CVP - Analysis

⇒ There are two types of Expense :-

Fixed Expense
- Remain constant like rent etc.
- will not change with output.

Variable Expense
- It varies with level of production and changes frequently

⇒ Now, 1 Pc pen
- Sale price = ₹100
- (cost in making) variable cost = ₹80
- k/a "contribution" ⇒ ₹20 (अंशदान (not profit ⚠))

"contribution" is the most imp point since, it will determine our rate of profit. when, अंशदान = fixed cost then we achieve no profit no loss stage.

⇒ for profit we need to subtract our other expense also (i.e. fixed expense)

- fixed cost = ₹10,000 (like factory rent)
- Net Profit/Net loss = ₹9980

IMP. point ★
fixed cost ↓ses as production ↑ses. like rent per unit pcs ↓ses if we ↑se our production from 1 to 100pcs but variable cost is fixed per unit. Eg. cost of making 1 pen = ₹80 will remain same for 100 pen = ₹8000.

★ Major Imp. formulas

(Try understanding rather than cramping)

	1 Pc	2 Pc	3 Pc	499 Pc	BEP 500 Pc	501 Pc
Sale Price	₹100	₹200	₹300	₹49900	₹50,000	₹50,100
Variable cost (चलत लागत)	₹80	₹160	₹240	₹39920	₹40000	₹40,080
Contribution (योगदान)	₹20	₹40	₹60	₹9980	₹10,000	₹10,020
Fixed Cost	₹10,000	₹10,000	₹10,000	₹10,000	₹10,000	₹10,000
Net Profit / Net Loss	⊖9980	⊖9960	⊖9940	⊖9920	0	₹20 (+)

we want this to ↑↑.

(at any point P/V ratio will be same)

★ P/V Ratio (Profit-Volume Ratio)

(comes from Sales)

$$P/V\ Ratio = \frac{Contribution}{Sale} \times 100$$

(Volume → Sale so in denom)

NOTE → Contribution and Sale should be of same level.

OR

$$P/V\ Ratio = \frac{Sales - Variable\ cost}{Sale} \times 100$$

* (Contribution = Sale − Variable cost)

OR

$$P/V\ Ratio = 1 - \frac{Variable\ cost}{Sale} \times 100$$

OR

$$P/V\ Ratio = \frac{Fixed\ cost + Profit\ (or\ -\ if\ loss)}{Sales} \times 100$$

(* we know that, Sales - Variable cost → contribution − fixed cost = profit/loss

→ contribution = fixed cost + profit/loss(−))

OR

$$P/V\ Ratio = \frac{Change\ in\ profit/\ contribution}{Change\ in\ Sales}$$

(can be noticed from the table :-

	1 Pc	2 Pc	3 Pc
SP →	₹100	₹200	₹300
VC →	₹80	₹160	₹240
contri →	₹20	₹40	₹60
Fixed →	10000	10000	10000
Net P/L →	(−)9980	(−)9960	(−)9940

1 Pc & 2 Pc compare: $\frac{9960 - 9980}{100} \times 100 = \frac{-20}{100} \times 100 = -20\%$

1 Pc & 2 Pc compare: $\frac{9960 - 9980}{100} \times 100 = 20\%$

Same

$\frac{60-40}{300-200} = \frac{20}{100} \times 100 = 20\%$ (2 Pc and 3 Pc compare)

Same

we calculate by original formula = $\frac{contri}{sale} \times 100 = \frac{20}{100} \times 100 = 20\%$

★ Break Even Point (BEP)

In terms of "Quantity"

⇒ we can find BEP point is point where there is no loss or profit → and, we can find this only at a point where contribution (कवर) = Fixed cost

if, your contri is greater than profit
less than loss.

⇒ So, in short we need to cover fixed cost (here ₹10000) by contribution (₹20) धीरे धीरे करके भी आ रहा है so,

$$Qty_{BEP} = \frac{\text{Total Fixed Cost}}{\text{Contribution per Unit}}$$ (Eg. $\frac{10,000}{20}$ = 500 unit)

OR

$$Qty_{BEP} = \frac{\text{Value of BEP}}{\text{Sale price per Unit}}$$ (Eg. $\frac{50,000}{100}$ = 500 unit Pc)

In terms of "Value" (₹)

$$Value_{BEP} = \frac{\text{Total Fixed cost}}{\text{Contribution ~~per unit~~}} \times \text{Sale ~~per unit~~}$$

no need of per unit, just pick contri & sale of same pc and you will get correct ans bcoz,

	1 Pc	2 Pc
Sale	100	200
conti	20	40
	Ratio = 5:1	Ratio = 5:1 so,

we can pick any just make sure it is of same bracket.

⇒ $$Value_{BEP} = \frac{\text{Total Fixed Cost}}{\text{Contribution}} \times \text{Sales}$$

OR

$$Value_{BEP} = Qty_{BEP} \times \text{Sale p. per unit}$$

(Eg. 500 × 100 = 50,000)

OR

$$\text{Value}_{BEP} = \frac{\text{Total Fixed Cost}}{\text{P/V Ratio}}$$

(Since, Value BEP = $\frac{\text{Total Fixed cost}}{\text{Contri}} \times \text{Sales}$ = P/V Ratio only)

★ Sale for Desired Profit

(FORMULA'S same as of BEP bcoz, we add desired profit with fixed cost → so we know Qty/Value req.)

Quantity

Sale Qty required for Desired profit = $\frac{\text{Total fixed Cost} + \text{Desired Profit}}{\text{Contribution per Unit}}$

OR

Sale Qty req. for desired profit = $\frac{\text{Value of Sale for desired profit}}{\text{Sale price per unit}}$

Value

Value of Sale for Desired profit = $\frac{\text{Total fixed Cost} + \text{Desired profit}}{\text{contribution}} \times \text{Sales}$

OR

Value of Sale for Desired profit = Qty. of Sale req for desired profit × Sale price per unit

OR

Value of Sale for Desired profit = $\frac{\text{Total fixed cost} + \text{Desired Profit}}{\text{P/V Ratio}}$

★ Margin of Safety (MOS)

Quantity

$$\text{Quantity}_{MOS} = \text{Actual Sale Quantity} - \text{BEP Quantity}$$

OR

$$\text{Qty}_{MOS} = \frac{\text{Value of MOS (margin of safety)}}{\text{Sale price per unity}}$$

Value

$$\text{Value}_{MOS} = \text{Actual Sales Volume} - \text{BEP sales Volume}$$

OR

$$\text{Value}_{MOS} = \text{Qty}_{MOS} \times \text{Sale price per unity}$$

OR

$$\text{Value}_{MOS} = \frac{\text{Net profit}}{\text{P/V Ratio}}$$

Imp. Point

⇒ Sometimes, Variable cost or Marginal cost ratio is given. So, in order to find PV ratio just subtract by 100%. Eg

Marginal / Variable cost Ratio = 80% | 75%

P/V Ratio = 20% | 25%

Break Even chart

Eg ⇒ Sale price = ₹400

V. Cost

Material = ₹40
Labour = ₹100
V. Overhead = ₹100
} = ₹240 ⇒ V. Cost for 375 Pcs = 375 Pcs x ₹240 = 90,000

Contribution = ₹160

Fixed Cost = ₹60,000

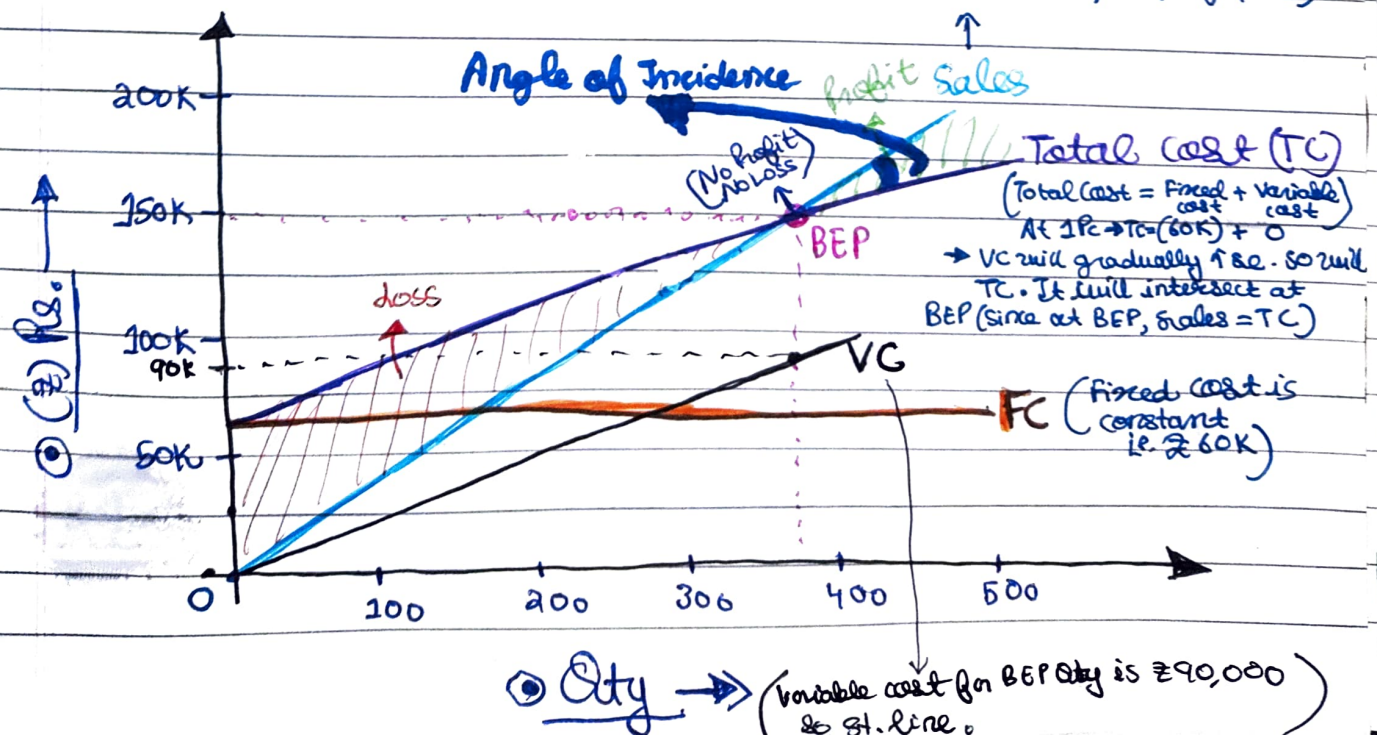
⇒ Draw BEP analysis chart.

⇒ BEP (Qty) = $\frac{60,000}{160}$ (Total fixed cost / contri)
= 375 Pcs ....

⇒ at (375, 150K) will be BEP

⇒ BEP (Value) = 375 Pcs x ₹400
= ₹1,50,000 ....

(Start from '0' and at BEP it reaches where, no profit/Loss)



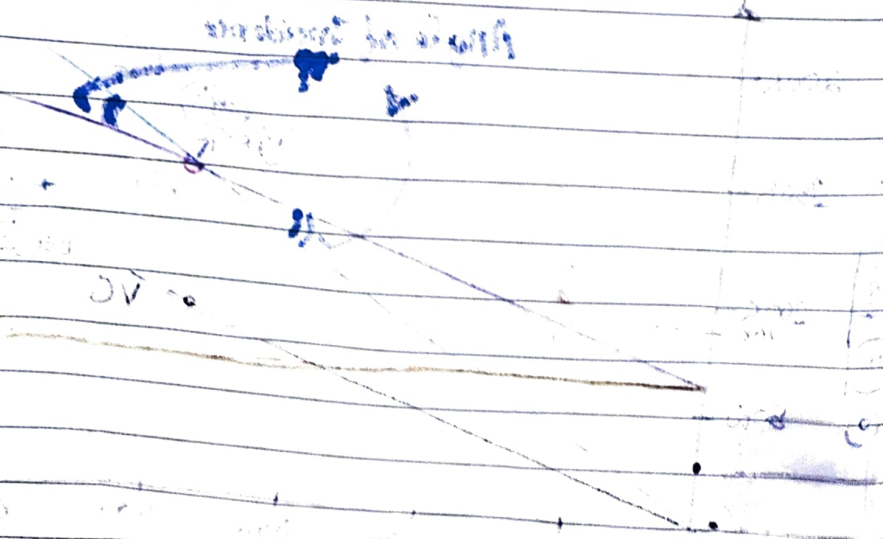
Angle of Incidence

⇒ It is the angle which is created by Cost and Sales line.

⇒ The angle is formed from the starting of the BEP.

⇒ Angle of Incidence shows the rate at which a company is making profits. The Simple Rule is that ⇒ Bigger the angle of incidence, higher will be the rate of profits.

⇒ The angle of incidence provides insights into the relationship between sales, costs and profitability. By analyzing this angle, business can make decision regarding pricing, cost management, and sales target to achieve desired level of profitability.



Cost-break-even point

It is a situation under which the cost of operating two alternative plants are equal. Though both the plants may have the same total costs, their total fixed costs and variable costs per unit may be different. In such a case, the firm may like to determine that point at which the total costs (fixed and variable) of operating both the plants are the same. Such a point may be called 'cost break even point.

$$\text{Cost break even point} = \frac{\text{Difference in fixed Cost}}{\text{Difference in Variable cost per unit}}$$

Ques.

	Plant A	Plant B
Fixed Cost	2,00,000	1,00,000
Variable cost p.u	30	40

Calculate Cost break even point

Ans - Cost break-even point = $\frac{100000}{10}$

= 10,000 units

Composite Break-even Point

It is a single break even point in the cas
of firms manufacturing two or more produ

$$\text{Composite BEP} = \frac{\text{Total fixed cost}}{\text{Composite PVR}}$$

$$\text{Composite PVR} = \frac{\text{Total Contribution}}{\text{total Sales}} \times 100$$

Que. From the following data, calculate

i) Composite PVR
ii) Composite contribution per unit of mix
iii) Composite BEP using PVR,

If Fixed cost is ₹ 50,000

Products	Units	Selling price p.u	Variable Cost p.u
A	1,000	5	4
B	2000	10	8
C	3000	15	12

Ans- Computation of Composite PV Ratio

Total Sales:

		₹
A : 1000 × 5	=	5000
B : 2000 × 10	=	20,000
C : 3000 × 15	=	45,000
		70,000

Calculation of Composite BEP

$$= \frac{\text{Total fixed Cost}}{\text{Composite PVR}}$$

$$= \frac{50,000}{20\%}$$

$$= ₹\ 2,50,000$$

Cash Break-even Point

While computing the break even point if only cash fixed costs are considered, the break even point so computed is called cash break even point. The computation of cash break even point excludes depreciation and other non-cash fixed expenses. Cash break-even point thus will give such a level of output or sales at which the sales revenue will be equal to cash outflow.

$$\text{Cash break even point} = \frac{\text{Cash fixed Cost}}{\text{Contribution p.u}}$$

Qus from the following data, Calculate Cash BEP

Selling price p.u = ₹ 10

Variable Cost p.u = ₹ 6

FC = ₹11000 (including ₹ 3000 as depreciation)

Ans- Cash Break even point = $\frac{\text{Cash fixed Cost}}{\text{Contribution p.u}}$

$$= \frac{8000}{4} = 2000 \text{ units}$$

Total Variable Cost:

	₹
A : 1000 × 4	= 4,000
B : 2000 × 8	= 16,000
C : 3000 × 12	= 36,000
	56,000

total Contribution = total Sales − total VC

= 70,000 − 56,000

= ₹14,000

$$\text{Composite PVR} = \frac{\text{total contribution}}{\text{total Sales}} \times 100$$

$$= \frac{14000}{70000} \times 100$$

$$= 20\%$$

ii) Calculation of Composite Contribution per unit

Contribution = Sales − VC

A = 5 − 4 = 1

B = 10 − 8 = 2

C = 15 − 12 = 3

$$\text{Composite Contribution per unit of Mix} = \frac{\text{total Contribution of A,B,C}}{\text{total units of A, B, C}}$$

$$= \frac{1 \times 1000 + 2 \times 2000 + 3 \times 3000}{1000 + 2000 + 3000}$$

$$= \frac{14000}{6000} = ₹\ 2.33$$

Aspect	Absorption Costing	Marginal Costing
Definition	A costing method that assigns all manufacturing costs, including both variable and fixed costs, to products.	A costing method that assigns only the variable manufacturing costs to products. Fixed costs are treated as period costs and are not assigned to products.
Cost classification	Both variable and fixed manufacturing costs are included in the product cost.	Only variable manufacturing costs are included in the product cost. Fixed costs are expensed as period costs.
Product cost	Includes direct materials, direct labor, variable manufacturing overhead, and fixed manufacturing overhead.	Includes direct materials, direct labor, and variable manufacturing overhead. Fixed manufacturing overhead is not considered a product cost.
Profit calculation	Sales - (Cost of goods sold + Selling and administrative expenses) = Net profit	Sales - (Variable manufacturing costs + Variable selling and administrative expenses) = Contribution margin
Inventory valuation	Considers fixed manufacturing overhead as part of the inventory cost.	Only variable manufacturing costs are allocated to the inventory cost. Fixed manufacturing overhead is not included.
Decision-making	Useful for long-term decision-making as it incorporates all costs, including fixed costs.	Useful for short-term decision-making, such as determining the profitability of specific products or services.
Example	Suppose a company produces and sells widgets. In absorption costing, the product cost would include direct materials, direct labor, variable manufacturing overhead, and fixed manufacturing overhead. Thus, the cost per unit will be higher.	Using the same example, in marginal costing, only variable costs like direct materials, direct labor, and variable manufacturing overhead will be considered in the product cost. Fixed manufacturing overhead will be treated as a period cost and will not be included in the cost per unit. As a result, the cost per unit will be lower compared to absorption costing.

It's important to note that both absorption costing and marginal costing their own advantages and limitations, and the choice between the two m depends on the specific circumstances and objectives of the company.

Relevant Costs and Decision-Making

1. **Key Factor:** The key factor is a crucial element that significantly influence a decision or outcome. In decision-making, it is essential to identify the ke factor, as it helps determine the most relevant costs and benefits associated with a particular choice. The key factor is often the limiting factor or constraint that affects the decision.
   Example: A manufacturing company has limited machine hours available. The key factor in determining the production quantity and profitability of different products would be the machine hours. The company would allocate its limited machine hours to the product that generates the highest profit per hour.

2. **Pricing:** Pricing decisions involve setting the optimal price for a product or service. Relevant costs play a vital role in determining the appropriate pricing strategy. These costs include variable costs directly associated with producing the product, as well as any additional costs incurred due to the pricing decision, such as changes in demand or production volume.
   Example: A restaurant wants to introduce a new dish on its menu. In determining the price, the restaurant considers the cost of ingredients, labor, and other variable costs associated with preparing the dish. Additionally, they assess market demand and competition to set a price that maximizes profitability.

3. **Product Profitability**: Analyzing product profitability involves assessing the costs and revenues associated with each product or service offered by a

company. By identifying the relevant costs and revenues specific to each product, businesses can evaluate their profitability accurately.
Example: A retail store sells multiple products and wants to evaluate their profitability. They consider the costs of purchasing or producing each item, along with any additional costs related to storage, packaging, and marketing. By comparing these costs against the revenues generated by each product, the store can determine which items are the most profitable.

4. **Dropping a Product Line:** Dropping a product line refers to the decision to discontinue offering a particular product or service. This decision is often based on an analysis of the relevant costs and benefits associated with maintaining the product line. If the costs outweigh the benefits, dropping the product line may be the appropriate choice.
   Example: A technology company manufactures smartphones and tablets. After analyzing sales figures and production costs, they realize that the tablet product line is consistently generating lower profits compared to smartphones. They may decide to drop the tablet product line to focus their resources and efforts on the more profitable smartphone business.

5. **Make or Buy:** Make or buy decisions involve determining whether a company should produce a component or product internally or purchase it from an external supplier. Relevant costs, such as production costs, purchase costs, and quality considerations, are crucial in making this decision.
   Example: An automobile manufacturer needs a specific component for its vehicles. They compare the costs and quality of producing the component in-house versus purchasing it from a specialized supplier. If the in-house production costs are higher or the external supplier offers better quality, the company may decide to buy the component instead of making it internally.

6. **Export Order:** When a company receives an export order, it involves selling products or services to customers in foreign markets. Decision-

making related to export orders considers relevant costs associate exporting, such as transportation, tariffs, customs duties, packagin marketing expenses, along with potential revenues.

Example: A clothing manufacturer receives a significant export order a retailer in another country. They assess the costs involved in export the goods, including shipping costs, customs fees, and any necessary product modifications. After comparing these costs against the expecte revenue from the order, the manufacturer decides whether accepting t export order is financially viable.

7. **Shut Down vs. Continue Operations:** When a business faces financial difficulties or operational challenges, a decision must be made regarding whether to shut down operations or continue operating. Relevant costs, such as fixed costs, variable costs, potential revenue, and potential losses, are crucial in evaluating the financial implications of both options.

Example: A struggling factory is operating at a loss due to declining demand for its products and high operating costs. To determine the best course of action, the company analyzes the fixed costs, variable costs, and potential revenue if operations continue. If the projected losses outweigh any potential gains, the company may decide to shut down operations rather than continue operating at a significant loss.

Illustration 5.4. A company annually manufactures 10,000 units of a product at a cost of Rs. 4 per unit and there is home market for consuming the entire volume of production at the sale price of Rs. 4.25 per unit. In the year 1997, there is a fall in the demand for home market which can consume 10,000 units only at a sale price of Rs. 3.72 per unit. The analysis of the cost per 10,000 units is:

Materials	Rs. 15,000
Wages	11,000
Fixed overheads	8,000
Variable overheads	6,000

The foreign market is explored and it is found that this market can consume 20,000 units of the product if offered at a sale price of Rs. 3.55 per unit. It is also discovered that for additional 10,000 units of the product (over initial 10,000 units) that fixed overheads will increase by 10 per cent. Is it worthwhile to try to capture the foreign market? *(M.Com., Madras, 1980)*

Solution:

STATEMENT SHOWING THE ADVISABILITY OF SELLING GOODS IN FOREIGN MARKET

Particulars	Year 1996 Home Market 10,000 units	Year 1997 Home Market 10,000 units	Year 1997 Foreign Market 20,000 units	Year 1997 Total Market 30,000 units
	Rs.	Rs.	Rs.	Rs.
Materials	15,000	15,000	30,000	45,000
Wages	11,000	11,000	22,000	33,000
Overheads				
Fixed	8,000	8,000	1,600	9,600
Variable	6,000	6,000	12,000	18,000
Total cost	40,000	40,000	65,600	1,05,600
Profit (Loss)	2,500	(2,800)	5,400	2,600
Sales	42,500	37,200	71,000	1,08,200

Illustration 5.14. The following details have been furnished to you regarding two proposals which are for consideration before a firm.

(a) Improvement in the quality of the product, which will result in an additional sale of 5,000 units at the existing price. However, this improvement in quality will result in increase in the variable cost by 10 paise per unit.

(b) Reduction in the selling price of the product by 12 paise per unit. This will push up sales by 5,000 units.

In both cases the fixed expenses will increase by Rs. 1,000.

The present sales of the firm are 10,000 units at the rate of Rs. 2.10 per unit. The variable cost is Rs. 1.60 per unit and the total fixed costs are Rs. 3,000.

You are required to state whether it will be appropriate for the firm to select any of the new proposals or should it continue with the existing scheme.

Solution:

EVALUATION OF ALTERNATIVES

Particulars	*Present Case*	*Proposed Case*	
		(a)	*(b)*
Expected sales (units)	10,000	15,000	15,000
Selling Price (Rs.)	2.10	2.10	1.98
Variable Cost (Rs.)	1.60	1.70	1.60
Contribution (Rs.)	0.50	0.40	0.38
Total Contribution (Rs.)	5,000	6,000	5,700
Fixed Expenses (Rs.)	3,000	4,000	4,000
Profit (Rs.)	2,000	2,000	1,700

The above analysis shows that it will be appropriate to continue with the *status quo*. However, if there is a possibility of increasing the selling price in future, proposal *(a)* may be considered.