BREAK EVEN ANALYSIS

DEFINITION

The **break-even** point for a product is the point where total revenue received equals the total costs associated with the sale of the product (TR=TC).

A **break-even** point is typically calculated in order for business to determine if it would be profitable to sell a proposed product, as opposed to attempting to modify an existing product instead so it can be made profitable.

Break-Even Analysis can also be used to analyze the potential profitability of expenditure in a sales-based business.
Break-even analysis is a technique widely used by production management and management accountants. It is based on categorizing production costs between those which are "variable" (costs that change when the production output changes) and those that are "fixed" (costs not directly related to the volume of production).

Total variable and fixed costs are compared with sales revenue in order to determine the level of sales volume, sales value or production at which the business makes neither a profit nor a loss (i.e., "BEP").

To break even would mean an organisation would be earning no profit and no loss.

Sales revenue = All variable and fixed cost

Main assumptions in this model are that selling price, fixed costs and variable costs are constant.

CLASSIFICATION OF COSTS:

Fixed Costs

Fixed costs are those business costs that are not directly related to the level of production or output. In other words, even if the business has a zero output or high output, the level of fixed costs will remain broadly the same. In the long term fixed costs can alter - perhaps as a result of

investment in production capacity (e.g. adding a new factory unit) or through the growth in overheads required to support a larger, more complex business.

Variable Costs

Variable costs are those costs which vary directly with the level of output. They represent payment output-related inputs such as raw materials, direct labour, fuel and revenue-related costs such as commission.

A distinction is often made between **"Direct"** variable costs and **"Indirect"** variable costs.

Direct variable costs are those which can be directly attributable to the production of a particular product or service and allocated to a particular cost centre. Raw materials and the wages those working on the production line are good examples.

Indirect variable costs cannot be directly attributable to production but they do vary with output. These include depreciation (where it is calculated related to output - e.g. machine hours), maintenance and certain labour costs.

Semi-Variable Costs

Whilst the distinction between fixed and variable costs is a convenient way of categorizing business costs, in reality there are some costs which are fixed in nature but which increase when output reaches certain levels. These are largely related to the overall "scale" and/or complexity of the business. For example, when a business has relatively low levels of output or sales, it may not require costs associated with functions such as human resource management or a fully-resourced finance department. However, as the scale of the business grows (e.g. output, number people employed, number and complexity of transactions) then more resources are required. If production rises suddenly then some short-term increase in warehousing and/or transport may be required. In these circumstances, we say that part of the cost is variable and part fixed.

THE CONTRIBUTION TO SALES RATIO (C/S ratio)

The contribution to sales (or C/S) ratio (also called the profit-volume or P/V ratio) would calculate how much contribution a product would earn for every Rs.1 of sales generated, expressed as a decimal or percentage. For example a 0.4 or 40% C/S ratio, would mean 40 pence of contribution is earned for every Rs.1 of sales generated.

MARGIN OF SAFETY

Measures the sensitivity of the budgeted sales volume compared with the break-even sales volume. The difference between the level of sales activity achieved and the level of sales activity required to break-even in absolute or percentage terms.

In **break-even** analysis, margin of safety is how much output or sales level can fall before a business reaches its **break-even** point (BEP).

Formulae

Break-even point (for output) = fixed cost/ contribution per unit

Contribution (p.u) = Selling price (p.u) – Variable cost (p.u)

Break-even point (for sales) = fixed cost/ contribution (pu) *sp (pu)

Contribution per unit = sales price per unit less variable cost per unit

$$\textbf{Break-even volume} = \frac{\textbf{Fixed overhead}}{\textbf{Contribution per unit}}$$

The contribution to sales ratio (C/S ratio)

$$\textbf{C/S ratio} = \frac{\textbf{Contribution per unit}}{\textbf{Sales price per unit}}$$

$$\textbf{C/S ratio} = \frac{\textbf{Total contribution}}{\textbf{Total sales revenue}}$$

Break-even Sales

$$= \frac{\text{Fixed overhead}}{\text{C/S ratio}}$$

Margin of safety

Margin of safety (units) = **Budgeted sales volume less Break-even sales volume**

Margin of safety (%) **=** $\frac{\text{Budgeted sales less Break-even sales volume x 100}}{\text{Budgeted sales volume}}$

Number of units sold to achieve a target profit

$$= \frac{\text{Fixed cost + Target profit}}{\text{Contribution per unit}}$$

Contribution per unit = sales price per unit less variable cost per unit

The contribution to sales ratio (C/S ratio)

C/S ratio **=** $\frac{\text{Contribution per unit}}{\text{Sales price per unit}}$

C/S ratio **=** $\frac{\text{Total contribution}}{\text{Total sales revenue}}$

Break-even revenue

$$= \frac{\text{Fixed overhead}}{\text{C/S ratio}}$$

Margin of safety (units) = **Budgeted sales volume less Break-even sales volume**

Margin of safety (%) =

$$\frac{\text{Budgeted sales less Break-even sales volume x 100}}{\text{Budgeted sales volume}}$$

Number of units sold to achieve a target profit

$$= \frac{\text{Fixed cost + Target Profit}}{\text{Contribution per unit}}$$

In Unit Sales

If the product can be sold in a larger quantity that occurs at the **break-even** point, then the firm will make a profit : below this point, a loss.

Break-even quantity is calculated by:

Total fixed costs / (Selling price- average variable costs). Explanation-in the denominator, "price minus average variable cost" is the variable profit per unit, or contribution margin of each unit that is sold.

Break Even =FC /(SP - VC)

Where FC is Fixed Cost, SP is selling Price and VC is Variable cost

Break even sales is computed as follows:-

Break-even sales in units = Fixed costs / Unit contributions margin.

Break-even sales in Rupees = Fixed costs /Contribution margin ratio.

For example, assume:

Fixed costs = Rs. 15,000.

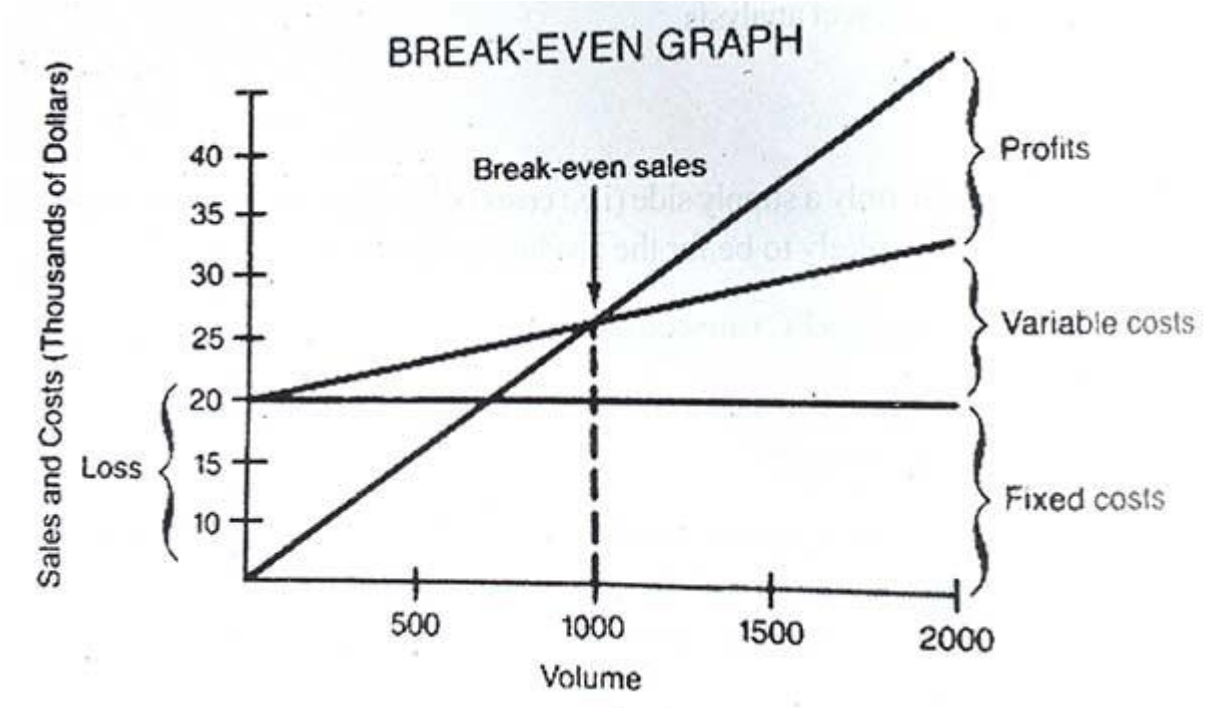
Unit contribution margin (selling price- unit variable cost)= Rs.15, and

Contribution margin ratio (unit CM/ selling price) = .6

Then, **break-even** sales in units = Rs. 15,000/Rs.15 = 1000 units and break-even sales in rupees = Rs.15,000/.6 =Rs. 25,000.

A **break-even** chart is one in which sales revenue, variable costs, and fixed costs are plotted on the vertical axis while volume is plotted on the horizontal axis .

The **Break-Even** Point is the Point at which the total sales revenue line intersects the total cost line.



Web Links:

http://www.economicsdiscussion.net/break-even-analysis/break-even-analysis-with-diagram/20360

http://mbaexamnotes.com/break-even-analysis-notes.html

https://www.tutor2u.net/business/reference/operations-introduction-to-break-even-analysis

https://www.accountingformanagement.org/break-even-point-analysis/

http://www.accountingnotes.net/financial-management/break-even-chart-financial-management/break-even-chart-meaning-advantages-and-types/6594