chart to locate BEP*

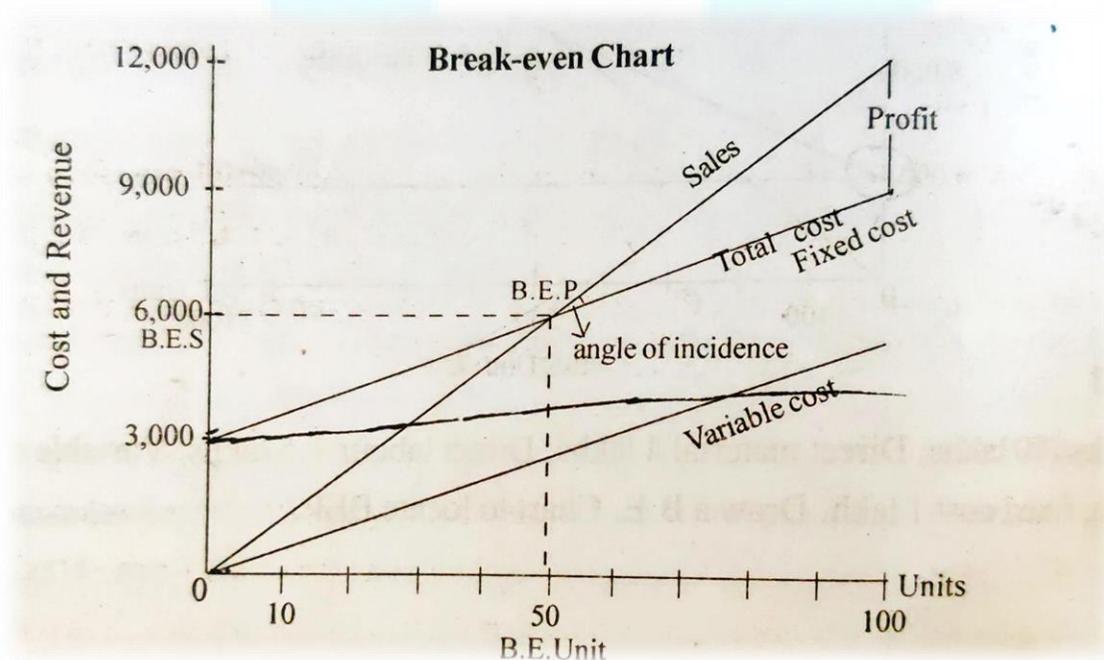


**Second method:**

Under this method, the variable cost line is drawn first starting from zero and the fixed cost line is drawn above the variable cost line which is parallel to the variable cost line. The fixed cost line forms the total cost line. The point at which the fixed cost line intersects the sales line gives the break-even point. This method is more helpful to the management for decision making as it shows the recovery of variable costs at various levels of production before profit are realised. This chart more clearly depicts the contribution at various levels of production

**Chart 3**

Draw up a break even chart of the following: *Sales 100 units; Selling price 120; Variable cost 60 per unit; Fixed cost 3,000*



## **Angle of incidence**

*Angle of incidence is an angle formed at break-even point at which the sales line intersects the total cost line. This angle indicates the rate at which the profits are being made. Large angle of incidence indicates high rate of profit and a small angle indicates low rate of profit. A large angle of incidence with a high margin of safety indicates the most favourable position of a business.*



## Advantages or Uses of break-even charts

Computation of break-even point or presentation of cost, volume and profit relationship by way of break-even charts has the following advantages:

1. **Easy to understand:** Information provided by the break-even chart is in a simple form and is clearly understandable even to a layman. The whole idea of the problem is presented at a glance.
2. **Helpful in managerial decisions:** The break-even chart is very useful to the management for taking decisions as the chart studies the relationship of cost, volume and profit at various levels of output
3. **Helps in analysing profitability:** The break-even charts help in knowing and analysing the profitability of different products under various circumstances.
4. **Helpful in forecasting:** A break-even chart is very useful for forecasting (the costs and profits), planning and growth.
5. **Helpful in cost control:** The break-even chart is a managerial tool for control of costs as it shows the relative importance of fixed cost in the total cost of a product.
6. **Helpful in comparing plant efficiencies:** The break-even charts can also be used to study the comparative plant efficiencies of business.

