



Marginal Costing

THE NATURE OF COSTS: Before one can begin to understand how a business is going to perform over time and with shifts in volume, it is imperative to first consider the cost structure of the business. This requires drilling down into the specific types of costs that are to be incurred and trying to understand their unique attributes.

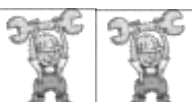
VARIABLE COSTS: Variable costs *will vary in direct proportion to changes in the level of an activity.*

For example,

direct material,

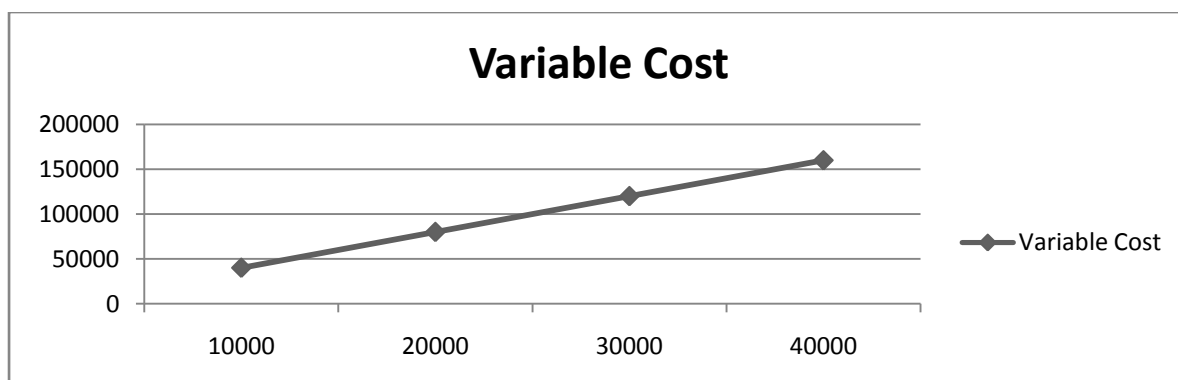
  1 Bag- Cost- Rs.100 Cost per statue-100	  2 Bag- Cost-Rs.200 Cost per statue-Rs.100	  3 Bag- Cost- Rs.300 Cost per statue-Rs.100
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direct labor,

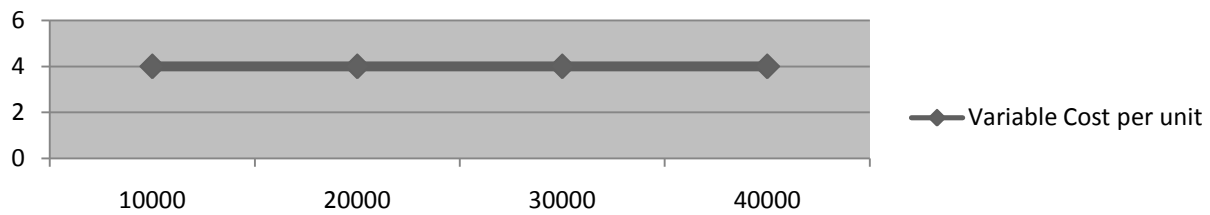
  1 Labour- Cost - Rs.2000 Cost per Ferrari- Rs.2000	  2 Labour- Cost- Rs.4000 Cost per Ferrari- Rs.2000
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sales commissions, fuel cost for a trucking company, and so on, may be expected to increase with each additional unit of output.

Units	Direct Material (Rs.)	Cost per unit (Rs.)
10000	40000	4
20000	80000	4
30000	120000	4
40000	160000	4



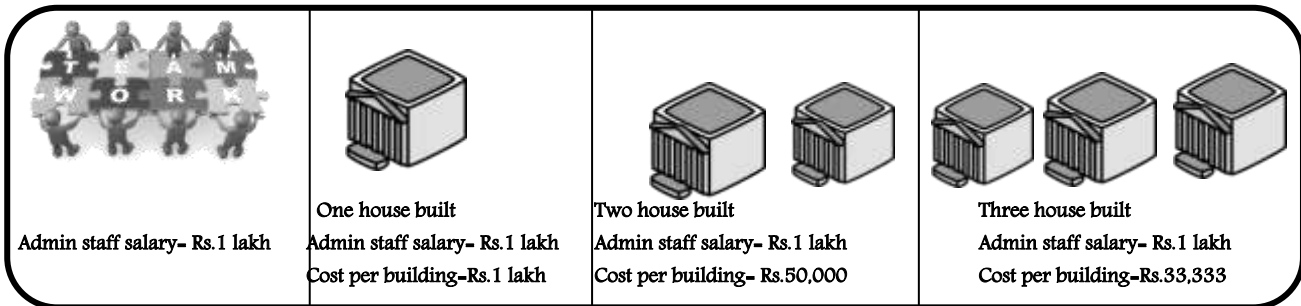
Variable Cost per unit



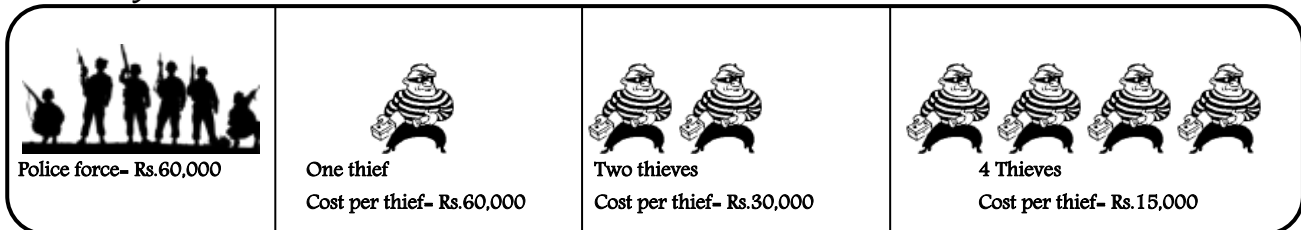
FIXED COSTS: The opposite of variable costs are fixed costs. Fixed costs *do not fluctuate* with changes in the level of activity.

Examples include

administrative salaries,



Security,



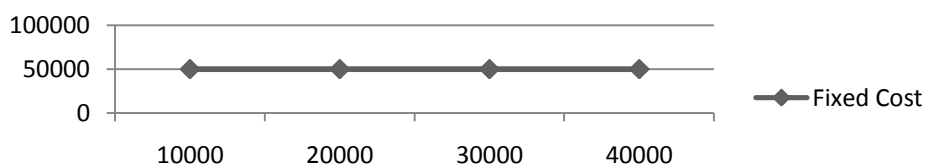
rents, property taxes, networking infrastructure support, and so forth.

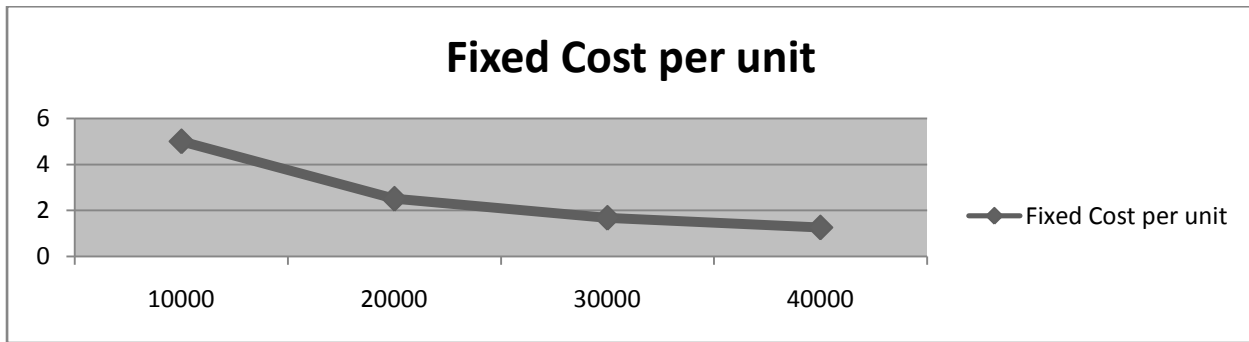
Observe that the fixed cost per unit will decline with increases in production

This attribute of fixed costs is important to consider in assessing the scalability of a business proposition.

Units	Factory rent(Rs.)	Rent per unit(Rs.)
10000	50000	5
20000	50000	2.5
30000	50000	1.67
40000	50000	1.25

Fixed Cost



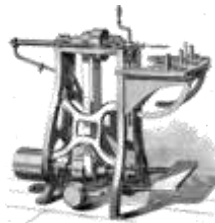


Types of fixed costs: For planning purposes, fixed costs can be viewed as either *committed* or *discretionary*.

Committed fixed costs – Relate the investment in



facilities,
& basic organizational structure.



equipment

They have two key characteristics:

- They are long term
- They can't be significantly reduced even for short periods of time without seriously impairing the profitability or long run goals of the organization

Discretionary fixed costs – Usually arise from annual decisions by management to spend in certain fixed cost areas.

Examples are:



Advertising,
Internships for students.



R & D,



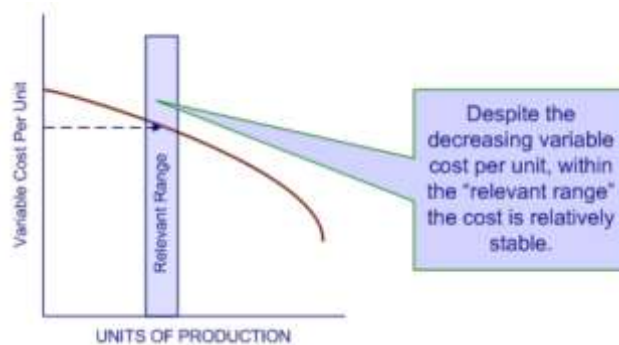
Public relations, Management development programs,

Two key differences exist between discretionary & committed fixed costs:

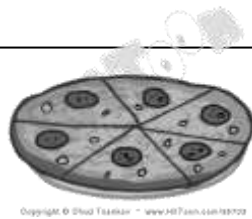
- The planning horizon for discretionary fixed costs is short term.
- Discretionary fixed costs can be cut for short periods of time with minimal damage to the long run goals of the organization.

RELEVANT RANGE

The "relevant range" is the anticipated activity level at which you will perform. Any pricing data outside of this range is irrelevant and need not be considered. This enhanced concept of variable cost is portrayed in the following graphic:



Cost behavior often changes outside of the relevant range of activity due to a change in the fixed costs. When volume increases to a certain point, more fixed costs will have to be added. When volume shrinks significantly, some fixed costs could be eliminated. Fixed costs that behave in this fashion are also called **semi fixed or step costs**

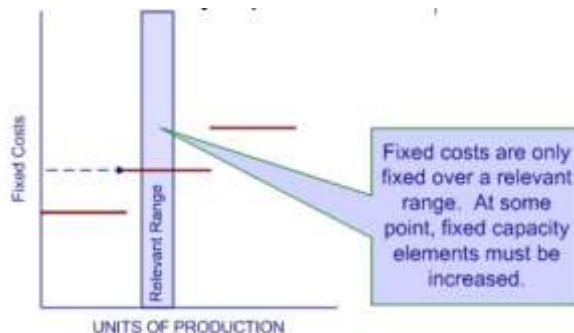
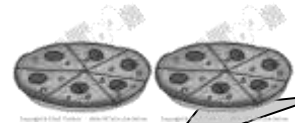


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For example, you are buying frozen pizza in a box from the grocery store. One pizza can feed 3 guys. Step fixed cost is the cost of the pizza, it is sold by the box,

and there is no partial pizza to be sold.

The relevant range is the 3 guys, once it's more than 3; it goes up to the next level- >need another box of pizza. When you have 4 guys waiting to eat pizza, you need to buy 2 pizzas, not 1.



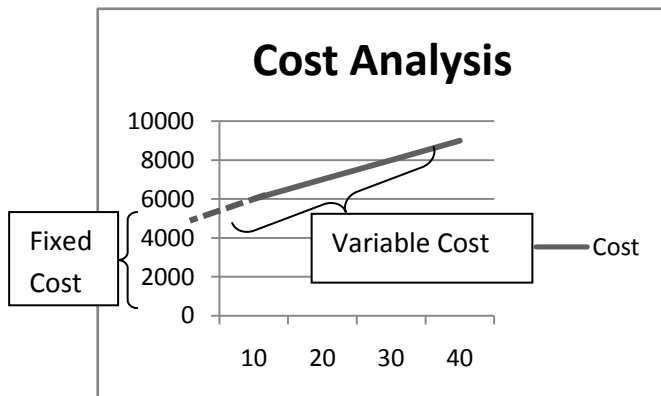
Note: Difference between Step fixed-cost function and Step variable-cost function is that the cost remains the same in step fixed-cost function over *wide* ranges of the activity in each relevant range though in step variable-cost function it remains same over *narrow* ranges of the level of activity in each relevant range.

MIXED COSTS: Many costs contain both variable and fixed components. These costs are called **mixed or semi-variable or semi-fixed costs**. If you have a phone, you probably know more than you wish about such items. Phone agreements usually provide for a monthly fee plus usage charges for excess minutes, internet expense and so forth. With a mixed cost, there is some fixed amount plus a variable component tied to an activity. Mixed costs are harder to evaluate, because they change in response to fluctuations in volume. But, the fixed cost element means the overall change is not directly proportional to the change in activity.





Methods for segregation of Mixed Cost.



1. Graphical Method (Scattered Graph) – The visual fit method or scatter-graph method requires that all recent, normal data observations be plotted on a cost (Y-axis) versus activity (X-axis) graph. A line is then drawn that is a best fit for the data points. When the line is extended to cross the Y-axis (at zero units of activity), there is a "fairly accurate estimate of fixed costs for the period". The slope can also be calculated to give another reasonably accurate estimate of the variable cost per product. To compute the

variable cost per unit, the slope of the line is determined by choosing two points and dividing the change in their cost by the change in the units of activity for the two points selected.

2. High-Low Method (Range Method) – uses the total costs incurred at the high and low levels of activity to classify mixed costs into fixed and variable components. The difference in costs between the high and low levels represents variable costs.

Variable Cost per unit = (Changes in Total Costs/High minus Low Activity Level)

The fixed cost can be found by subtracting the total variable cost at either the high or the low activity level from the total cost at that activity level.

3. Comparison by period (Level of Activity Method) – This method is same as Range Method except high & low activities we arbitrarily choose any two activity levels.

4. Least Squares Method – This method uses mathematical approach to determine the components of variable & fixed expenses. The following regression equation for a straight line can be used to express the relationship between a mixed cost & the level of activity:

$$Y = a + bX$$

We will solve following equations to yield the values of parameters a and b of the above equation.

$$\Sigma Y = Na + b \Sigma X$$

$$\Sigma XY = a \Sigma X + b \Sigma X^2$$

- Y = the total mixed cost
- a = the total fixed cost
- b = the variable cost per unit of activity
- X = the level of activity
- N = No. of activities

This equation makes it very easy to calculate what the total mixed cost would be for any level of activity within the relevant range.

5. Analytical Method (Accounting Method): Each account under consideration is classified as either variable or fixed based on the analyst's prior knowledge of how the cost behaves.



Question 1. Briefly explain the methods of separating semi-variable costs into their fixed and variable elements. (6 Marks) May/00

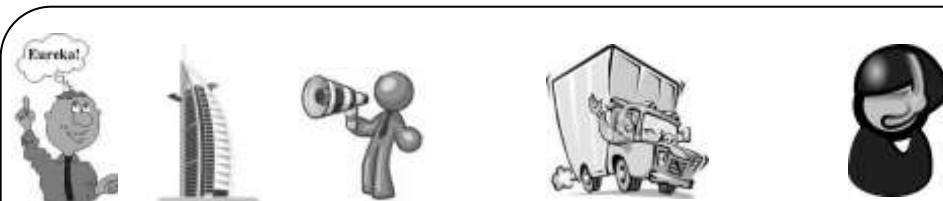
Question 2. Distinguish between 'committed fixed costs' and 'discretionary fixed cost' (5 Marks) May/96

Marginal Costing: The accounting system in which variable cost are charged to cost units and fixed costs of the period are written off in full against the aggregate contribution. (CIMA's Official Terminology). Variable costing & Contribution Approach are other names of marginal costing.

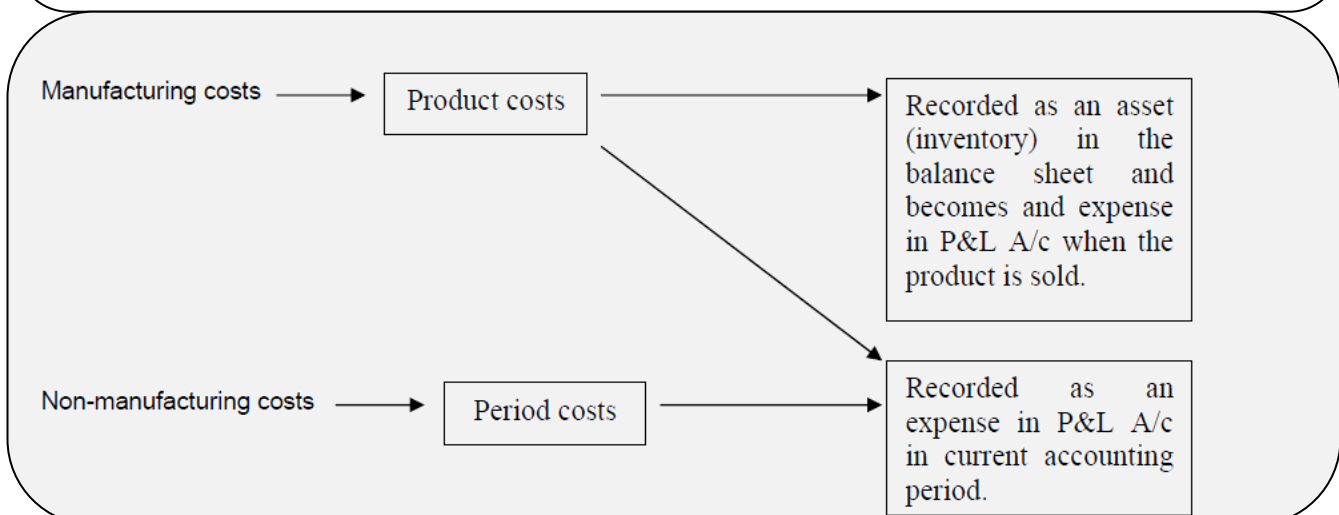
It may be defined as the technique of presenting cost data wherein variable costs and fixed costs are *shown separately for managerial decision-making*. It should be clearly understood that marginal costing is not a method of costing like process costing or job costing. Rather it is simply a method or technique of the analysis of cost information for the guidance of management which tries to find out an effect on profit due to changes in the volume of output.

Product Cost: A product cost is the sum of the costs assigned to a product for a specific purpose. In Financial accounting courses, it is a concept used in applying the cost plus approach to product pricing in which only the costs of manufacturing the product are included in the cost amount to which the markup is added. *The three components of manufacturing costs: direct materials, direct labor, and factory overhead costs.* Generally, *inventorial (manufacturing) costs* are called product costs.

Period Costs: These are all costs in the income statement *other than cost of goods sold*. Period costs are treated as expense of the A/cing period in which they are incurred because they are expected to benefit revenues in that period and are not expected to benefit revenues in future periods (or because there is not sufficient evidence to conclude that such benefits exists).



R&D cost, Design costs, Marketing costs, distribution costs, customer-service costs are some examples of period costs.





Marginal Cost. The cost of one unit of product or service which would be avoided if that unit were not produced or provided. (CIMA's Official Terminology)

Note: In this context, a unit is usually either a single article or a standard measure such as the litre or kilogram, but in certain circumstances is an operation, process or part of an organization.

The marginal cost of a product – "is its variable cost". This is normally taken to be; direct labour, direct material, direct expenses and the variable part of overheads.

Presentation of Cost Data under Marginal Costing and Absorption Costing

Following presentation of two Performa shows the difference between the presentation of information according to absorption and marginal costing techniques.

Absorption Costing

ABC Ltd. Income Statement For the year ended

		(Rs. '000)
Sales		YYY
Cost of Goods Sold:		
Direct material consumed	XXXX	
Direct labour cost	XXXX	
Variable manufacturing overhead	XXXX	
Fixed manufacturing overhead	XXXX	
Manufacturing Cost incurred during the year (a.k.a. Gross Factory Cost)	XXX	
Opening Work-in-Progress	XXXX	
Less: Closing Work-in-Progress	XXXX	
Total cost of goods manufactured	XXXXX	
Add: Op. stock of finished goods (valued at total cost of <i>previous</i> year)	XXXX	
Less: Cl. stock of finished goods (valued at total cost of <i>current</i> year)	XXXX	YYYY
Gross profit/Margin (i.e. Sales-Cost of goods sold)		YYYYY
Less: Operating Costs:		
These are period costs → Selling and distribution costs (Both Fixed & Variable)	XXXX	
Administration costs, etc. (Both Fixed & Variable)	XXXX	YYYY
Operating Income		ZZZZ

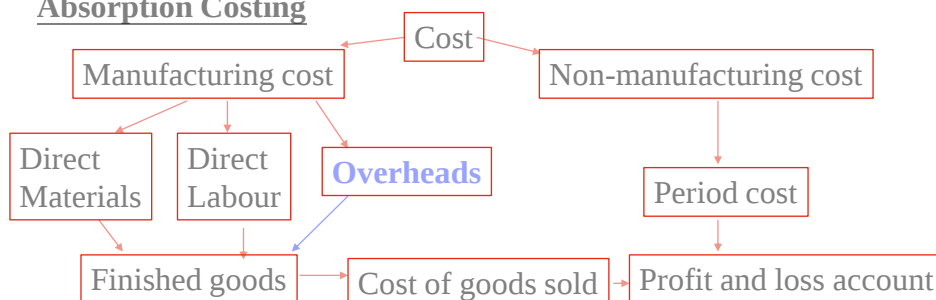
Marginal Costing

ABC Ltd. Income Statement (a.k.a. Contribution Income Statement) For the year ended

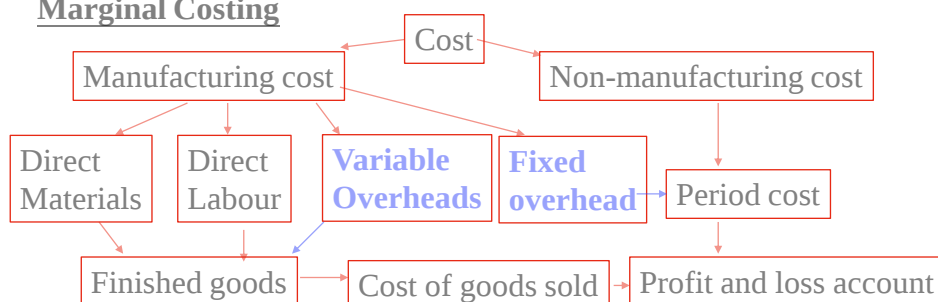
		(Rs. '000)
Sales		YYY
Total variable cost:	XXXX	
Direct material consumed	XXXX	
Direct labour cost	XXXX	
Variable manufacturing overhead	XXXX	
Variable cost of goods produced	XXXXX	
Add: Op. stock of finished goods (valued at Total Var. Cost of <i>previous</i> year)	XXXX	
Less: Cl. stock of finished goods (valued at Total Var. Cost of <i>current</i> year)	XXXX	
Variable Cost of Goods Sold	XXXX	
Add: Variable administration, selling and dist. overhead	XXXXX	
Total variable cost		YYYYY
Contribution Margin (Sales - Total variable cost)		YYYYY
Less: Fixed operating costs (Production, administration, selling and distribution)		YYYY
Operating Income		ZZZZ



Absorption Costing



Marginal Costing



1. Net Income/Profit = Operating Income – Non Operating Expenses (e.g. Income Taxes, Interest, etc.)
2. As Non Operating Expenses are generally not given in question, we take Operating Income as Net Profit

Important factors to be considered in marginal costing Decisions

- i. Whether the product or production makes a contribution.
- ii. In the selection of alternatives, additional fixed costs if any should be considered.
- iii. The continuity of demand after expansion and its impact on selling price are to be considered.
- iv. Non-cost factors such as the need to keep labour force intact and government attitude are also to be taken into account
- v.

Question : State the distinction between Marginal Costing and Absorption Costing. (7 Marks) Nov/01

Absorption Costing

1. It is a total cost technique i.e. both variable and fixed costs are charged to products, processes or operations.

2. Fixed factory overheads are absorbed by the production units on the basis of a predetermined fixed factory overhead recovery rate based on normal capacity. Under/over absorbed overheads are adjusted before arriving at the figure of profit for a particular period.

3. Inspire of best possible forecast and equitable basis of apportionment/allocation of fixed costs, under or over recovery of fixed overheads generally arises.

4. Managerial decisions under this costing technique are based on profit i.e. excess of sales value over total costs, which may at times lead to erroneous decisions.

Marginal Costing

Here only variable costs are charged to product, processes or operations. Fixed costs are charged as period costs to the profit statement of the same period in which they are incurred.

The cost of production under this method does not include fixed factory overheads and therefore, the value of closing stock comprises of only variable costs. No part of the fixed expenses is included in the value of closing stock and carried over to the next period.

Since fixed overheads are not included in the cost of production, therefore the question of their under/ over recovery does not arise.

Here decisions are made on the basis of contribution i.e. excess of sales price over variable costs. This basis of decision making results in optimum profitability.



Cost-Volume-Profit Analysis

Profit Profit per unit of a product depends on its selling price and cost of sales

Volume Total profit depends on sales volume which in turn depends inter alia on selling price

Cost By and large cost also depends on volume of production

Thus, a close relationship exists between costs, volume and profit.

Analysis of this relationship opens up an interesting and useful field for the management accountant. *Cost-volume-profit analysis may be applied for profit planning, cost control, and decision making.*

The following purposes are served by analysis of cost-volume-profit relationship:



i. To forecast profit fairly accurately.



ii. To set up flexible budgets.



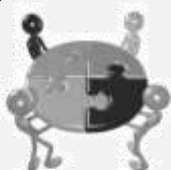
iii. To evaluate performance for control.



iv. To formulate price policies



vi. To ascertain the effects of costs of changes in volume for market expansion or contraction.



vi. To know the amount of overhead costs that could be charged to productions costs at various levels of operation.



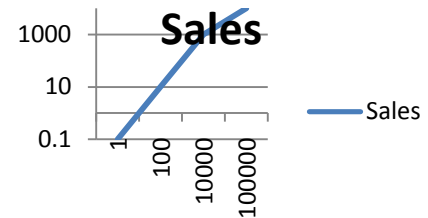
Cost-volume-profit (CVP) analysis is used to determine how changes in costs and volume affect a company's operating income and net income. In performing this analysis, there are *several assumptions made*, including:



Coal purchase: 1unit= 10paise



100000units= Rs.10,000



-Sales price per unit, Variable costs per unit & total fixed costs are known & *constant* (Within relevant range & time period) & if represented *graphically they are linear* in behavior (representing straight lines).



Labour efficiency remains same

Start of the day- time to clean 1000sq. ft.- 1hr

End of the day after cleaning for 7hrs already- time to clean 1000sq. ft.- 1hr

- Other variables like production efficiency, production methods, and price levels remain constant.



- Everything produced is sold.



Material cost- always variable



Rent- always fixed

- All the company's costs, including manufacturing, selling, and administrative costs, be identified as variable or fixed

- Revenue & Costs are only affected because activity changes.



1 shampoo sale- 2 soap sale



2 shampoo sale- 4 soap sale

- If a company sells more than one product, they are sold in the same mix (i.e. **constant sales mix**).



- All revenues & costs can be added, subtracted & compared *without taking into account time value of money*.



Contribution margin and contribution margin ratio

Key calculations when using CVP analysis are the **contribution margin** and the **contribution margin ratio**. The contribution margin represents the amount of income or profit the company made before deducting its fixed costs.

Said another way, it is the amount of sales available to cover (or contribute to) fixed costs.

	-		=	700	
Wine sold- Rs.1000		Cost incurred for making- Rs.300 Of grapes, bottle, label, etc.		available to cover FIXED COST	like Rent, interest etc.

When calculated as a ratio, it is the percent of sales available to cover fixed costs

Once fixed costs are covered, the next rupee of sales results in the company having income. The contribution margin (a.k.a. contribution) is sales revenue minus all variable costs.

To calculate the contribution margin ratio, the contribution margin is divided by the sales or revenues amount.

Contribution Margin Ratio is also popularly known as **Profit Volume Ratio (P/V Ratio)** & **Contribution Sales Ratio (C/S Ratio)**.

Single product contribution income statement		Multi-product contribution income statement				
Units	XXXX	Particulars	A	B	C	Total
	(Rs. '000)	Sales	XXX	XXX	XXX	XXX
Sales	XXX	Less: Variable cost	XXX	XXX	XXX	XXX
Less: Variable cost	XXX	Contribution	XXX	XXX	XXX	XXX
Contribution	XXX	Less: Specific Fixed cost	XXX	XXX	XXX	XXX
Less: Fixed cost	XXX	Total	XXX	XXX	XXX	XXX
Profit	XXX	Less: General/Common fixed cost				XXX
		Profit				XXX

Formulae for Calculation.

- Profit (Operating Income) = Sales – Variable Costs – Fixed Costs
- Contribution = Sales – Variable costs
- Contribution = Fixed Cost + Profit
- Sales – Variable cost = Fixed cost + Profit
- P/V ratio (or C/S ratio) = Contribution ÷ Sales
 - = Contribution per unit ÷ selling price per unit
 - = Change in Contribution ÷ Change in Sales
 - = Change in Profit ÷ Change in Sales
 - = Profit ÷ Margin of Safety Sales
 - = 1 – Variable Cost Ratio
- Profit = (Sales × P/V ratio) – Fixed Cost = P/V ratio × Margin of Safety sales(Rs.)
 - = Contribution p.u. × Margin of safety (in units)

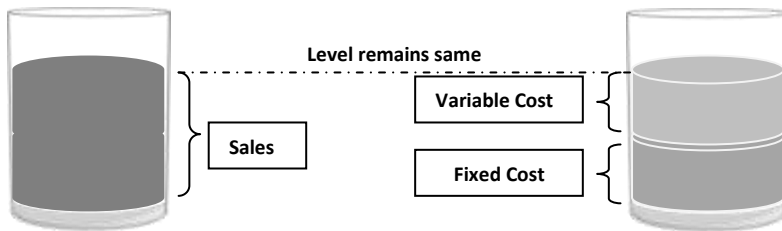
Break-even point

Cost

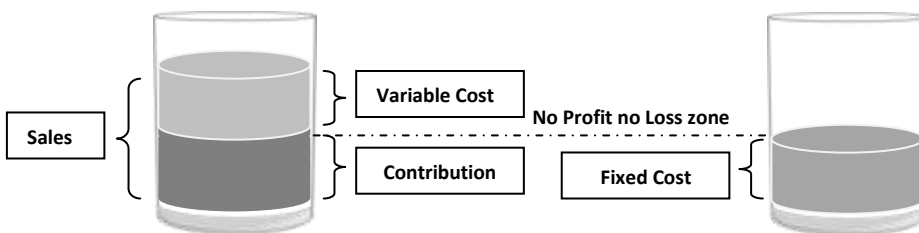


Revenue

The break-even point represents the *level of sales where net income equals zero*.



In other words, the point where sales revenue equals total variable costs plus total fixed costs,



and contribution margin equals fixed costs.

Variable costs represent all variable costs including costs classified as manufacturing costs, selling expenses, and administrative expenses. Similarly, the fixed costs represent total manufacturing, selling, and administrative fixed costs.

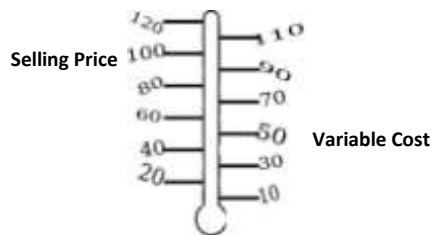
$$\text{Break Even point (in units)} = \text{Fixed Cost} \div \text{Contribution per unit}$$

The **assumptions** underlying break even analysis are as below:

- i. All costs can be easily classified into fixed and variable components.
- ii. Both revenue and cost functions are linear over the range of activity under consideration.
- iii. Prices of output and input remain unchanged.
- iv. Productivity of the factors of production will remain the same.
- v. The state of technology and the process of production will not change.
- vi. There will be no significant change in the levels of inventory.
- vii. The company manufactures a single product.
- viii. In the case of a multi-product company, the sales mix will remain unchanged.

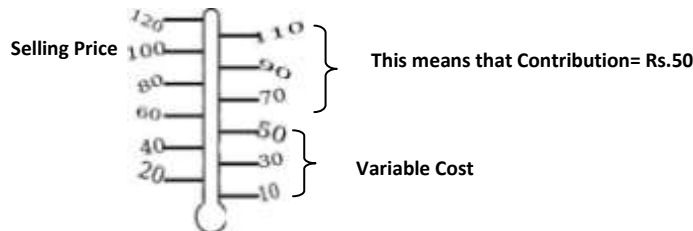


Break-even point (in rupees). The break-even point in sales rupees is calculated by dividing total fixed costs by the contribution margin ratio.



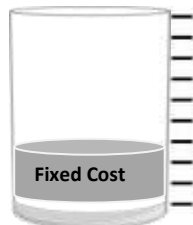
Suppose Selling Price is Rs.100 and Variable Cost is Rs.50, that means Variable cost is 50% of Selling Price and will remain same whatever no. of units sold.

1 unit sold- Sales-100 V.C.- Rs.50 V.C. p.u.- Rs.50 V.C./Sales- 50%	2 units sold- Sales-200 V.C.-Rs.100 V.C.p.u.-Rs.50 V.C./Sales- 50%	3 units sold- Sales-300 V.C.-Rs.150 V.C.p.u.-Rs.50 V.C./Sales- 50%	4 units sold- Sales-400 V.C.- Rs.200 V.C.p.u.-Rs.50 V.C./Sales- 50%
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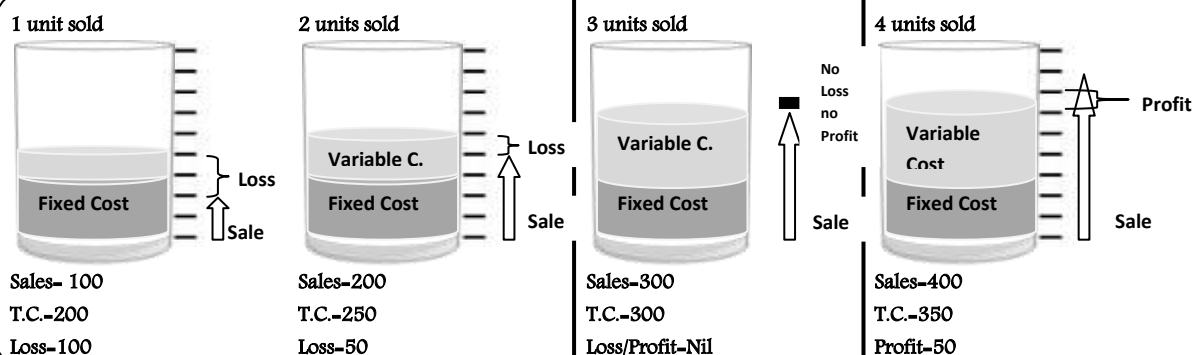


Contribution-Rs.50 C.p.u-50 C/Sales- 50%	Contribution- Rs.100 C.p.u-50 C/Sales-50%	Contribution-Rs.150 C.P.u-50 PV Ratio-50%	Contribution-Rs.200 C.p.u-50 PV Ratio-50%
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Total Fixed Cost remains constant whatever number of units sold



1 unit sold- F.C.-150 F.C.p.u- 150	2 units sold-F.C.-150 F.C.p.u.-75	3 units sold-F.C.-150 F.C.p.u.-50	4 units sold-F.C.-150 F.C.p.u.-37.5
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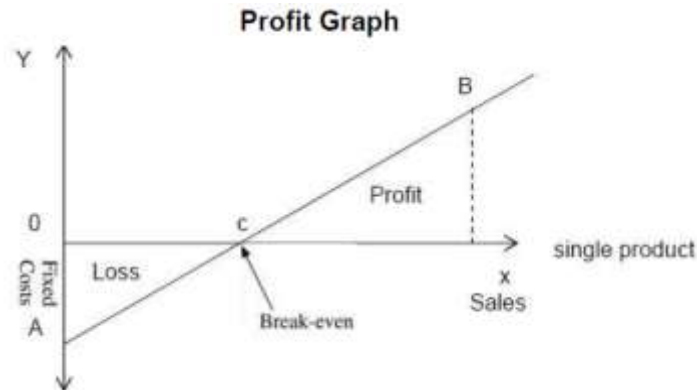


- Break Even Sales (in sales value) = Fixed Cost ÷ P/V ratio

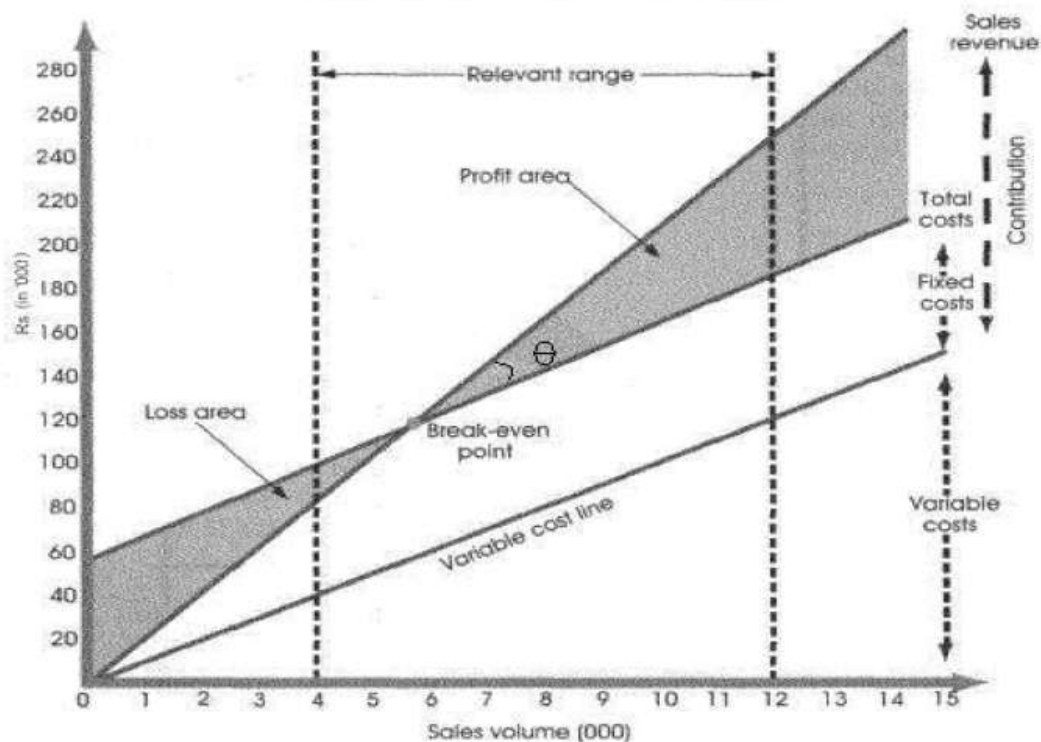
- Break Even Sales (in sales value) = Variable Costs + Fixed Costs



Once the break-even point in units has been calculated, the break-even point in sales rupees may be calculated by multiplying the number of break-even units by the selling price per unit. This also works in reverse. If the break-even point in sales rupees is known, it can be divided by the selling price per unit to determine the break-even point in units.



Contribution Break Even Chart



The main **limitations of break-even** chart are as follows:



1 hen purchased
Cost per egg- let's say 10paise



more hens purchased
Cost per egg increases as one helper needs to be kept now



- The variable cost line need not necessarily be a straight line because of the possibility of operation of law of increasing costs or law of decreasing returns.



2. Similarly the selling price will not be a constant factor. Any increase or decrease in output is likely to have an influence on the selling price.
3. When a number of products are produced, separate break-even charts have to be drawn. This poses a problem of apportionment of fixed expenses to each product.
4. Break-even charts ignore the capital employed in business which is one of the important guiding factors in the determination of profitability.
5. The preparation of break-even chart presumes that costs can be reliably divided into fixed and variable component. This is very difficult in practice.
6. The break-even chart presumes that production and sales will be synchronized at all points of time or in other words, the entire production will be sold. This may not be true in practice.

Question 3: A company manufactures a single product having a marginal cost of Rs. 0.75 per unit. Fixed Cost is Rs. 15000 per annum. The market is such that up to 40000 units can be sold at a price of Rs. 1.50 per unit, but any additional sale must be made at Re. 1 per unit. Company has a planned profit of Rs. 25000. How many units must be made and sold.

[Ans., 80000]

Question 4 (Sensitivity analysis): The Super co. owns and operates six outlets in and around Kansas City. You are given the following corporate budget data for next year:

Revenue	Rs.1,00,00,000
Fixed Costs	Rs.17,00,000
Variable Costs	Rs.82,00,000

Variable costs change with respect to the number of units sold.

Required.

Compute the budget operating income for each of the following deviations from the original budget data. (Consider each case independently.)

- a. A 10% increase in contribution margin, holding revenues constant.
- b. A 10% decrease in contribution margin, holding revenues constant.
- c. A 5% increase in fixed costs.
- d. A 5% decrease in fixed costs.
- e. An 8% increase in units sold.
- f. An 8% decrease in units sold.
- g. A 10% increase in fixed costs and 10% increase in units sold.
- h. A 5% increase in fixed costs and 5% decrease in variable costs.

[Ans., 280000, (80000), 15000, 185000, 244000, (44000), 110000, 425000]

Question 5 (Sensitivity analysis): If labour costs and material cost are likely to go up by 10% and 5% respectively per unit, what is the percentage increase necessary in selling price to keep the P/V of 20% as before, assuming that the ratio between material and labour is 3:2, and variable overheads is nil. [Ans., 7%]

Question 6: H Ltd. produces Pens and Pencils. The company's budget for 2008 includes the following data:

	Pens	Pencils
Unit Selling Price (Rs.)	10	5
Contribution Margin ratio (%)	40	60



The budget is designed to show a figure of profit or loss for each product, after apportioning joint fixed costs of Rs. 100000 in proportion to the number of units of each product sold. For 2008, Pens are budgeted to show a profit of Rs. 14000, and pencils a loss of Rs. 2000. The number of units of each product sold is expected to be equal. You are required to write a report to the managing director of H Ltd. advising him on the basis of the information given whether to implement any of the following three proposals:

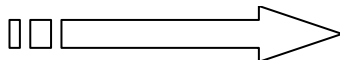
- (i) To increase the price the pencil by 25%, in the expectation that the price elasticity of demand over this range of prices will be unity;
- (ii) To make changes to the production process that would reduce the joint fixed costs by 12.5% and increase the variable costs of each product by 10%;
- (iii) To introduce both the above changes.

[Ans.: (i) Increase in contribution = Rs. 6400; (ii) Decline in profit = Rs. 300; (iii) Increase in profit = Rs. 6740]

Targeted income



Target income generally equal to
Opportunity cost



CVP analysis is also used when a company is trying to determine what level of sales is necessary to reach a specific level of income, also called **targeted income**.

To calculate the required sales level, the targeted income is added to fixed costs, and the total is divided by the P/V Ratio to determine required sales rupees, or the total is divided by contribution per unit to determine the required sales level in units.

$$\text{Required Sales Revenue in Rupees} = \frac{(\text{Fixed Costs} + \text{Target Operating Income})}{\text{P/V Ratio}}$$

$$\text{Required Sales in Units} = \frac{\text{Fixed Costs} + \text{Target Operating Income}}{\text{Contribution Margin per unit}}$$

This calculation of targeted income assumes it is being calculated for a division as it ignores income taxes. If a targeted net income (income after taxes) is being calculated, then income taxes would also be added to fixed costs along with targeted net income.

$$\text{Required Sales Revenue in Rupees} = \frac{\text{Fixed Costs} + \text{Target Net Income} + \text{Income Tax}}{\text{P/V Ratio}}$$

$$\text{Required Sales in Units} = \frac{\text{Fixed Costs} + \text{Target Net Income} + \text{Income Tax}}{\text{Contribution Margin per unit}}$$

Where, **Target Operating Income = Target Net Income + Income Taxes**



If Rate of Income Tax is known & Value of Income Tax not known then,

$$\text{Target Operating Income} = \frac{\text{Target Net Income}}{1 - \text{Tax Rate}}$$

Question 7: Two companies, H and L have the same values for turnover and net profit and make a similar product. H has higher P/V ratio than L. which company will perform better when: (i) The market demand is high? (ii) The market demand is low?

(2 Marks) Nov.'11 [Ans.:(i) H (ii) L]

Question 8: X Ltd. is a recently formed company, manufacturing vehicles. Its cost structure is such that on sale of every Rs.2,000, it spends Rs.1400/-. In 2002, when the total sales revenue was Rs.10,00,000/-, it sustained loss of Rs. 2,00,000/- You are required to compute the breakeven point. If the minimum net profit to be earned is Rs.2,00,000/- in order to justify the survival, what must be sales revenue?

[Ans.:1666667 & 2333333]

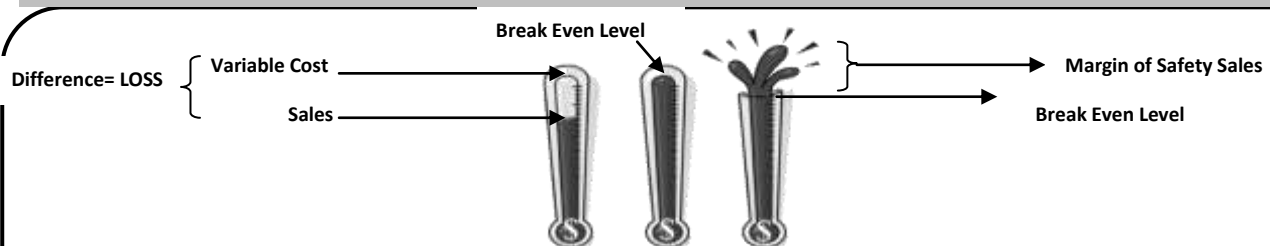
Question 9(Volume analysis). The following figures for profit & sales are obtained from the accounts of X Co. Ltd.

Year	Sales	Profit
	Rs.	Rs.
2002	20,000	2,000
2003	30,000	4,000

- Find out Contribution Sales Ratio.
- What is Break Even Sales?
- Find out the sales to earn a profit of Rs.6000 in 2004.
- What is the profit when sales are Rs.12000 in 2004?

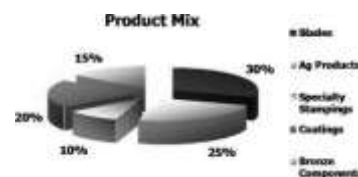
[Ans.:0.2,10000,40000,(400)]

Margin of Safety:



Margin of safety is the difference between the sales or productions at a particular level of activity and the break even sales a production.

A large margin of safety indicates the soundness of the business and correspondingly a small margin of business indicates a not too-sound position.



Margin of safety can be improved by lowering the fixed cost and variable costs, increasing the volumes of sales and production, increasing the selling prices or changing the product mix resulting into a better overall Profit/Volume ratio.

- Margin of safety Sales = Sales at selected activity – BEP Sales
- Margin of safety Sales = Profit at selected activity ÷ P/V ratio
- Margin of safety (%) = Margin of Safety Sales X 100 ÷ Sales at selected activity
- Margin of safety (%) = 1 – BEP (%)

Question 10(Single product marginal cost sheet). A company producing a single article sells it at Rs.10 each. The marginal cost of production is Rs.6 each and fixed cost is Rs.400 per annum.

- Calculate** (a) The P/V ratio;
 (b) The break-even sales;
 (c) The sales to earn a profit Rs.500;
 (d) Profit at sales Rs.3, 000;
 (e) New break-even point if sales price is reduced by 10%.
 (f) MOS when the profit earned in Rs.200 and PVR – 40%.

[Ans.: 0.4, 1000, 2250, 800, 1200, 500]

Question 11. From the following particulars, you are required to calculate:

- P/V Ratio
- BEP for sales;
- Margin of Safety;
- Profit when sales are Rs.2,00,000/-
- Sales required to earn a profit of Rs.40,000/-

Year	Sales	Profit
I	Rs. 2,40,000	18,000
II	Rs. 2,80,000	26,000

You may make plausible assumptions. Also evaluate the effect on II year's profit of

- 20% decrease in sales quantity.
- 20% decrease in sales quantity accompanied by 10% increase in sales price and reduction of Rs.3,500/- in fixed costs.

[Ans.: 0.20, 150000, 130000, 10000, 350000. (a) Reduction in profit 11200; (c) Increase in profit 14700]

Question 12. The following information is given by Z Ltd.:

Margin of safety Rs.1,87,500

Total cost Rs.1,93,750

Margin of safety 7500 units

Break-even sales 2500 units



Required:

Calculate Profit, P/V Ratio, BEP Sales (in Rs.) and Fixed Cost. (4 Marks) Nov./10–N.C.

[Ans.: Rs.56250, 0.30, Rs.62500, Rs.18750]

Question 13: A single product company furnishes the following data:

	Year 2007	Year 2008
Sales	24,00,000	?
P/V Ratio	33-1/3 %	30%
Margin of Safety	25%	40%

While there was no change in volume of sales in year 2008, the selling price was reduced. Calculate sales, fixed cost and profit for year 2008.

[Ans.: Sales: 2285714, Fixed Cost: 411429, Profit: 274285]

Angle of Incidence.

It is the angle of intersection (θ) between the sales & the total cost lines. (See page 14) It indicates the profit earning capacity of the concern at a certain level of sales production. The larger the angle of incidence the more is the profit earning capacity & vice versa. It also provides an indication as to what extent the output & sales price may be varied to attain a desire level of profit. It gives an easy & clear idea to the profitability under different levels of activities & also for different product mix & is a simple visual aid to find out profit earning capacity without going in for any calculation.

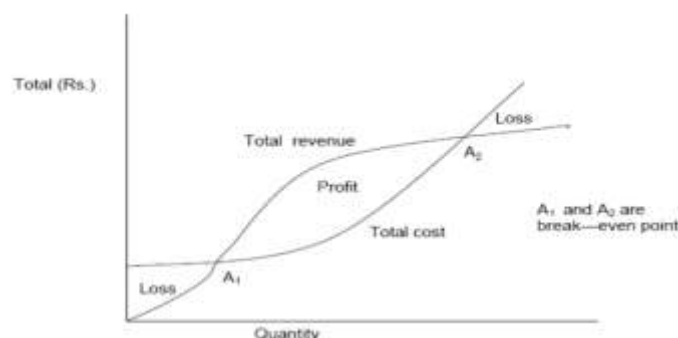
Curvilinear CVP analysis

In CVP analysis, the usual assumption is that the total sales line and variable cost line will have linear relationship, i.e. these lines will be straight lines, and however, in actual practice it is unlikely to have a linear relationship for two reasons, namely:

--- After the saturation point of existing demand the sales value may show a downward trend.

--- The average unit variable cost declines initially, reflecting the fact that, as output increases the firm will be able to obtain bulk discounts on the purchase of raw materials and can also benefit from division of labour. When the plant is operated at further higher levels of output, due to bottlenecks and breakdowns the variable costs per unit will tend to increase. Thus the law of increasing costs may operate and the variable cost per unit may increase after reaching a particular level of output.

In such cases, the contribution will not increase in linear proportion on the phenomenon of diminishing marginal productivity; the total cost line will not be straight, as assumed but will be of curvilinear shape. This situation will give rise to two break even points. The optimum profit is earned at the point where the distance between sales and total cost is the greatest.





Composite BEP i.e. *more than one product* with common fixed costs

(i) Without limiting factor (Multi Products)

$\text{BEP (in units)} = \text{Fixed cost} \div \text{Weighted Average contribution p.u.}$

Where, Weighted Av. Contribution p.u. = $\sum [\text{Sales Mix}(\%) \times \text{Contribution p.u.}]$

Also, $\text{BEP (in Rs.)} = \text{Fixed cost} \div \text{composite P/V ratio}$

Where, composite P/V ratio = $\text{Cumulative Contribution} \div \text{Cumulative Revenue}$

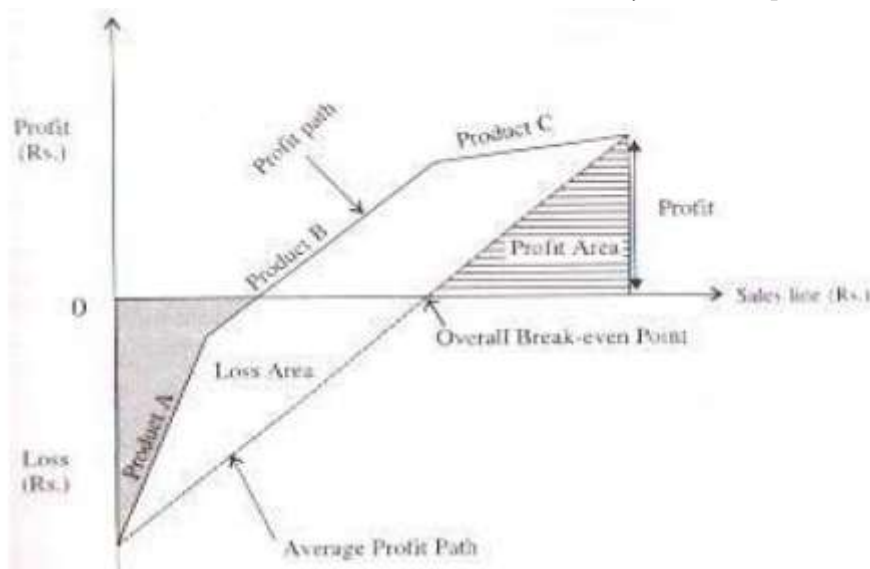
But, when sales mix in rupee is given

$\text{BEP (in Rs.)} = \text{Fixed cost} \div \text{composite P/V ratio}$

Where, composite P/V ratio = $\sum [\text{Sales Mix} \times \text{P/V Ratio}]$

(ii) With limiting factor:

Find contribution per limiting factor & give rank. Find total contribution from 1st rank product. Calculate the amount of fixed cost still to recover. Whether it can be recovered by 2nd rank product or not?



Indicate circumstances under which you will permit to fix a price, which is less than the marginal cost of the product.

Circumstances under which a firm may fix a price less than the marginal cost of the product are as under:

- i. When goods are of perishable nature.
- ii. When the concern had already purchased huge quantities of raw materials and the prices of these materials is falling considerably in the market.
- iii. When competitors are to be eliminated from the market.
- iv. When a new product is to be introduced in the market.
- v. To obviate shut-down costs.
- vi. To push-up the sale of another highly profitable product.
- vii. To capture future market.
- viii. To capture foreign market.