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# Mathematics for
# Indian Retail
# Business

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# PREFACE

A retailer is the final business in a distribution channel. It is interface between customers and the rest of the channel. Thus, retailer is a business that sells products and services to customers for their personal, family or non-business use. Retailing includes all the activities involved in selling goods or services directly to the final consumer for personal or non-business use. Retailing is the sale of goods and services to the ultimate consumer for personal, family household use. Thus, retailing involves more than selling tangible products. It includes every sale of goods and services to the final consumer. Thus purchase of a service such as reservation of railway ticket, consultancy of a physician, maintenance services of a plumber, carpenter, hair-cut etc., dry cleaning, stay at hotel, rental of book, home delivery of goods, consultation by lawyer/ doctor are also retail transactions. Consumer is a key issue in the concept of retailing. The person who runs the shop will not be the ultimate or final or 'end of the chain' customers (end user). All retailing do not occur through stores or shops. There are numerous examples of non-store retailing, such of Aquaguard by Eureka Forbes, sale of cosmetics by Avon, catalogue sales by L.L.Bean, etc. Also retailing does not need physical presence of retailer or his representative. For example, automatic vending machines.

Retailing accounts for about 15-20% of the organized workforce in any developed economy. It is the second largest employer in the India after agriculture. There are about 6 million retail establishments in India. Of which, 4.1 million (70%) sell food products and related items. An interesting research in this area has shown that grocery stores (56% of all retail outlets) and general stores (13%) dominate rural India. There are 1.8 million retail outlets in urban India. Of which more than 50% earn between ₹ 7,500 and ₹ 25,000 daily. Approximately 6.6% of urban adults in India are shop owners. There are about 21% outlets in urban area engaged service retailing. Retailing accounts for an impressive part of Gross Domestic Product (GDP).

Cooperative marketing is not new to India. To get the economies of scale, Indian craftsmen and traders made shrenies or groups of similar products and trade during 6th and 7th centuries. This was the basis of caste system. The villages during medieval and British period grew with cooperative trade. Cooperative marketing is just an extension and application of the philosophy of cooperation in the area of agricultural marketing. It is a process of marketing through a cooperative society, formed for the producers, by the producers. It seeks to eliminate the middlemen between the producer and the consumer, thus getting the maximum price for their produce. Kirana shops are traditional retail outlets in India. However with the advent of new cooperative marketing with modern all facility malls, there is general perception that retails consumers are getting skewed towards malls and consequently Kirana stores are experiencing tough competition to retain their customers.

India is witnessing a change in the age and income profiles of its over 1 billion population, which is likely to fuel accelerated consumption in the years to come.

The country is believed to have an average age of 24 years for its population as against 36 years for the USA and 30 years for China. A younger population tends to have higher aspirations and spends more as it enters the earning phase. Besides, the gradual disintegration of the traditional Indian joint family system has led to nuclearisation of families, which in turn has led to enhanced demand. Add to this an increasing population of working women and new job opportunities in emerging service sectors such as IT-enabled services, retail, food services, entertainment and financial services.

Retailer is a marketer who decides about products to be sold, price the consumer may demand and work on sales promotion techniques. While deciding prices, he should know the basic techniques of calculating the mark ups/down, discounts, profits etc.

Retail mathematics is not a new branch of learning and I am not the first person to write on the subject. Theoretical examples are based on the broad range of writings on the subject. Some of the examples will not be novel, as they have been dealt with elsewhere by many authors. However, my point is to put the things in a simple way so that students may understand in easy way. Though a unique way has been adopted while presenting the topics, I shall not deny that authors, whom I have referred, have already contributed a lot to the subject. I am humbly presenting the subject.

Major techniques used in retail have been discussed in the chapters like merchandising for profits, structuring price lines, inventory planning and control, invoicing etc. Students of retail management have been encouraged to calculate by heart. A chapter on regression for small business is an add on.

Abhishek Sachdeva has contributed a lot in designing the chapter plan and adding contents in each chapter which a retail manager should know.

Nothing is perfect in this world and there are always chances to improve. Suggestions are sought from students and teachers. I shall always remain obliged for any improvement suggestions.

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# DETAILED CONTENTS

# CONTENTS

# Merchandising for Profit

## 1.1 LEARNING OBJECTIVES

After reading this chapter you will be able to know:

1. Meaning of profit, profit factor and Profit and Loss statement

2. Concept of fixed costs, variable cost and break-even point

3. Concepts of Gross sales, cost of goods sold, profit margin and customer' returns and allowances

4. How to increase profits?

## 1.2 PROFIT FACTORS

### Introduction - The Meaning of Profit

The starting point in understanding the profit and loss account is to be clear about the meaning of **"profit".**

Profit is the **incentive** for business; without profit people do not work. Profit is the reward for taking risk; generally speaking high risk = high reward (or loss if it goes wrong) and low risk = low reward. People won't take risks without reward. All business is risky (some more than others) so no reward means no business. No business means no jobs, no salaries and no goods and services.

Profit also has an important role in **allocating resources** (land, labour, capital and enterprise). Put simply, falling profits signal that resources should be taken out of that business and put into another one; rising profits signal that resources should be moved into this business. Without these signals we are left to guess as to what is the best use of society's scarce resources.

# 1.3 PROFIT AND LOSS STATEMENTS

The main task of accounts is to monitor and measure profits.

Profit = Revenue less Costs

So monitoring profit also means monitoring and measuring revenue and costs. There are two parts to this:

**(1) Recording financial data**. This is the 'book-keeping' part of accounting.

**(2) Measuring the result.** This is the 'financial' part of accounting. If we say 'profits are high' this begs the question 'high compared to what?' This is what we read during Ratio Analysis.

Profits are 'spent' in three ways.

**(1) Retained** for future investment and growth.

**(2) Returned** to owners in the form of 'dividend' or profit share.

**(3) Paid** as tax.

## 1.3.1 Parts of the Profit and Loss Account

The Profit & Loss Account aims to monitor profit. It has three parts.

**(1) The Trading Account:** This records the money in (revenue) and out (costs) of the business as a result of the business' 'trading' ie buying and selling. This might be buying raw materials and selling finished goods; it might be buying goods wholesale and selling them retail. The figure at the end of this section is the **Gross Profit**.

**(2) The Profit and Loss Account proper:** This starts with the Gross Profit and adds to it any further costs and revenues, including overheads. These further costs and revenues are from any other activities not directly related to trading. An example is income received from investments.

**(3) The Appropriation Account:** This shows how the profit is 'appropriated' or divided between the three uses mentioned above.

## 1.3.2 Uses of the Profit and Loss Account

(1) The main use is to monitor and measure profit, as discussed above. This assumes that the information recording is accurate. Significant problems can arise if the information is inaccurate, either through incompetence or deliberate fraud.

(2) Once the profit (loss) has been accurately calculated, this can then be used for comparison i.e., judging how well the business is doing compared to itself in the past, compared to the managers' plans and compared to other businesses.

(3) There are ways to 'fix' accounts. Internal accounts are rarely 'fixed', because there is little point in the managers fooling themselves (unless fraud is going on) but public accounts are routinely 'fixed' to create a good impression out to the outside world. If you understand accounts, you can usually (not always) spot these 'fixes' and take them out to get a true picture.

## Example Profit and Loss Account

An example profit and loss account is provided below:

|  | ₹'000 | ₹'000 |
|---|---|---|
| Revenue | 12,500 | 10,000 |
| Cost of Sales | 7,500 | 6,000 |
| Gross Profit | **5,000** | **4,000** |
| Gross Profit Margin *(gross profit/revenue)* | 40% | 40% |
| Operating Costs | | |
| Sales and Distribution | 1,260 | 1,010 |
| Finance and Administration | 570 | 555 |
| Other Overheads | 970 | 895 |
| Depreciation | 235 | 210 |
| Total Operating Costs | 3,035 | 2,670 |
| Operating Profit *(gross profit less operating costs)* | 1,965 | 1,330 |
| Operating Profit Margin *(operating profit/revenue)* | 15.7% | 13.3% |
| Interest | (450) | (475) |
| Profit before Tax | 1,515 | 855 |
| Taxation | (455) | (255) |
| Profit after Tax | 1,060 | 600 |
| Dividends | 650 | 400 |
| Retained Profits | 410 | 200 |

The contents analysis of the profit and loss account covers several aspects: horizontal analysis, vertical analysis, calculation of economic and financial indicators.

## 1.3.3  The Horizontal Analysis of the Profit and Loss Account

The horizontal analysis of the profit and loss account has as finality the calculation of variation in time of the components that have influenced the evolution of the financial results, which is the company's revenues and expenditures in total, but also the three types of activities:

operating, financial and extraordinary. The research involves systematization, and the determination of the index variation. The research of the above elements gives the opportunity to characterize the evolution of the results' definitive elements. Calculations show if the revenues dynamics exceeds the expenditures one, which is the dynamic results for the three types of activities that they generate.

## 1.3.4 The Vertical Analysis of the Profit and Loss Account

The vertical analysis is useful because it helps calculating the intermediary sold of administration and the provisional estimation of the operating outcome. Analysis of the company's results based on grouping revenues and expenditures by their nature offers the ability to calculate the intermediate balance administration, which, to some extent, is a variant of the profit and loss account. By reporting each category of expenditure in the turnover (raw materials, materials, labor personnel expenditures and amortization), it is obtained their ratio in the turnover. When there are no major changes in the company's activity, the above calculations represent a relatively easy way to predict the elements of profit and loss account by applying the ratio of the above elements on the estimated turnover.

## 1.4 CONCEPT OF BREAK-EVEN POINT

First we shall have to understand the concept of Break-Even Analysis

Break-even analysis is a technique widely used by production management and management accountants. However, it is widely used by retailers also. It is based on categorising procurement costs between those which are "variable" (costs that change when the quantity of sales changes) and those that are "fixed" (costs not directly related to the volume of sale).

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 (the "break-even point").**

## 1.4.1 The Break-Even Chart

In its simplest form, the break-even chart is a graphical representation of costs at various levels of activity shown on the same chart as the variation of income (or sales, revenue) with the same variation in activity. The point at which neither profit nor loss is made is known as the "break-even point" and is represented on the chart below by the intersection of the two lines:
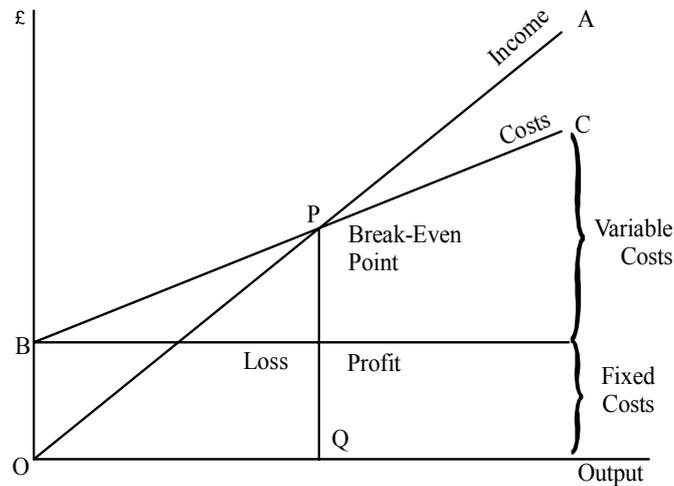
In the diagram above, the line OA represents the variation of income at varying levels of production activity ("output"). OB represents the total fixed costs in the business. As output increases, variable costs are incurred, meaning that total costs (fixed + variable) also increase. At low levels of output, Costs are greater than Income. At the point of intersection, P, costs are exactly equal to income, and hence neither profit nor loss is made.

## 1.4.2 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.

Examples of fixed costs:

– Rent and rates

– Depreciation

– Telephone fixed bills

– Marketing costs (non-revenue related)

– Administration costs

## 1.4.3 Variable Costs

Variable costs are those costs which vary directly with the level of sales. 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.

## 1.4.4 Semi-Variable Costs

Whilst the distinction between fixed and variable costs is a convenient way of categorising 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 **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 businesses 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 lucrative. Break-even analysis can also be used to analyse the potential profitability of an expenditure in a sales-based business.

break even point = 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)

Here we can say contribution is retailer's margin.

For instance, a retailer gets a product from the distributor or wholesale price at a price of ₹ 80 and the sale price is ₹ 100. So the product contribution is ₹ 20. The shopkeeper spends ₹ 10,000 as fixed costs in month. It means shopkeeper will have to sell (10,000/20) = 500 units to break-even. His profit can start if he sells 501 units or more. Now a shopkeeper usually sell many more products in shop, he can allocate the share of Fixed Costs to each product.

## 1.4.5 Margin of Safety

Margin of safety represents the strength of the business. It enables a business man to know that what is the exact amount he/she has gained or loss over or below break even point).

Margin of safety = ((sales – break-even sales)/sales) × 100% If P/V ratio is given then sales/pv ratio

## 1.4.6  Limitations

◆ Break-even analysis is only a supply side (i.e., costs only) analysis, as it tells you nothing about what sales are actually likely to be for the product at these various prices.

◆ It assumes that fixed costs (FC) are constant

◆ It assumes average variable costs are constant per unit of output, at least in the range of likely quantities of sales. (i.e., linearity)

◆ It assumes that the quantity of goods produced is equal to the quantity of goods sold (i.e., there is no change in the quantity of goods held in inventory at the beginning of the period and the quantity of goods held in inventory at the end of the period).

◆ In multi-product companies, it assumes that the relative proportions of each product sold and produced are constant (i.e., the sales mix is constant).

# 1.5 ACTIVITY BASED PRICING

Activity based pricing (ABP) is a pricing method that uses knowledge about customer demand and knowledge about the costs of a specific selling situation to establish a price that will result in a specific planned profit. Market research can estimate the amount of product that will be sold at various prices. Activity based costing allows the company to project costs corresponding to various sales volumes. When this information is combined, the company can project total revenue, expenses, and profit at any point on the customer demand curve. This process is called ABP. Activity based pricing is important because it marries volume sensitive marketing data with volume sensitive cost accounting to provide definitive answers about pricing. Market research data, when used alone, can project the price at which revenue is maximized, but not the price at which profit is maximized. Cost accounting data, when viewed without marketing data, tell how many units the company would have to sell at various prices to earn a profit, but provides no insight into how many units customers will buy. When both customer demand and cost are analyzed together, ABP can provide definitive answers about price. When activity based costing data and customer demand data for many customers are combined, an analysis shows that in real world situations profit is maximized at a price that is always higher than the price that maximizes revenues.

Activity based pricing provides a competitive advantage to companies that use it. This technique does not promise that a company using ABP will have big increases in sales. Many companies could quickly achieve large sales increases by simply lowering price. However, major price reductions are usually a formula for disastrous financial performance. ABP is a strategy for superior financial performance through superior financial knowledge. A company that uses ABP will often be able to win competitively bid contracts for desirable high volume work when competing against companies using more traditional pricing methods.

There are four commandments of ABP. They relate to required knowledge about both revenue and expenses. These commandments are:

1. Know thy product.

2. Know thy processes.

3. Know thy customers.

4. Know thy competitors.

Marketing people have long known how to estimate how many units of a product would be sold at various price points. Unfortunately, for a long time marketing's ability to accurately describe the behaviour of the revenue side of the profit equation surpassed the ability of cost accounting to model the behaviour of costs. Despite these shortcomings, cost accounting personnel still usually gave management a single number that represented cost and was able to convince everyone they knew what they were doing.

In order to perform ABP (Activity based process), a company must be able to take the activity costs that have been derived through its activity-based costing efforts and recombine them based on the resources that a new product is expected to consume.

Many businesses give discounts to their customers based on the volume of product that they purchase. Some companies define their discount based on the number of units of a particular product that are purchased, others provide a discount based on the value of all items purchased in one order, while still others consider the total amount of purchases that the customer buys for the whole year. A customer's buying pattern affects the cost to serve that customer. The way that a discount schedule is structured also may affect the manner in which a customer makes its purchases.

Price influences the volume of product that will be sold. In general, as price increases, sales volume decreases. Sales volume affects product costs; therefore, costs can only be stated accurately for a specific number of units. ABP seeks to identify the appropriate price to charge for a product based on a specific situation.

Costs are often categorized as fixed, variable, and step-variable. Most products have costs that fall into all three categories. Because of fixed costs and step variable costs, unit costs decrease as sales volume increases. Costs may be customer related as well as product related. Accordingly, different prices may be appropriate for different customers or categories of cus-tomers.. In the real world, when selling a product that will be purchased by many customers, the price that maximizes profit is higher than the price that maximizes.

# 1.6 BASIC ELEMENTS OF PROFIT IN RETAIL

The function of the retail store is to sell merchandise to consumers at a profit. These sales are the store's source of operating income. Before merchandise can be sold, however, it must be bought. Even in a computerized organization in which financial personnel may preset programs and spreadsheets, the buyer is ultimately responsible for creating a merchandise assortment. This selection occurs after planning and predicting what, when, where, and how much to buy and what

to pay for these purchases. Cost is the amount the retailer pays for these purchases. Retail is the price at which stores offer merchandise for sale to the consumer.

*Profit and Loss statement* is used to measure profitability as it evaluates the results of current performance and allows for comparison of present and possible future trends. Because the buyer buys and prices the merchandise offered for sale in a retail store, the buyer must have the ability to know, manipulate, and understand the interaction among the three basic profit factors, which are: the operating income, also known as sales or sales volume, which indicates in rupee s how much merchandise has been sold; the cost of goods sold, which shows the amount paid for the goods sold; and the operating expenses, which refers to those expenses, other than the cost of the goods, incurred in the buying/selling process.

Gross sales are the entire amount received for goods sold during a given period. This total sales figure is calculated by multiplying the retail price of the individual items of merchandise by the number of pieces actually sold to consumers. The accurate calculation of gross sales, however, must also take into account adjustments because of returns and price reductions. Stores typically give customers the privilege of returning merchandise. When merchandise is returned to stock and the customer receives a cash refund or a charge credit, these returns of sales are called customer returns. In addition, if a customer receives a price reduction after the sale is completed, it is known as a customer allowance. These two adjustments are referred to collectively as customer returns and allowances. When a customer return or allowance takes place, the previously recorded sale must be cancelled and subtracted from the gross sales amount. When customer returns and allowances are subtracted from gross sales, the resulting total is the net sales figure. Thus, net sales is the sales total after customer returns and allowances have been deducted from gross sales. Net sales represent the amount of goods that actually stay sold. When retailers calculate profit, the net sales figure is the more significant because a firm can only realize a profit on goods that remain sold at the retail price. For this reason, the term sales volume is always a net sales figure.

Merchandisers must determine and balance the retail price for the items they purchase for sale to customers with, among other factors, how much they can afford to pay a vendor for merchandise. Cost of goods sold is simply the cost of the merchandise that has been sold during a given time period. This concept is simple, but the actual calculation is complex because other necessary adjustments must be made to the cost or purchase price that appears on the bill or invoice (vendor's bill). These adjustments are transportation costs, known as inward freight, which is the amount a vendor may charge for transporting merchandise to the designated premises of the retailer; alteration and workroom costs, which is a chaise to a selling department when it is necessary to treat merchandise so that it will be in condition for sale (i.e., assembling, polish-ing, making cuffs, etc.); and cash discounts, which vendors may grant for payment of an invoice within a specified period of time.

In addition, the retailer must maintain a place of business from which die goods are sold, and to maintain this place, it must incur operating expense. Operating expenses usually fall into two major categories and are charged to a merchandise department to determine the net profit

for that department. Expenses that are specific to a given department and that would cease if that department were discontinued are called direct expenses. These include salaries of the buyer, assistant buyer, and salespeople; departmental advertising; selling supplies; and customer delivery expenses. Store expenses that exist whether a department is added to or discontinued are indirect expenses. These include store expenses that are prorated to all selling departments on the basis of their sales volume, such as store maintenance, insurance, and salaries of top management.

# 1.7 ELEMENTS OF EACH BASIC PROFIT FACTOR

Each of the basic profit factors needs to be dissected because each consists of elements that contribute to profit. The calculations involved highlight the meaning and importance of each element.

## 1.7.1 Operating Income (Sales)

### Gross Sales

Gross sales are the total initial rupees received for merchandise sold during a given period.

**CONCEPT:**

Gross sales = Total of all the prices charged to consumers on individual items × Number of units actually sold.

### Solved Example

On Monday, an accessories department sold 30 dolls priced at ₹ 15 each, 25 dolls priced at ₹ 25 each, and 5 dolls priced at ₹ 30 each. What were the gross sales for that day?

**Solution:**

30 dolls @ ₹ 15 each = ₹ 450

5 dolls @ ₹ 30 each = 150

25 dolls @ ₹ 25 each = 625

Gross sales = ₹ 1,225

## 1.7.2 Customer Returns and Allowances

Customer returns and allowances are profit factors because the customer receives either a complete refund of the purchase price or a partial rebate. Thus, the retailer must make a corresponding deduction from the gross sales figure because these transactions result in some cancellation of sales. This rupee figure is usually expressed as a percentage of gross sales.

Customer returns and allowances = Total of all refunds or credits to the customer on individual items of merchandise × Number of units actually returned.

## 1.7.2.1  Solved  Example

On Saturday, the junior petite department refunded ₹ 98 for one velour jacket, ₹ 75 each for two wool skirts, and ₹ 55 each for two velvet tops. Other returns for the week amounted to ₹ 400, and the weekly total of allowances given was ₹ 57. What was the rupee amount of customer returns and allowances?

**Solution:**

Valour Jacket = ₹ 98

Wool skirts = ₹ 150

Velvet Tops = ₹ 110

Customer Returns for Saturday = 358

Total weekly returns = ₹ 400

Total weekly allowance = ₹ 57

Customer returns and allowance for week = ₹ 815

Customer returns and allowance percentage = The  sum of customer returns and allowances expressed as a percentage of gross sales.

Customer returns and allowances % = Customer returns and allowances/Gross sales

## 1.7.2.2  Solved  Example

Last week, the junior petite sportswear department had gross sales of ₹ 20,375. Customer returns and allowances for the week totalled ₹ 815. What was the combined percentage of allowances and merchandise returns for the week?

**Solution:**

Customer returns and allowances % = 815/20,375

Customer returns and allowances % = 4%

Conversely, customer returns and allowances can be computed when the gross sales and customer returns and allowances percentage are known.

Customer returns and allowances = Gross sales × Customer returns and allowances percentage.

## 1.7.2.3 Solved Example

Last week, the junior petite sportswear department reported gross sales of ₹ 20,375, with customer returns and allowances of 4%. What was the rupee amount of customer returns and allowances?

**Solution:**

Rupee customer returns and allowances = ₹ 20,375 gross sales × 4% customer returns and allowances

Rupee customer returns and allowances = ₹ 815

# 1.7.3 Net Sales

Net sales are the sales total for a given period after customer returns and allowances have been deducted from gross sales.

Net sales = Gross sales – Customer returns and allowances.

## 1.7.3.1 Solved Example

A housewares department sold ₹ 65,000 worth of merchandise. Customer returns were ₹ 6,500. What were the net sales of this department?

**Solution:**

Gross sales = Net sales – Customer returns and allowances

= ₹ 65,000 – 6,500 = ₹ 58,500

In retailing, the operating income is known as net sales. The net sales figure, also called sales volume, is used to designate the size of a particular store or a merchandise department. Retailers use net sales to measure a department's performance or productivity. It is common practice to calculate the percentage of sales that an individual department has contributed to the store's net sales. This type of analysis allows a retailer to compare a particular department of one store with other departments or stores within the company, as well as to compare this selected department's sales with industry figures.

The individual department's net sales are expressed as a percentage of the store's total net sales.

Department's net sales % of total store sales = Department's net sales/Store's total net rupee sales

## 1.7.3.2 Solved Example

The costume jewellery department had net sales of ₹ 9,00,000. For the same period, total store sales were ₹ 4,50,00,000. What is the costume jewellery department's net sales percentage of the total store's net sales?

**Solution:**

Department's net sales = ₹ 9,00,000

Total store net sales = ₹ 4,50,00,000

Department's net sales % of total store sales = 2%

Because net sales are determined by the adjustment of customer returns and allowances to gross sales, it is also possible through this relationship to calculate, when desired, a gross sales amount—provided an amount of the net sales and the percentage of customer returns and allowances are known.

Gross sales = Net sales/100% (Gross sales) – Customer returns and allowances%

## 1.7.3.3 Solved Example

The net sales of a Department were ₹ 4,60,000. The customer returns and allowances were 8%. What were the gross sales of the department?

**Solution:**

4,60,000/(100 – 8) = ₹ 5,00,000

## 1.7.4 Cost of Merchandise Sold

The control of the cost of goods sold is crucial to profitability. The buyer, who decides what merchandise to buy, also makes decisions regarding the cost, transportation, and credit terms as they relate to these purchases. In actual practice, to determine the accurate cost of goods sold, there must be a complete calculation to represent the total cost of goods purchased, which begins with an invoice or billed cost to which the following factors are adjusted:

Billed cost is the purchase price that appears on the invoice (i.e., vendor's bill)

PLUS

Inward freight or transportation costs.

This is the amount that a vendor may charge for delivery of merchandise. Inward freight plus billed cost is called the billed delivered cost.

PLUS

Alteration and workroom costs.

It is accepted practice to treat this figure as an additional cost because it applies only to merchandise that has been sold and not to all purchases.

MINUS

Cash discounts.

These are discounts that vendors may grant for payment of an invoice within a specified time. For example, a vendor may offer a 2% cash discount (deducted from the billed cost) if payment is made within a designated time period. The discounts are offered in the form of a percentage and are deducted from only the billed cost, but the rupee discount earned is used in the calculation of the total cost of sales. For example, a 2% cash discount given on a billed cost of ₹ 1,000 translates into a ₹ 20 deduction:

₹ 1,000 billed cost × 2% cash discount

cash discount = ₹ 20

## Concept

Total cost of merchandise = Billed cost + Inward transportation charges − Workroom costs − Cash discount.

## 1.7.4.1 Solved Example

An activewear department, for a six-month period, had billed costs of merchandise amounting to ₹ 80,000; transportation charges of ₹ 2,000; earned cash discounts of 7 1/2%, and workroom costs of ₹ 500. Calculate the total cost of merchandise.

**Solution:**

| | |
|---|---|
| Billed costs | + ₹ 80,000 |
| Inward freight | + ₹ 2,000 |
| Billed delivered cost | ₹ 82,000 |
| + Workroom costs | + ₹ 500 |
| Gross merchandise costs | ₹ 82,500 |
| − Cash discount \ | |
| (7 1/2% × ₹ 80,000) | − 6,000 |
| Total cost of merchandise | ₹ 76,500 |

## 1.7.5 Operating Expenses

Because the expenses of operating a business determine whether or not a net profit is achieved, the control and management of operating expenses are of major concern. For the purpose of analysis, the expenses incurred by the retailer (e.g., maintenance of store space, salaries, etc.) are classified to measure the performance of the designated function or activity. There are various approaches to classifying these items and, although there are many different kinds of expenses, each can be easily identified as just that. However, there is a variation in the format used to record them. Traditionally, operating expenses fall into two major categories and are charged to a merchandise department to determine its net profit. These major categories are direct and indirect expenses.

## 1.7.6 Direct Expenses

Direct expenses exist only within a given department and cease if that department is discontinued. These might include salespeople's and buyers' salaries, buyers' travelling expenses, advertising, selling supplies, delivery to customers, and selling space. For the purpose of expense analysis in retailing, the amount of floor space occupied that generates a given department's sales volume is allotted by the square foot and is charged directly to that department even though there is no cash outlay. Each expense and/or the total direct expenses are expressed as a percentage of net sales. For example, if the net sales of a department are ₹ 1,00,000 and ₹ 3,500 is spent on advertising, the percentage of advertising expenses would be ₹ 3,500 ÷ ₹ 100,000, or 3.5%.

## 1.7.7 Indirect Expenses

Indirect expenses are store expenses that will continue to exist even if the particular department is discontinued. These might include store maintenance, insurance, security, depreciation of equipment, and salaries of senior executives. Many indirect expenses are distributed among individual departments on the basis of its sales volume (e.g., if a department contributes 1.5% to the store's total sales, the indirect expenses charged to this department are 1.5%).

Operating expenses = Direct expenses + Indirect expenses

## 1.7.7.1 Solved Example

A children's department has net sales of ₹ 3,00,000, and indirect expenses are 10% of net sales. Direct expenses are:

- Selling salaries            = ₹ 24,000
- Advertising expenses   = 6,000
- Buying salaries            = 12,000
- Other direct expenses  = 18,000

Find the total operating expenses of the department in rupees and as a percentage.

**Solution:**

Indirect expenses (10% × ₹ 3,00,000) = ₹ 30,000 Direct expenses:

Selling salaries            = 24,000

Advertising                 = 6,000

Buying salaries             = 12,000

Other                       = 18,000

Total operating expenses  = ₹ 90,000

Operating expense %

90,000/3,00,000*100       = 30%

# 1.7.8 Controllable and Non-controllable Expenses

There are additional expenses that further complicate expense assignments. Many, but not all, direct expenses are controllable expenses. For example, the rent for branch store Y is directly related to this store, but is not under the control of the present store manager because this expense was previously negotiated. Utilities are another example of a direct expense to a store, but an indirect expense to a particular department. The rates are not controllable, but the utilization is.

Because retailers do not always agree on the handling of expenses, some firms use the contribution technique to evaluate the performance of a buyer or store manager. Contribution, also known as controllable margin, includes those expenses that are direct, controllable, or a combination of direct and controllable (e.g., selling salaries).

Contribution is the amount the department contributes to indirect expenses and profit as shown below

| | | Rupees | %age | |
|---|---|---|---|---|
| Net Sales | | ₹ 5,00,000 | 100.0% | |
| (minus) Cost of Merch. Sold | | –2,66,000 | –53.2% | |
| | | ₹ 2,34,000 | 46.8% | |
| (minus) Direct Expenses | | | | |
| Payroll | ₹ 73,000 | | | |
| Advertising | 13,000 | | | |
| Supplies | 7,000 | | | |
| Travel | 5,000 | | | |
| Other | 12,000 | | | |
| | | –1,10,000 | –22.0% | ₹ 1,10,000 |
| | | | | ₹ 5,00,000 |
| Contribution | | 1,24,000 | 24.8% | ₹ 1,24,000 |
| | | | | ₹ 5,00,000' |
| (minus) Indirect Expenses | | 1,06,500 | 21.3% | ₹ 1,06,500 |
| | | | | ₹ 5,00,000 |
| Operating Profit | | ₹ 17,500 | 3.5% | |

# 1.8  THE RELATIONSHIPS AMONG THE BASIC PROFIT FACTORS

The following examples show the relationships among the **three fundamental factors** on which the amount of profit depends. For comparison, these factors are expressed in percentages as well as in amount. The net sales figure is the basis for determining profit computation, and so is considered 100%. The other factors involved are shown and stated as a percentage of net sales.

**Example:**

Net sales (operating income) say ₹ 10,000 (100%)

Cost of Merchandise sold say      ₹ 5,500 (55%)

Operating expenses say            ₹ 4,300 (43%)

Profit                            ₹ 200 (2%)

From the break-even analysis, we can say that there are only three ways to increase profit:

- Increase your sales volumes.
- Increase your sales prices.
- Reduce your costs.

Use 7ps techniques to increase sales volume and sales price. Negotiate with manufacturers, wholesalers and distributors for better retail margins.

The factors that govern profits are variable and net profits do not represent any fixed sum. As a frame of reference, Following table lists various types of retail stores and their profit performances. These results illustrate that the amount of profit generated can be different depending on the type of organization and is rarely, if ever, constant. For each store type, the actual figures will change annually, but the information required for analysis will remain constant.

After reviewing a profit and loss statement, however, to determine how each of these factors affects profit, certain measures can be taken to improve profits. However, because these three factors (that is, sales, cost of goods sold, and operating expenses) are always interrelated, the adjustments made must keep all three factors balanced in relationship to one another. Fundamentally, profits can be improved through the following three approaches:

1. Increase sales with only a proportionate increase in the cost of the merchandise and little or no increase in expenses.

2. Decrease the cost of merchandise sold without a decrease in sales (e.g., sell a larger proportion of higher markup merchandise or decrease the net cost of goods sold by lowering shipping charges and/or obtaining greater cash discounts).

3. Reduce expenses.

## Profit Performance by Store Type

| Store Type | Profits | | | Profits to Sales | | |
|---|---|---|---|---|---|---|
| Last Year | This Year | % Change | | Last Year | This Year | |
| Department stores | ₹ 14,70,655 | ₹ 15,80,722 | + 7.5 | 3.3% | 3.5% | |
| Mass merchandisers | 18,96,700 | 20,33,300 | + 7.1 | 2.8 | 2.8 | |
| Specialty stores | 5,55,579 | 5,68,774 | + 2.4 | 4.4 | 5.0 | |
| Discount stores | 3,35,336 | 4,32,774 | + 29.1 | 3.4 | 3.3 | |
| Off-price stores | 24,143 | 32,073 | + 32.9 | 5.4 | 5.2 | |
| Miscellaneous | 4,78,326 | 4,61,537 | − 3.5 | 2.3 | 2.6 | |
| Total | ₹ 47,62,739 | ₹ 51,09,000 | + 7.3 | 3.0% | 3.2% | |

# 1.9.1 Solved Example

The following example shows the application and effect of each approach. For the accounting period under consideration, a merchant estimated sales at ₹ 1,00,000, merchandise purchases at ₹ 70,000, and total operating expenses at ₹ 25,000. If the merchant wants to increase the previous 5% net profit, which approach should he take?

Actual Estimated Performance

| | |
|---|---|
| Sales – Cost of goods sold | = ₹ 1,00,000 – 70,000 |
| Gross margin | = 30,000 = 30% |
| – Operating expenses | – 25,000 = 25% |
| Net profit | = ₹ 5,000 = 5% |

## Method 1:

Increase sales with only a proportionate increase in cost of goods sold and little or no increase in expenses.

Let sales be increased by 10% = 1,10,000

Cost of goods sold 70% = 77,000

Operating Expenses = 25,000

(Increased net profit) = 1,10,000 – 77,000 – 25,000 = 8,000 = 8% (increased by 3%)

## Method 2:

Decrease the cost of goods sold without decreasing sales, which is equivalent to a larger gross margin.

Let sales be = 1,00,000

Cost of goods sold 69.5% = 69,500

Operating Expenses = 25,000 Gross margin = 30,500 – Operating expenses – 25,000

Net profit

= ₹ 5,500 = 5.5% (Increased net profit)

**Method 3:**

Reduce expenses

Decrease the cost of goods sold without decreasing sales, which is equivalent to a larger gross margin.

Let sales be = 1,00,000

Cost of goods sold 70% = 70,000

Operating Expenses = 24,000

Net profit = Gross margin = 30,000 – Operating expenses – 24,000 = ₹ 6,000

6% (Increased net profit by 1%)

# 1.10 PROBLEMS FOR PRACTICE

1. Customer returns and allowances for department came to ₹ 4,500. Gross sales in the department were ₹ 90,000. What percentage of merchandise sold was returned?

2. The gross sales for store B were ₹ 8,76,500. The customer returns and allowances were 10%.

   (a) What was the rupee amount of returns and allowances?

   (b) What were net sales?

3. The net sales of department X were ₹ 46,780. The customer returns were ₹ 2,342. What were gross sales?

4. For this year, department store G's sales volume was ₹ 55,00,00,000. The junior dress department had net sales of ₹ 82,50,000, and the misses dress department had net sales of ₹ 2,47,50,000. What were the net sales percentages of each department to the total store?

5. Branch store H had total sales of ₹ 3,00,00,000. The hosiery departments sales were 1.9% of store H's total sales. The handbag department's sales were 2.1% of the total branch sales. What were the rupee net sales for each department?

6. Discussion Problem: Explain why a merchant should be alarmed if customer returns are excessive. How does a merchant determine what is an excessive percentage of returns? What can be done by the department itself to correct a problem rate of returns?

7. A gift shop has workroom costs of ₹ 575. The billed cost of merchandise sold amounted to ₹ 59,000, with cash discounts earned of ₹ 1,180, and freight charges of ₹ 650. Find the total cost of the merchandise.

8. A specialty dress shop made purchases amounting to ₹ 3,700 at cost, with 8% cash discounts earned, workroom costs of ₹ 100, and no transportation charges. Determine the total cost of the merchandise.

9. A sporting goods buyer placed the following order:

   • 18 nylon backpacks costing ₹ 22 each

   • 12 two-person tents costing ₹ 54 each

   • 6 camp stoves costing ₹ 55 each.

Shipping costs, paid by the store, were ₹ 60 and a cash discount of 1% was taken. Find:

   (a) Billed cost on the total order.

   (b) Total delivered cost of the merchandise.

10. Note the following figures:

    Net profit 2.5%

    Gross margin ₹ 7,000

    Operating expenses 6,600

    (a) The cost of goods in rupees.

    (b) The percentage of operating expenses.

11. The net profit in an appliance of department for the Spring/Summer period was ₹ 20,000, which represented 2% of net sales. Operating expenses totalled ₹ 4,80,000. Find:

    (a) The rupee amount of gross margin.

    (b) The net sales figure.

12. The linen department had net sales of ₹ 80,000. There was a 2% loss, and the gross margin was 46%. Determine the operating expenses of the department and express the result in rupees and as a percentage.

13. During the year, a stationery store achieved the following results:

    | | |
    |---|---|
    | Sales | ₹ 5,85,000 |
    | Purchases, at cost | 5,48,000 |
    | Transportation charges | 5,000 |
    | Inventories at cost: | |
    | Beginning of year | 5,55,000 |
    | End of year | 5,00,000 |

Determine the gross cost of merchandise sold.

14. Find the net profit or loss as a percentage and the gross margin as a amount:

| | |
|---|---|
| Gross sales | ₹ 2,00,000 |
| Customer returns and allowances | 15,000 |
| Opening inventory, at cost | 38,000 |
| Billed cost of goods | 99,000 |
| Inward transportation | 5,000 |
| Cash discount | 6,000 |
| Closing inventory, at cost | 36,000 |
| Payroll | 48,000 |
| Occupancy | 28,000 |
| Wrapping and packing | 1,200 |
| Utilities | 2,000 |
| Delivery | 2,800 |

15. Construct a profit and loss statement using the following departmental figures and show the amounts for net sales, total cost of goods sold, gross margin, expenses, and profit:

| | |
|---|---|
| Gross sales | ₹ 82,000 |
| Customer returns and allowances | 4,000 |
| Inward freight | 2,000 |
| Workroom costs | 1,000 |
| Opening inventory, at cost | 17,000 |
| Closing inventory, at cost | 14,000 |
| Purchases, at cost | 36,000 |
| Cash discounts | 8% |
| Advertising | 5,000 |
| Rent | 12,000 |
| Salaries | 17,000 |
| Miscellaneous expenses | 2,500 |

16. Construct a final profit and loss statement from the figures listed below and calculate the major factors as percentages and rupee amounts.

| | |
|---|---|
| Opening inventory | ₹ 74,200 |
| Gross sales | 2,48,000 |
| Advertising | 15,000 |
| Misc. expenses | 18,000 |
| Purchases, at cost | 1,20,000 |
| Closing inventory | 78,000 |
| Customer returns | 25,800 |
| Salaries | 26,000 |
| Transportation charges | 8,000 |
| Rent | 39,000 |
| Cash discounts | 3% |

17. The following figures are for your department:

| | |
|---|---|
| Net sales | ₹ 4,90,000 |
| Billed cost of goods | 2,65,000 |
| Freight charges | 11,160 |
| Rent | 56,640 |
| Salaries | 1,11,600 |
| Miscellaneous expenses | 25,260 |
| Cash discounts | 37,000 |
| Insurance | 27,800 |
| Advertising | 16,740 |
| Opening inventory (cost) | 1,17,000 |
| Closing inventory (cost) | 1,20,000 |

(a) Calculate the total cost of goods sold.

(b) Determine the operating expenses in rupees.

(c) Determine the profit or loss in rupee s and as a percentage.

18. If profit is ₹ 8,000 and profit percentage is 4%, what is the net sales figure?

19. If expenses are ₹ 85,340 and gross margin is ₹ 90,960, express operating profit or loss in rupees.

20. Find the net profit or loss in rupees and as a percentage if:

    | | |
    |---|---|
    | Opening inventory (cost) | ₹ 70,000 |
    | Operating expenses | 1,80,000 |
    | Closing inventory | 72,000 |
    | Net sales | 4,00,000 |
    | Inward freight | 5,000 |
    | Purchases, at cost | 2,10,000 |

21. Gross sales are ₹ 25,619; customer returns and allowances are ₹ 2,791.32; purchases at billed cost are ₹ 12,585; inward freight is ₹ 932.45; and cash discounts earned average 2%. What is the gross margin in rupees?

22. If a department experiences a loss of 3% during a six-month period and its gross margin is 43%, what must its expense percentage be?

23. Gross margin in the shoe department was ₹ 1,85,000. Operating expenses were ₹ 1,78,000, and the net profit was 2% of net sales. What were the net sales?

23. Express the gross margin as a percentage if:

    | | |
    |---|---|
    | Gross sales | ₹ 2,83,000 |
    | Customer returns | 7,000 |
    | Billed cost of goods | 1,37,000 |
    | Inward freight | 5,000 |
    | Workroom charges | 3,000 |
    | Cash discounts | 6% |

24. Find the gross margin percentage when:

    | | |
    |---|---|
    | Gross sales | ₹ 5,66,000 |
    | Customer returns | 10% |
    | Billed cost of goods | 2,58,000 |
    | Inward freight | 9,000 |
    | Workroom charges | 2,200 |
    | Cash discounts | 6% |

25. Set up a profit and loss statement, showing rupee amounts only, using the following figures:

    | | |
    |---|---|
    | Gross sales | ₹ 1,27,000 |
    | Closing inventory, at cost | 29,000 |

| | |
|---|---|
| Opening inventory, at cost | 33,000 |
| Miscellaneous expenses | 5,000 |
| Customer returns | 6,000 |
| Purchases, at cost | 60,000 |
| Rent and utilities | 23,000 |
| Payroll | 30,000 |
| Transportation charges | 1,700 |
| Cash discounts | 896 |
| Advertising | 6,000 |

# 1.11 ACTIVITY

1. The housewares department in a specialty store had net sales of ₹ 15,00,000. The direct expenses during the period under consideration were:

| | |
|---|---|
| Buying salaries | ₹ 1,25,000 |
| Selling salaries | 2,75,000 |
| Advertising | 90,000 |
| Receiving & marking | 15,000 |
| Wrapping & packing | 10,000 |

The gross margin achieved during this time was 34.0%. After reviewing this performance, management decided that expenses must be reduced. The manager was given the choice of either reducing the advertising budget to a maximum of ₹ 50,000 or eliminating a salesperson which would reduce selling salaries by ₹ 50,000.

Which plan of action would you choose? Why? Explore the two options mathematically, and then state your choice. Justify your decision. Discuss the impact your strategy will have on net profit.

2. Go to mall near to you, visit each and every department. See the plan how goods have been displayed. Draw construction plan for each department. Do you find any discrepancy in sales promotion? How these discrepancies can affect profit-write a note and discuss with your friends.

3. Discuss the concept of customer returns and allowances with a retail shop owner, why are required.

4. Interview a FMCG distributor in your area, attempt to find out the distributor margin for 20 products.

5. Go to retail shop and watch for one day how salesmen attend the customers, write a report.

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