BUS 401 Business and Entrepreneur

Cost and managerial accounting

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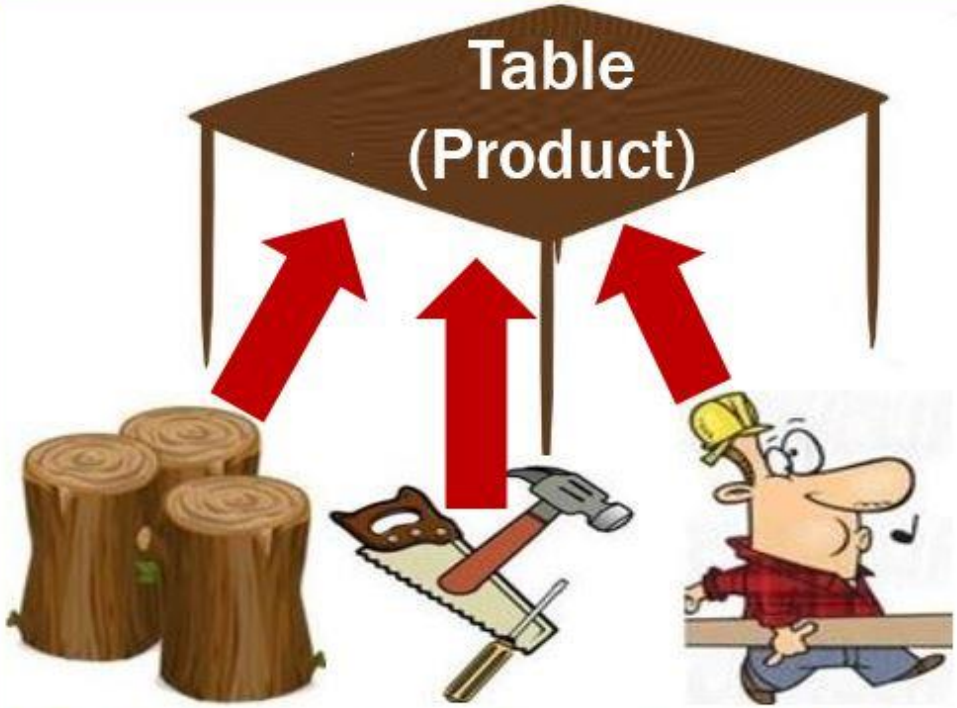
What are Costs?



Resources used to make the product

Costs are the resources used to make a product. It is expressed in monetary terms.

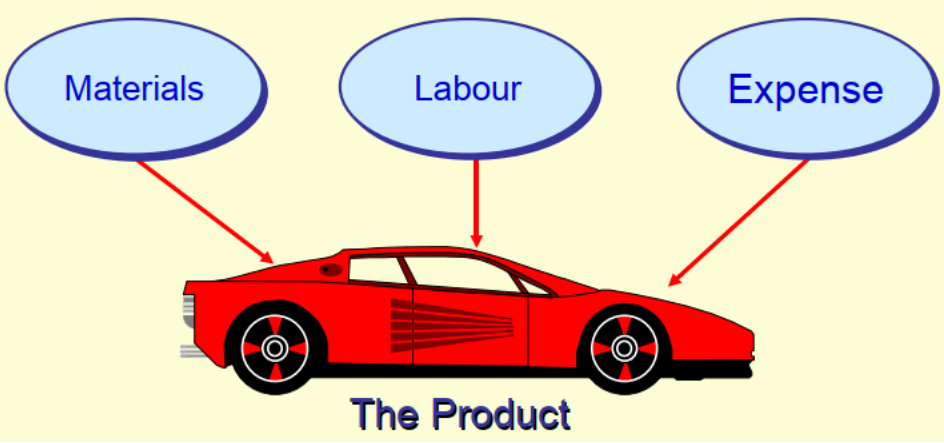
Cost Classifications

According to:

- Nature/ Elements
- Function
- Degree of traceability to product
- Change in volume
- Controllability
- Normality

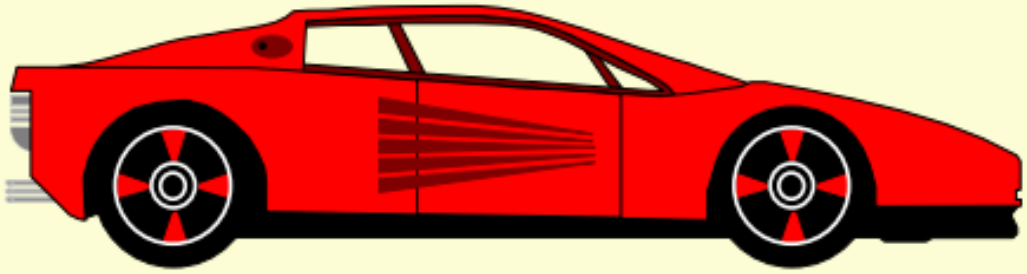
Related to .

1. Time
2. Planning & control
3. In relationship with accounting period
4. Association with product
5. Managerial decisions



Direct Materials

Those materials that become an integral part of the product and that can be conveniently traced directly to it.



Example: A radio installed in an automobile

Indirect Material

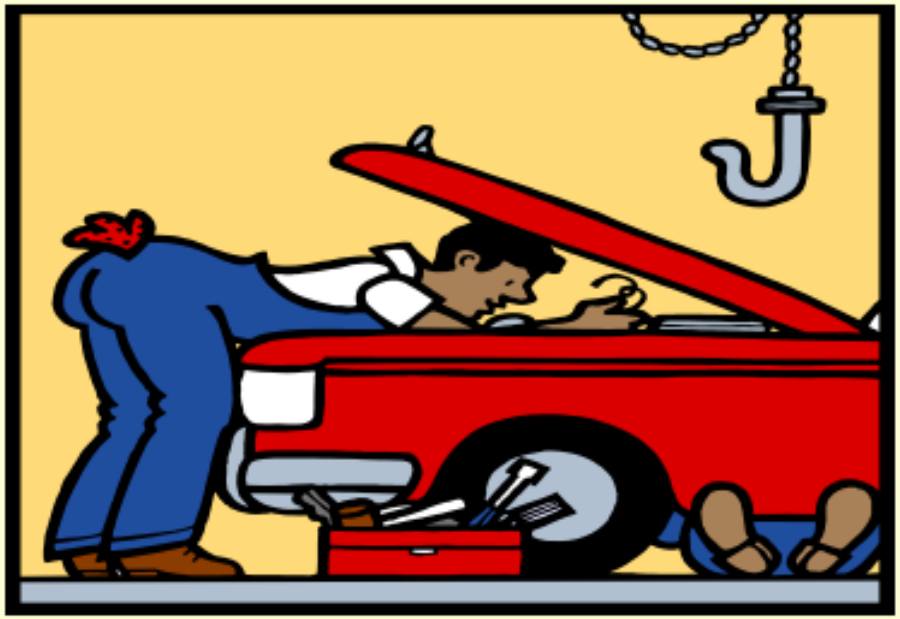
Those materials that do not become an integral part of the product but which helps in production.

Example: indirect materials

Materials used to support the production process.
Examples: lubricants and cleaning supplies used in the automobile assembly plant.

Direct Labor

Those labor costs that can be easily traced to individual units of product.

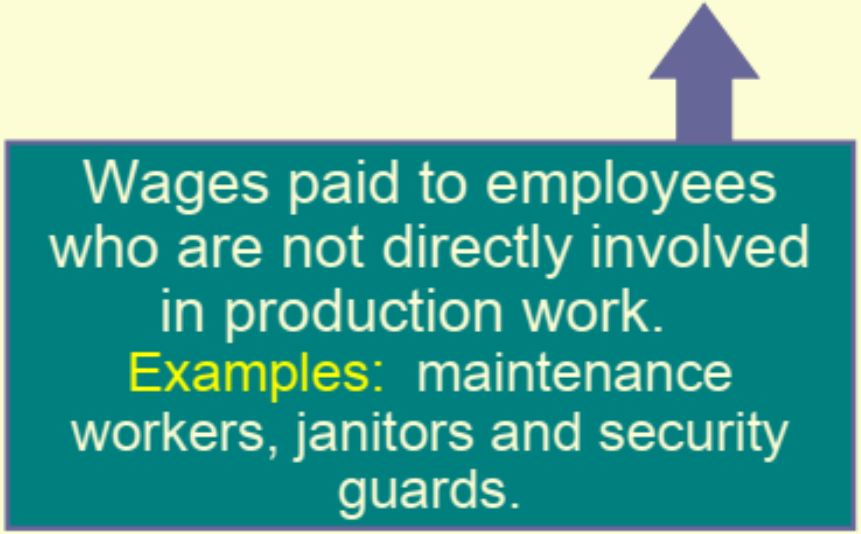


Example: Wages paid to automobile assembly workers

Indirect Labour

Those labor costs that cannot be easily traced to individual units of product.

Examples: Indirect labor



Expense

- The cost of services provided to an undertaking and the notional cost of the use of owned asset.
- Expenses are of two types:
  - Direct expense
  - Indirect expense

Expense

- Direct expense is an expense which is incurred with manufacture of a product.

Eg: Purchase of raw materials, factory labour, factory wages, electricity

- Indirect expense also called as overhead are additional expenses which are incurred on bringing a product to final customer.

Eg: Sales and Distribution, Office Salary, office electricity, office water, printing and stationery, outsourcing expenses, advertising expenses etc.

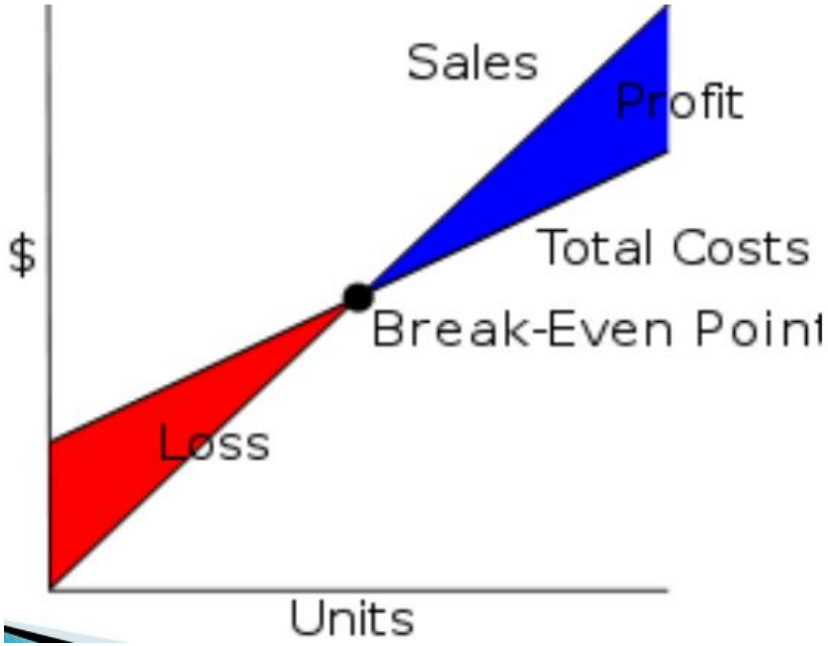
Different types of Business cost

1) **Direct costs:** For example, Apple manufactures iPhone and a worker spends about 6 hours building the phone. The direct costs that are associated with the phone are the wages to be paid to the worker
2) **Indirect Costs:** The types of business expenses which are not related to producing a good or rendering a service. Exp. Electricity bill
3) **Fixed cost:** these are not dependent on the output. This also termed as overhead costs. Such as Rent, salary
4) **Variable cost**: These types of business costs change upon the quantity of the products are the services . Exp. Office Printing bill
5) **Operating Cost**: the types of business costs which are associated with everyday transactions and business activities. for example, include rent utilities for a manufacturing plant.
6) **Product or period cost:** Product costs are those which the firm's accounting system relates to the output and are used to value inventory.
7) **Opportunity Cost**: Opportunity costs represent an alternative which is left out when making a decision. In terms of investing opportunity cost is the difference between chosen investment and the one that has come up.
8) **Sunk Cost:** which are historical in nature and have already been incurred and will not make any difference based on the current decisions by the management. Exp. adding more labor and material.
9) **Incremental Cost:** Associated with changing from one activity to other or from one course of action to another. Unlike opportunity cost.
10) **Controllable or non controllable cost**: which cannot be changed by an individual or a department or even a business.

Break-even (BE) Analysis

Break-even (BE) Analysis

- The objective of BE analysis is to determine the quantity or dollar amount of sales that generates zero profit.
- There are basically three methods for BE analysis:
  - Graph
  - Equation
  - Contribution margin



Break-even (BE) Analysis

- A **breakeven analysis** is used to determine how much sales volume your business needs to start making a profit.
- The breakeven analysis is especially useful when you're developing a pricing strategy, either as part of a marketing plan or a business plan.
- In economics & business, specifically cost accounting, the **break-even point** (BEP) is the point at which cost or expenses and revenue are equal: there is no net loss or gain, and one has "broken even".
- Total cost = Total revenue = B.E.P.

Cont..

In order to calculate how profitable a product will be, we must look at the Costs Price and Revenue involved.

- There are two basic types of costs a company experiences.
  - Variable Costs
  - Fixed Costs

- Variable costs are costs that change with changes in production levels or sales. Examples include: Costs of materials used in the production of the goods.

- Fixed costs remain roughly the same regardless of sales/output levels. Examples include: Rent, Insurance and Wages

Unit Price:
The amount of money charged to the customer for each unit of a product or service.

- **Total Cost:**

The sum of the fixed cost and total variable cost for any given level of production.
(Fixed Cost + Total Variable Cost)

- **Total Variable Cost:**

The product of expected unit sales and variable unit cost.
(Expected Unit Sales * Variable Unit Cost)

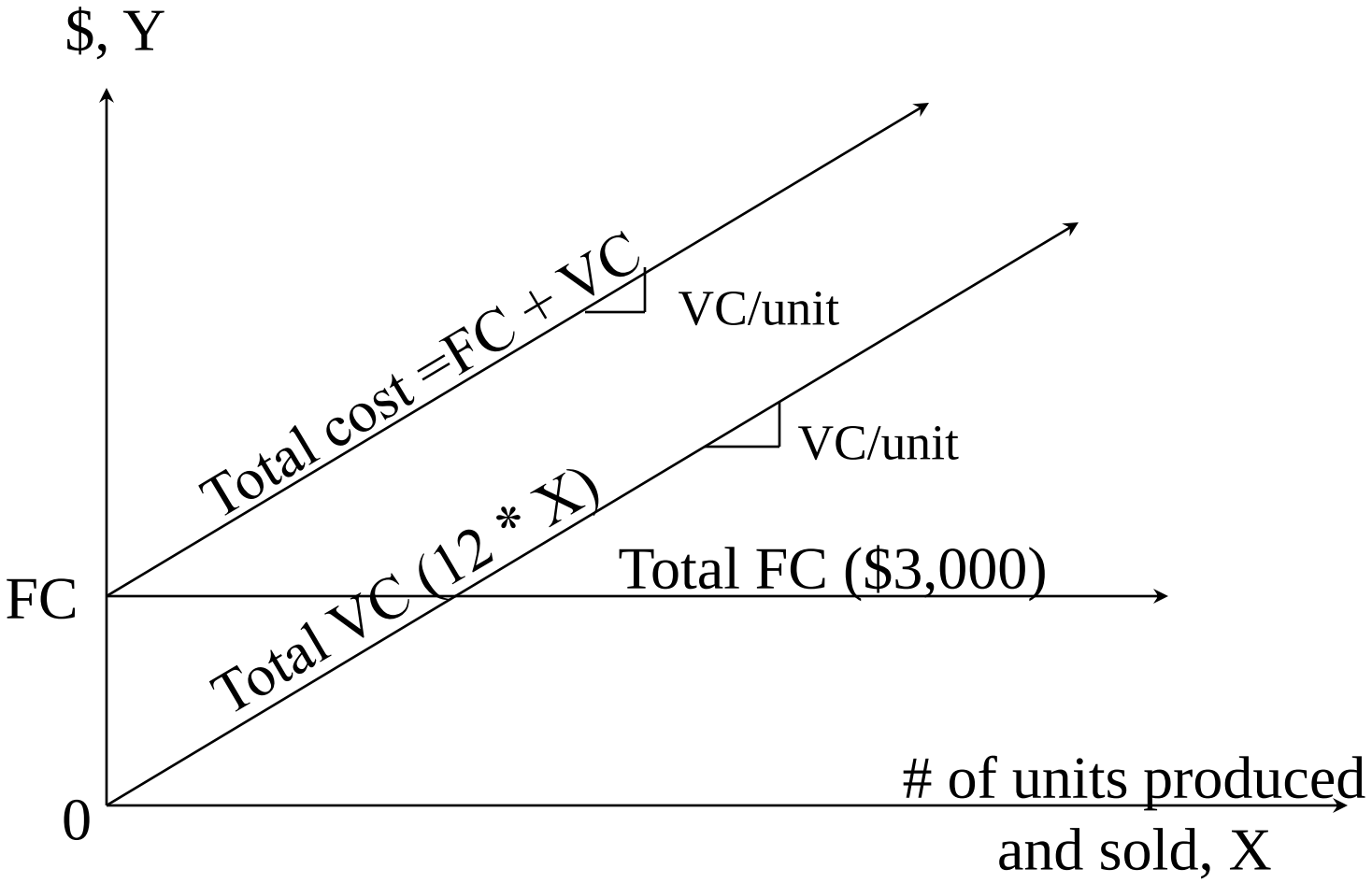
- **Total Revenue:**

The product of expected unit sales and unit price.
(Expected Unit Sales * Unit Price)

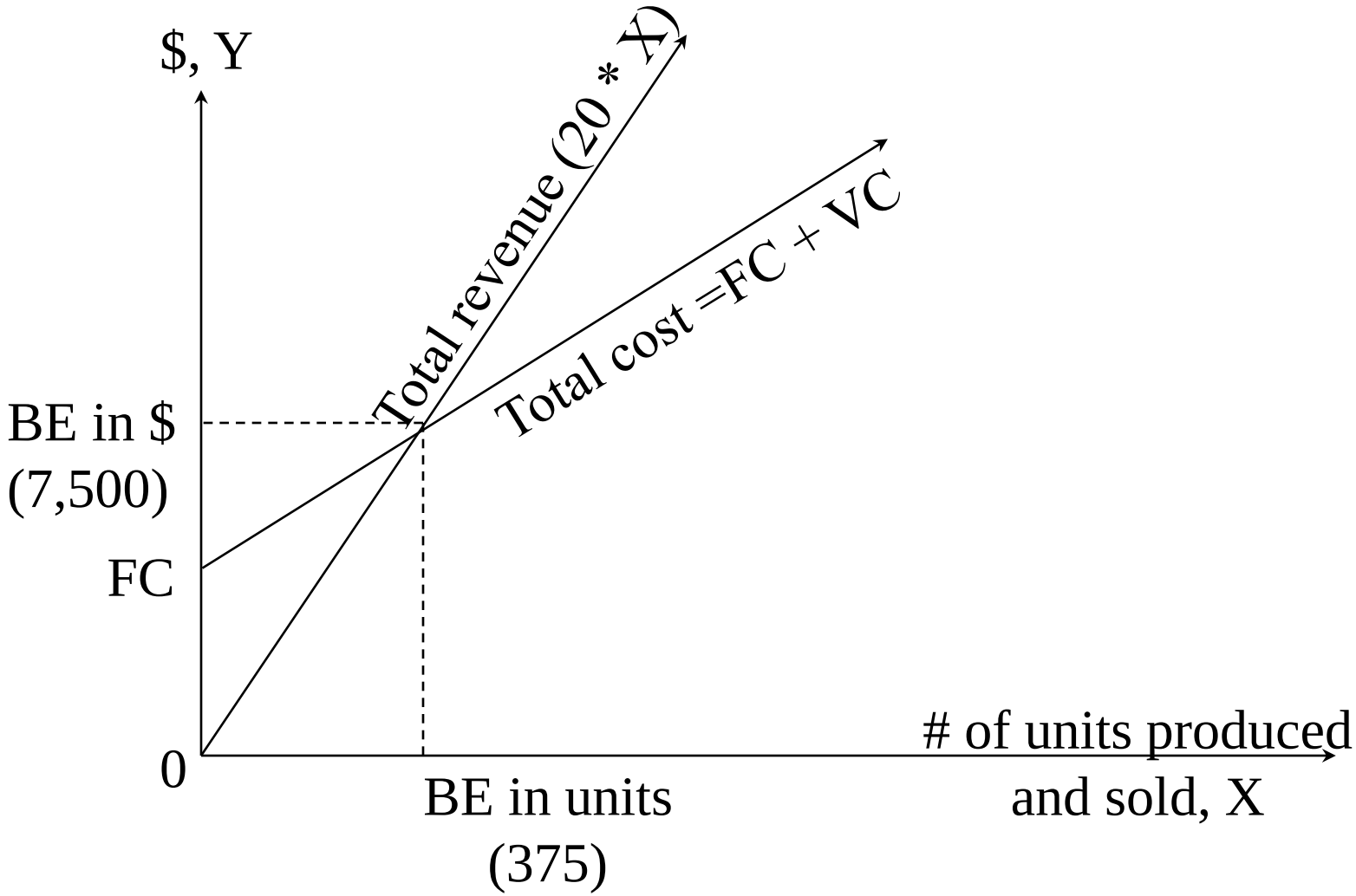
- **Profit/ loss**

The monetary gain or loss resulting from revenues after subtracting all associated costs. (Total Revenue – Total Costs)

BE Analysis – Graphic Method



BE Analysis – Graphic Method



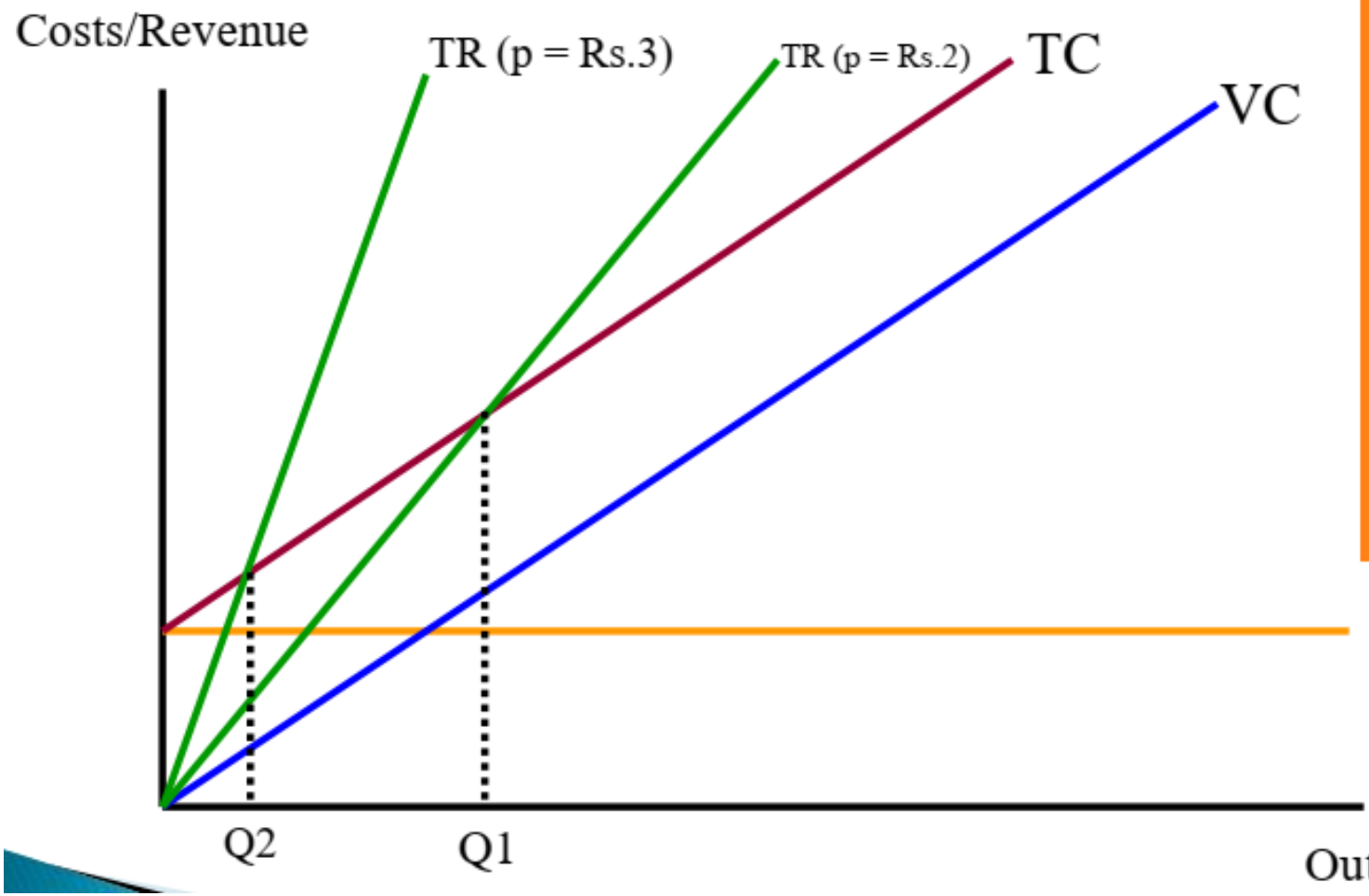
Examples

- For example, suppose that your fixed costs for producing 100,000 product were 30,000 tk a year.
- Your variable costs are 2.20 tk materials, 4.00 tk labor, and 0.80 tk overhead, for a total of 7.00 tk per unit.
- If you choose a selling price of 12.00 tk for each product, then:
- BEP= TFC/P-V
- 30,000(TFC) divided by [12.00(P) - 7.00(V)] equals 6000 units.
- This is the number of products that have to be sold at a selling price of 12.00 Rs before your business will start to make a profit.

- For example, if it costs R.s. 50 to produce a pen, and there are fixed costs of R.s.1,000, the break-even point for selling the widgets would be:

If selling for R.s. 100: 20 Widgets
(Calculated as 1000/(100-50)=20)
If selling for $200: 20 Widgets
(Calculated as 1000/(200-50)=6.7)
From this we can make out that the company should sell products at higher price to reach **BEP** faster.

Break-Even Analysis



If the firm chose to set price higher than Rs.2 (say Rs.3) the TR curve would be steeper – they would not have to sell as many units to break even

BE Analysis – Equation Method

Revenue = (Unit SP) * Volume

Total cost = (Unit VC) * Volume + Total FC

Profit = Revenue - Total cost

= (Unit SP) * Volume - (Unit VC) * Volume - Total FC

= (Unit SP - Unit VC) * Volume - Total FC

At break-even, profit is zero. Thus:

$Volume_{be}$ = (Total FC) / (Unit SP - Unit VC)

$Dollar_{be}$ = $Volume_{be}$ * Unit SP

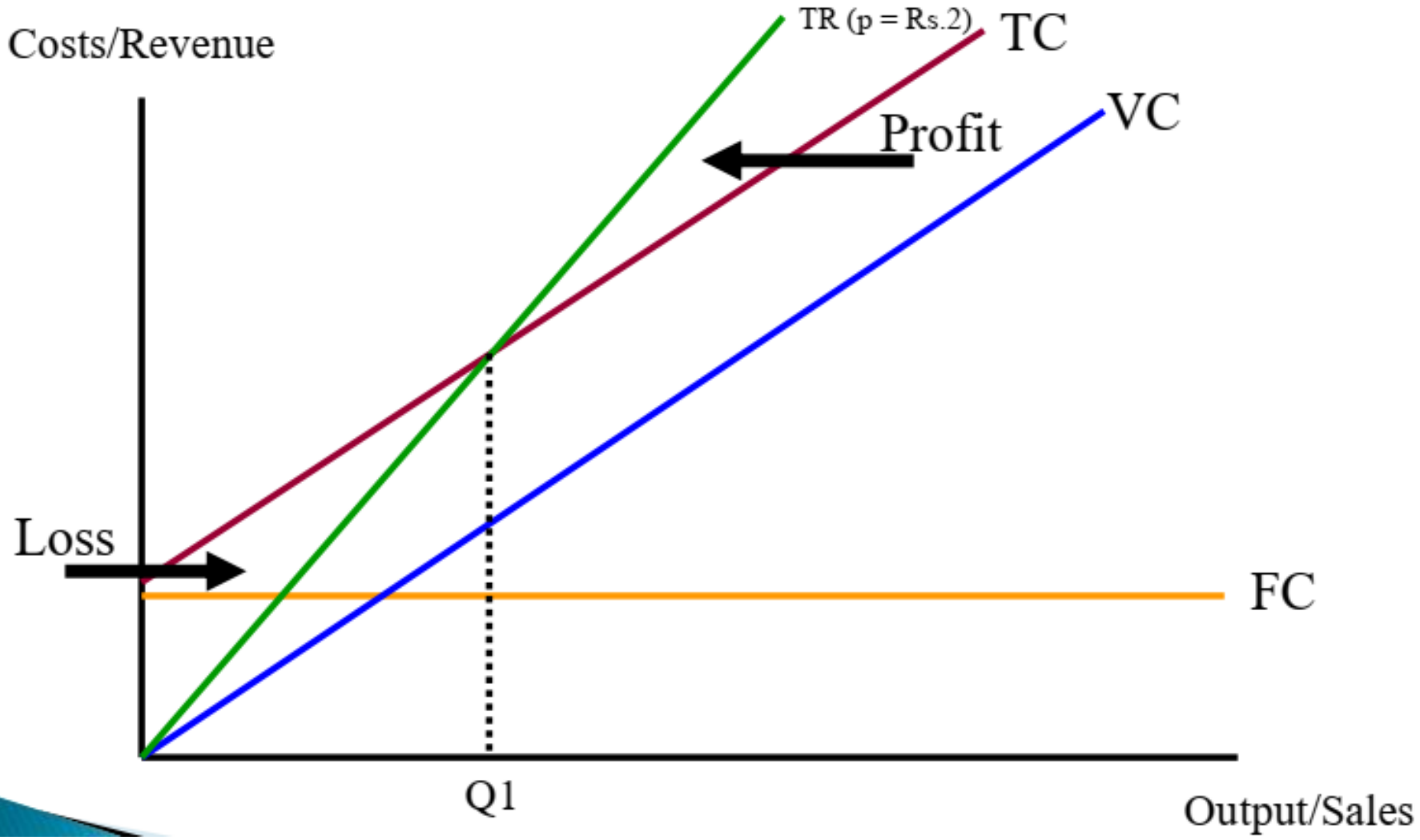
BE Analysis – CM Method

- CM per unit (CM ratio) is the amount that each unit (dollar of sales) contributes toward recovering fixed costs and then toward earning a profit for the period.
- The volume and dollar sales at break-even then are:

  $Volume_{be}$ = (Total FC) / (Unit CM) = \$3,000 / \$ 8

  $Dollar_{be}$ = (Total FC) / (CM ratio) = \$3,000 / .40
- CM formulas can be derived from the equation method.

Break-Even Analysis



Cost-Volume-Profit (CVP) Analysis

Cost-Volume-Profit (CVP) Analysis

- CVP analysis is an analysis of the relationships among activity level, revenue, costs and profit.
- Classification of cost items into fixed and variable is paramount in CVP analysis.
- Contribution margin (CM) concept facilitates CVP analysis.

The CM Concept

- Assume the following budgeted (expected) annual data for ABC, a single-product company.

	Total	Per Unit	Percent
Sales **(500 units)**	$10,000	**20**	100%
-Variable costs	6,000	**12**	60%
Contribution margin	$ 4,000	**8**	40%
-Fixed costs	**3,000**		
Net income	$ 1,000		

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Contribution Margin (CM) is the amount remaining from sales revenue after variable costs have been deducted.

The CM Concept

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CM goes to cover fixed costs.

The CM Concept

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Net income	$ 1,000		

After covering fixed costs, any remaining CM contributes to profit.

Quick Test

Carver Company produces a product which sells for $30. Variable manufacturing costs are $15 per unit. Fixed manufacturing costs are $5 per unit based on the current level of activity, and fixed selling and administrative costs are $4 per unit. A sales commission of 10% of the selling price is paid on each unit sold. The contribution margin (CM) per unit is:

a. $ 3

b. $15

c. $ 8

d. $12

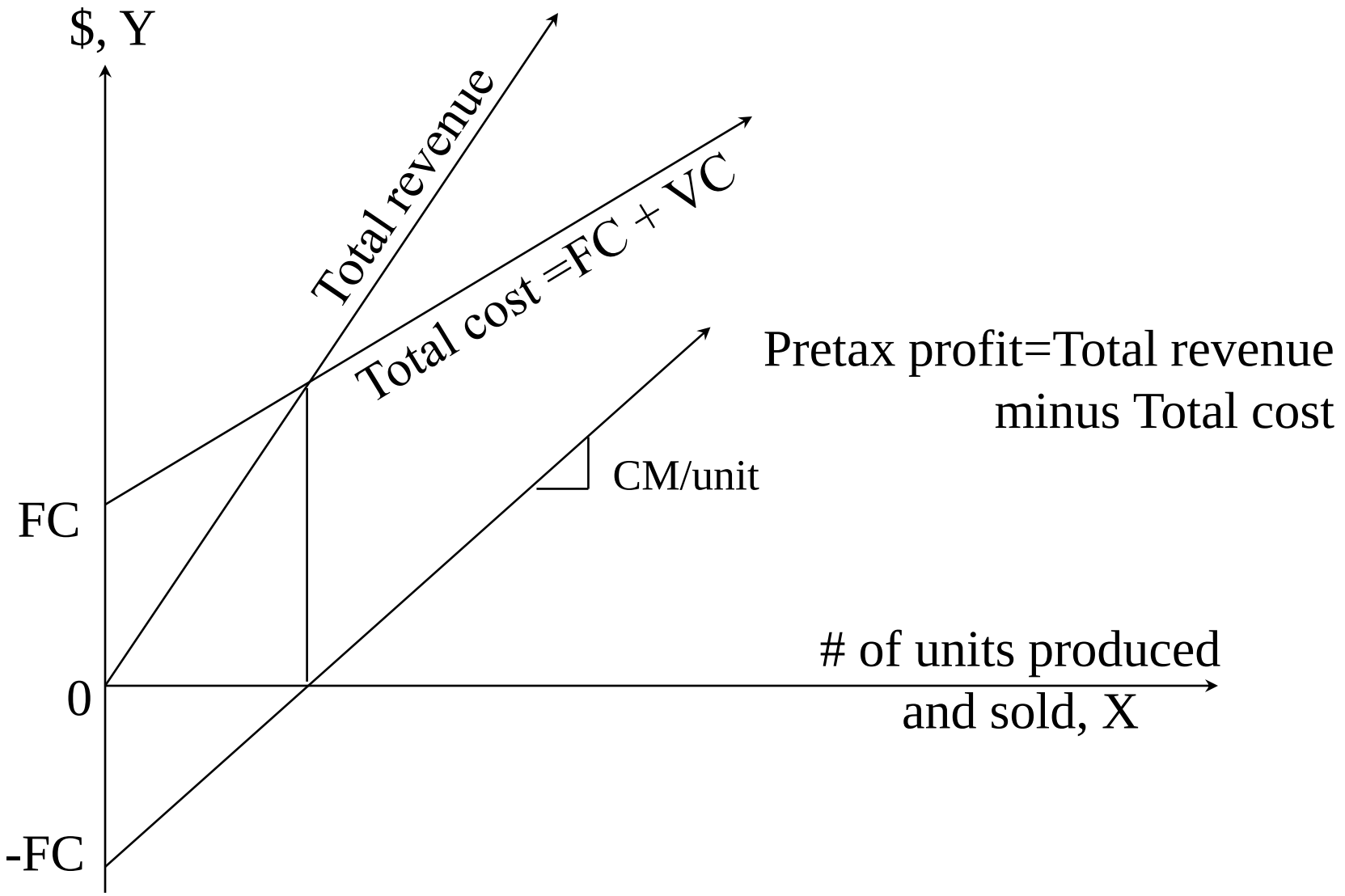
Applications of CVP Analysis

- Break-even analysis (calculation)
- Profit at a given level of sales
- Target sales
- The effect on profit of changes in cost structure
- The effect on profit of changes in selling price
- The effect on profit of changes in costs and selling price
- The effect on profit of changes in sales mix (for a multi-product company)

Profit at a Given Level of Sales

- The same three methods as in BE **analysis** can be used. See next slide for graphic solution.
- Using equation method,
  Profit = Revenue - Total cost
  = (Unit SP) * Volume - (Unit VC) * Volume - Total FC
  = (Unit SP - Unit VC) * Volume - Total FC
- Using CM method,
  Profit = (CM/unit) * Volume - Total FC
  or, (CM ratio) * Revenue - Total FC

Profit Calculation – Graphic Method



Pretax profit=Total revenue
minus Total cost

Target Sales

- The objective here is to determine the level of sales that has to be achieved to make a given amount of profit.
- The same three methods as in BE analysis can be used. Using contribution margin method:

Volume_{ts} = (Fixed cost + Profit) / (Unit CM)

Dollar_{ts} = (Fixed cost + Profit) / (CM ratio)

Assuming ABC desires a profit of $1,000, then

Volume_{ts} = ($3,000 + $1,000) / $8 = 500 units

The Effect of Change in Cost Elements

- For example, NBC produces a surge protector.
- SP = $30; VC = $18; total FC = $15,000; and sales volume = 2,000.
- A proposed automation decreases VC by $3 per unit, but increases FC by $5,000.
- What is the impact on profit?

Increase in CM ($3 * 2,000)	$ 6,000
Increase in FC	(5,000)
Net effect on profit	$ 1,000

The Effect of Change in Selling Price

- For example, XYZ produces a spray paint.
- SP = $20; VC = $8; total FC = $10,000; and sales volume = 1,000.
- Sales people insist that reducing the selling price by $4 per unit increases sales volume by 20%.
- What is the impact on profit?

Proposed CM (8 * 1,200)	$ 9,600
Current CM (12 * 1,000)	12,000
Net effect on profit	$(2,400)

The Effect of Change in Sales Volume and Costs

- For example, XYZ produces a spray paint.
- SP = $20; VC = $8; total FC = $10,000; and sales volume = 1,000.
- An advertising campaign costing $3,000 increases sales volume by 20%.
- What is the impact on income?

Increase in CM (12 * 200)	$ 2,400
Increase in FC	(3,000)
Net change in profit	$ (600)

Assumptions in CVP Analysis

- Linearity of revenues and costs, i.e., efficiency, productivity, and selling price do not change
- Accurate classification of costs into variable and fixed (i.e., only one cost driver, unit)
- Constancy of sales and production mix
- Constancy of the inventory level, i.e., sales = production
- Equality of revenues and expenses with cash flows
- Ignoring time value of money and non-quantitative information

Margin of Safety

- Margin of safety is the excess of budgeted sales over the break-even sales. It is the amount by which sales can drop before losses are incurred.

Margin of safety = Budgeted sales - Break-even sales

Let's calculate the margin of safety for ABC.

Margin of Safety

- ABC has a break-even sales of $7,500; budgeted sales are $10,000. The margin of safety is $2,500.

	Budgeted	BE Sales
Sales	$10,000	$7,500
-Variable costs	6,000	4,500
Contribution margin	$ 4,000	$3,000
-Fixed costs	3,000	3,000
Net income	$ 1,000	$ 0

Margin of Safety

- The margin of safety can be expressed as 25 percent of sales.

($2,500 ÷ $10,000)

	Budgeted	BE Sales
Sales	$10,000	$7,500
-Variable costs	6,000	4,500
Contribution margin	$ 4,000	$3,000
-Fixed costs	3,000	3,000
Net income	$ 1,000	$ 0

Methods of Cost Estimation

- Engineering Method
  - It is based on a study of input-output relationship.
  - The cost of all inputs are added to estimate the cost of the output.
  - This method is used only when input-output relationship remains stable over-time and indirect costs are a small portion of total cost; it is also used when there is no past data to analyze.
- Analysis of Past Data

Analysis of Past Data

- Analysis of Past Data
  - High-low Method
  - Scatter-graph
  - Simple Ordinary Least-Square (OLS) Regression
- Note: all of these methods assume linearity and one independent variable (one cost driver).