



Let's learn.

Substitution method of solving simultaneous equations

There is one more method to eliminate a variable. We can express one variable in terms of other from one of the equations. Then substituting it in the other equation we can eliminate the variable. Let us discuss this method from following examples.

Ex (1) Solve $8x + 3y = 11$; $3x - y = 2$

Solution : $8x + 3y = 11$(I)

$3x - y = 2$(II)

In Equation (II), it is easy to express y in terms of x .

$$3x - y = 2$$

$$3x - 2 = y$$

Substituting $y = 3x - 2$ in equation (I).

$$8x + 3y = 11$$

$$\therefore 8x + 3(3x-2) = 11$$

$$\therefore 8x + 9x - 6 = 11$$

$$\therefore 17x - 6 = 11$$

$$\therefore 17x = 11 + 6 = 17$$

$$\therefore x = 1$$

Now, substituting this value of x in the equation $y = 3x - 2$.

$$y = 3 \times 1 - 2$$

$$\therefore y = 1$$

$\therefore (1, 1)$ is the solution of the given equations

Ex (2) Solve. $3x - 4y = 16$; $2x - 3y = 10$

Solution : $3x - 4y = 16$(I)

$2x - 3y = 10$(II)

Writing x in terms of y from equation (I).

$$3x - 4y = 16$$

$$3x = 16 + 4y$$

$$x = \frac{16 + 4y}{3}$$

Substituting this value of x in equation (II)

$$2x - 3y = 10$$

$$2\left(\frac{16 + 4y}{3}\right) - 3y = 10$$

$$\frac{32 + 8y}{3} - 3y = 10$$

$$\frac{32 + 8y - 9y}{3} = 10$$

$$32 + 8y - 9y = 30$$

$$32 - y = 30 \quad \therefore y = 2$$

Now, substituting $y = 2$ in equation (I)

$$3x - 4y = 16$$

$$\therefore 3x - 4 \times 2 = 16$$

$$\therefore 3x - 8 = 16$$

$$\therefore 3x = 16 + 8$$

$$\therefore 3x = 24$$

$$\therefore x = 8$$

$$\therefore x = 8 \text{ and } y = 2$$

$\therefore (8, 2)$ is the solution of the given equations.

Practice set 5.1

- (1) By using variables x and y form any five linear equations in two variables.
- (2) Write five solutions of the equation $x + y = 7$.
- (3) Solve the following sets of simultaneous equations.

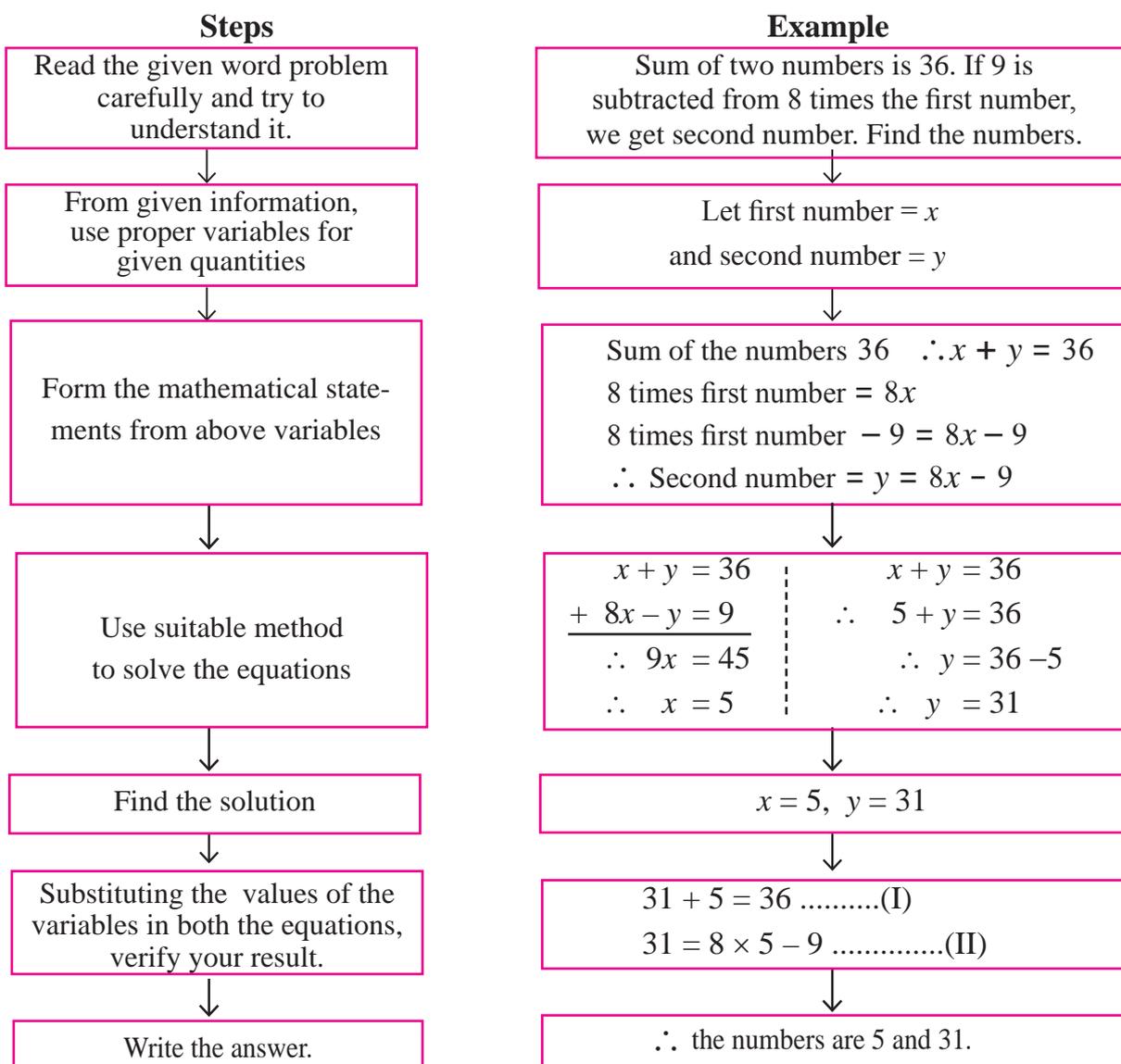
(i) $x + y = 4$; $2x - 5y = 1$	(ii) $2x + y = 5$; $3x - y = 5$
(iii) $3x - 5y = 16$; $x - 3y = 8$	(iv) $2y - x = 0$; $10x + 15y = 105$
(v) $2x + 3y + 4 = 0$; $x - 5y = 11$	(vi) $2x - 7y = 7$; $3x + y = 22$



Let's learn.

Word problems based on simultaneous equations

While solving word problems, converting the given information into mathematical form is an important step in this process. In the following flow-chart, the procedure for finding solutions of word problems is given.



Word Problems

Now we will see various types of word problems.

- (1) Problems regarding age.
- (2) Problems regarding numbers.
- (3) Problems based on fractions.
- (4) Problems based on money transactions.
- (5) Problems based on geometrical properties
- (6) Problems based on speed, distance, time.

Ex (1) Sum of two numbers is 103. If greater number is divided by smaller number then the quotient is 2 and the remainder is 19. Then find the numbers.

Solution : Step 1 : To understand the given problem.

Step 2 : Use proper variables for given quantities. Also note the rule
dividend = divisor \times quotient + remainder.

Let the greater number be x and the smaller number be y

Step 3 : Given information : Sum of the numbers = 103

$x + y = 103$ is the first equation.

By dividing greater number by smaller numbers quotient is 2
and remainder is 19.

$x = 2 \times y + 19$...(dividend = divisor \times quotient + remainder)

$x - 2y = 19$ is the second equation.

Step 4 : Let us find the solution of the equations.

$$x + y = 103 \quad \text{.....(I)}$$

$$x - 2y = 19 \quad \text{.....(II)}$$

Subtracting eqn. (II) from eqn. (I)

$$\begin{array}{r} x + y = 103 \\ x - 2y = 19 \\ \hline - \quad + \quad - \\ \hline 0 + 3y = 84 \\ \therefore y = 28 \end{array}$$

Step 5 : Substituting value of y in equation $x + y = 103$.

$$\therefore x + 28 = 103$$

$$\therefore x = 103 - 28$$

$$\therefore x = 75$$

Step 6 : Given numbers are 75 and 28.

Ex (2) Salil's age is 23 years more than half of the Sangram's age. Five years ago, the sum of their ages was 55 years. Find their present ages.

Solution : Let Salil's present age be x and Sangram's present age be y .

Salil's age is 23 years more than half of the Sangram's age $\therefore x = \frac{y}{2} + \square$

Five years ago Salil's age = $x - 5$. Five years ago Sangram's age = $y - 5$

The sum of their ages five years ago = 55

$$\square + \square = 55$$

Finding the solution by solving equations

$$2x = y + 46 \qquad 2x - y = 46 \dots\dots\dots(I)$$

$$(x - 5) + (y - 5) = 55$$

$$x + y = 65 \qquad \dots\dots\dots(II)$$

Adding equation (I) and (II)

$$\begin{array}{r} 2x - y = 46 \\ + \quad x + y = 65 \\ \hline \end{array}$$

$$\therefore 3x = 111$$

$$\therefore x = 37$$

Substituting $x = 37$ in equation (II)

$$x + y = 65$$

$$\therefore 37 + y = 65$$

$$\therefore y = 65 - 37$$

$$\therefore y = 28$$

Salil's present age is 37 years and Sangram's present age is 28 years.

Ex (3) A two digit number is 4 times the sum of its digits. If we interchange the digits, the number obtained is 9 less than 4 times the original number. Then find the number.

Solution : Let the units place digit in original number be x , and tens place be y .

	Digit in tens place	Digit in units place	Number	Sum of the digits
For original number	y	x	$10y + x$	$y + x$
Number obtained by interchanging the digits	x	y	$10x + y$	$x + y$

From first condition, $10y + x = 4(y + x)$

$$\therefore 10y + x = 4y + 4x$$

$$\therefore x - 4x + 10y - 4y = 0$$

$$\therefore -3x + 6y = 0 \quad \therefore -3x = -6y \qquad \therefore x = 2y \quad \dots\dots(I)$$

$$\begin{aligned}
\text{From second condition, } 10x + y &= 2(10y+x)-9 \\
10x+y &= 20y + 2x-9 \\
10x-2x+y-20y &= -9 \\
8x - 19y &= -9 && \text{.....(II)} \\
x &= 2y && \text{.....(I)}
\end{aligned}$$

Substituting $x = 2y$ in equation (II).

$$\begin{aligned}
16y - 19y &= -9 && \text{.....(I)} \\
\therefore -3y &= -9 \\
\therefore y &= 3
\end{aligned}$$

Substituting $y = 3$ in equation (I).

$$\begin{aligned}
x - 2y &= 0 \\
x - 2 \times 3 &= 0 && \therefore x - 6 = 0 && \therefore x = 6
\end{aligned}$$

$$\begin{aligned}
\text{Original two digit number : } 10y + x &= 10 \times 3 + 6 \\
&= 36
\end{aligned}$$

Ex (4) The population of a certain town was 50,000. In a year, male population was increased by 5% and female population was increased by 3%. Now the population became 52020. Then what was the number of males and females in the previous year?

Solution : Let the number of males in previous year be x , number of females be y .

$$\text{By first condition } \square + \square = 50000 \text{(I)}$$

$$\text{Male population increased by 5\% } \therefore \text{ number of males} = \frac{\square}{\square} x$$

$$\text{Female population increased by 3\% } \therefore \text{ number of females} = \frac{\square}{\square} y.$$

$$\text{From second condition } \frac{\square}{\square} x + \frac{\square}{\square} y = 52020$$

$$\square x + \square y = 5202000 \text{(II)}$$

Multiplying equation (I) by 103

$$\square x + \square y = 5150000 \text{(III)}$$

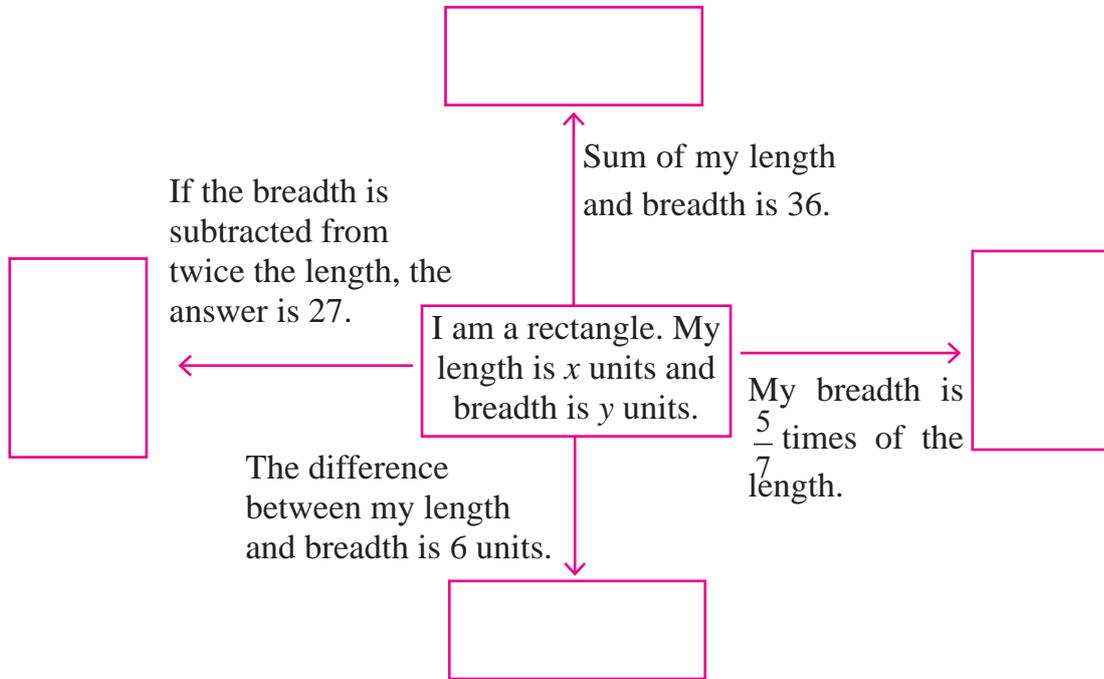
Subtracting equation (III) from equation (II) .

$$2x = 5202000 - 5150000$$

$$2x = 52000$$

$$\therefore \text{ number of males} = x = \square \quad \therefore \text{ number of females} = y = \square$$

Activity I : There are instructions written near the arrows in the following diagram. From this information form suitable equations and write in the boxes indicated by arrows. Select any two equations from these boxes and find their solutions. Also verify the solutions. By taking one pair of equations at a time, how many pairs can be formed ? Discuss the solutions for these pairs.



Practice set 5.2

- (1) In an envelope there are some 5 rupee notes and some 10 rupee notes. Total amount of these notes together is 350 rupees. Number of 5 rupee notes are less by 10 than number of 10 rupee notes. Then find the number of 5 rupee and 10 rupee notes.
- (2) The denominator of a fraction is 1 less than twice its numerator. If 1 is added to numerator and denominator respectively, the ratio of numerator to denominator is 3 : 5. Find the fraction.
- (3) The sum of ages of Priyanka and Deepika is 34 years. Priyanka is elder to Deepika by 6 years. Then find their today's ages.
- (4) The total number of lions and peacocks in a certain zoo is 50. The total number of their legs is 140. Then find the number of lions and peacocks in the zoo.
- (5) Sanjay gets fixed monthly income. Every year there is a certain increment in his salary. After 4 years, his monthly salary was Rs. 4500 and after 10 years his monthly salary became 5400 rupees, then find his original salary and yearly increment.
- (6) The price of 3 chairs and 2 tables is 4500 rupees and price of 5 chairs and 3 tables is 7000 rupees, then find the total price of 2 chairs and 2 tables.

- (5*) A two digit number is 3 more than 4 times the sum of its digits. If 18 is added to this number, the sum is equal to the number obtained by interchanging the digits. Find the number.
- (6) The total cost of 8 books and 5 pens is 420 rupees and the total cost of 5 books and 8 pens is 321 rupees. Find the cost of 1 book and 2 pens.
- (7*) The ratio of incomes of two persons is 9 : 7. The ratio of their expenses is 4 : 3. Every person saves rupees 200, find the income of each.
- (8*) If the length of a rectangle is reduced by 5 units and its breadth is increased by 3 units, then the area of the rectangle is reduced by 8 square units. If length is reduced by 3 units and breadth is increased by 2 units, then the area of rectangle will increase by 67 square units. Then find the length and breadth of the rectangle.
- (9*) The distance between two places A and B on road is 70 kilometers. A car starts from A and the other from B. If they travel in the same direction, they will meet after 7 hours. If they travel towards each other they will meet after 1 hour, then find their speeds.
- (10*) The sum of a two digit number and the number obtained by interchanging its digits is 99. Find the number.

Activity : Find the fraction.

$$\frac{\text{Numerator } x}{\text{Denominator } y}$$

If numerator is multiplied by 3 and 3 is subtracted from the denominator then the fraction obtained is $\frac{18}{11}$.

Equation I

$$11x - 6y + 18 = 0$$

If numerator is increased by 8 and denominator is doubled then the resulting fraction is $\frac{1}{2}$.

Equation II

$$x - y + 8 = 0$$

$$\therefore \text{ Given fraction} = \frac{\square}{\square}$$

Verify the answer obtained.



6

Financial Planning



Let's study.

- Introduction to financial planning
- Tax structure
- Savings and Investments
- Computation of Income -tax



Let's discuss.

Anagha : Shall we buy computer ?
 Mother : Ok, let's buy it next year.
 Anagha : Mamma, why not now ?
 Mother : Anagha, you don't know how expensive it is !
 Anagha : You mean we will have to save up for it, right ?
 Mother : Yes, thats the thing.



We often hear such conversations.

Everyone requires money to meet a variety of needs. That is why after spending on the necessities of the present, everyone tries to save money to make provisions for the future needs. That is what we call 'Saving' money. In order to protect our savings or even to make them grow, we keep them as fixed deposits or buy immovable properties such as a house, land etc. That is what we call 'investment'.

Every investor, first spends the amount required to meet primary necessities and saves the remaining amount. One also uses these savings to make a carefully considered investments. This is called **financial planning**. The main purpose of financial planning is protection and growth of the wealth.

Financial planning is useful for making provisions for the predictable and unpredictable expenses that each of us has to meet in our life.

Predictable expenses	Unpredictable expenses
(1) Education of children and other expenses for them	(1) Natural disasters
(2) Capital for a profession or business	(2) Medical expenses for a family member.
(3) Buying a vehicle	(3) Loss due to an accident
(4) Buying or building a house.	(4) Sudden death
(5) Old age requirements.	

The above considerations make it quite clear why financial planning is a must. However some important points must be kept in mind as we plan our finances.



Let's learn.

Savings

(1) It is for our own benefit to keep our savings safe and to make them grow. Our savings remain safe in a bank or in a post office. Money saved in a bank is also useful for cashminus transactions. This way, we do not have to carry large amounts of cash or worry about losing it or getting it stolen.

(2) If the money we get or earn is in the form of cash and we keep it as it is, without investing it, its value diminishes with time. For example, if today your can buy two pencils for ten rupees, a few years hence, you may be able to buy only one for that amount.

(3) If the amount invested is used for expanding a business, to start an industry or other such purposes, it contributes to the growth of the national production.

(4) If some part of the income is spent for a socially useful cause everyone benefits from it in the long run.

(5) After spending on necessities it is beneficial to limit spending on luxuries and to save, instead for education, medical treatment etc.



Let's discuss.



Observe the above picture, which shows some modes of investment. Discuss them. Find out other modes of investment and write them in the blank spaces in the picture.



Let's learn.

Investments

Investments are of many types. Investors often favour institutions like banks and postal departments for investing their money because it is safe there. There is a certain risk in investing money in shares, mutual funds, etc. That is because this money is invested in a business or industry and if that incurs a loss, the investor suffers the loss too. On the other hand, if it makes a profit the money is safe and there is the opportunity to get a dividend too.

An investor must take two important points into account when making an investment namely the risk and the gain. It is possible to make big gains by taking greater risk. However it must be kept in mind that the greater risk can also lead to greater loss.

Study the following examples based on income and investment.

Ex(1) Shamrao's income in 2015-16 after paying all taxes is Rs. 6,40,000 . He pays Rs. 2000 per month for insurance and 20% of his annual income into his provident fund. He puts aside Rs. 500 per month for emergencies. How much money does he have for yearly spending ?

Solution : (i) Annual income = 6,40,000 rupees

(ii) Insurance premium = $2000 \times 12 = 24,000$ rupees

(iii) Contribution to provident fund = $6,40,000 \times \frac{20}{100} = 1,28,000$ rupees

(iv) Amount put aside for emergency = $500 \times 12 = 6000$ rupees

\therefore Total planned expenditure = $24,000 + 1,28,000 + 6,000 = 1,58,000$ rupees

\therefore Amount available for yearly expenses = $6,40,000 - 1,58,000 = 4,82,000$ rupees

Ex(2) Mr. Shah invested Rs. 3,20,000 in a bank at 10% compound interest . He also invested Rs. 2,40,000 in mutual funds. At market rates he got Rs. 3,05,000 after 2 years. How much did he gain ? Which of his investments was more profitable ?

Solution : (i) We shall first calculate the compound interest on the money invested in the bank.

Compound interest = Amount - Principal

That is, $I = A - P$

$$= P \left(1 + \frac{r}{100} \right)^n - P$$

$$= P \left[\left(1 + \frac{r}{100} \right)^n - 1 \right]$$

$$= 3,20,000 \left[\left(1 + \frac{10}{100} \right)^2 - 1 \right]$$

$$\begin{aligned}
&= 3,20,000 \left[(1.1)^2 - 1 \right] \\
&= 3,20,000 [1.21 - 1] \\
&= 3,20,000 \times 0.21 \\
&= 67,200 \text{ rupees}
\end{aligned}$$

Mr. Shah invested Rs. 3,20,000 in the bank and got Rs. 67,200 as interest.

Let us see percentage of interest obtained on the investment.

$$\text{Percentage of interest} = \frac{100 \times 67200}{3,20,000} = 21$$

∴ The investment in the bank gave a profit of 21%.

(ii) The amount Mr. Shah got at the end of 2 years from the mutual fund = 3,05,000 rupees

∴ The gain from the mutual fund = 3,05,000 – 2,40,000 = 65,000 rupees

$$\therefore \text{Percentage gain} = \frac{65000 \times 100}{2,40,000} = 27.08$$

The investment in the mutual fund yielded a profit of 27.08% .

It is clear that Mr. Shah's investment in the mutual fund was more profitable.

Ex(3) Mr. Shaikh invested Rs. 4,00,000 in a glass industry. After 2 years he received Rs. 5,20,000 from the industry. Putting aside the original investment, he invested his gains in a fixed deposit and in shares in the ratio 3 : 2. How much amount did he invested originally in each of the schemes ?

Solution : Mr. Shaikh's profit at the end of 2 years = 5,20,000 – 4,00,000 = 1,20,000 rupees

$$\begin{aligned}
\text{Amount invested in the fixed deposit} &= \frac{3}{5} \times 1,20,000 \\
&= 3 \times 24,000 \\
&= 72,000 \text{ rupees}
\end{aligned}$$

$$\begin{aligned}
\text{Amount invested in shares} &= \frac{2}{5} \times 1,20,000 \\
&= 2 \times 24,000 \\
&= 48,000 \text{ rupees}
\end{aligned}$$

Mr. Shaikh invested 72000 rupees in the fixed deposit and 48,000 rupees in shares.

Ex(4) The ratio of Mr. Anil's monthly income to expenditure is 5 : 4,. For Mr. Aman the same figure is 3 : 2. Also, 4% of Aman's monthly income is equal to 7% of Anil's monthly income. If Anil's monthly expenditure is 96,000 rupees-

(i) Find Aman's annual income. (ii) Savings made by Mr. Anil and Mr. Aman.

Solution: We know that savings = Income – Expenditure

Anil's income to expenditure 5 : 4

Aman's income to expenditure 3 : 2

Suppose Anil's income is $5x$.

Suppose Aman's income is $3y$.

Anil's expenditure is $4x$

Aman's expenditure is $2y$

Anil's monthly income is 9600 rupees,

$$\therefore 5x = 9600$$

$$x = 1920$$

Monthly expenditure = $4x = 4 \times 1920 = 7680$ rupees.

Anil's monthly expenditure is 7680 rupees. \therefore Anil's saving is 1920 rupees.

4% of Aman's income = 7% of Anil's income

$$\therefore \frac{4}{100} \times 3y = 9600 \times \frac{7}{100}$$

$$\therefore 12y = 9600 \times 7$$

$$\therefore y = \frac{9600 \times 7}{12} = 5600$$

Aman's income = $3y = 3 \times 5600 = 16,800$ rupees

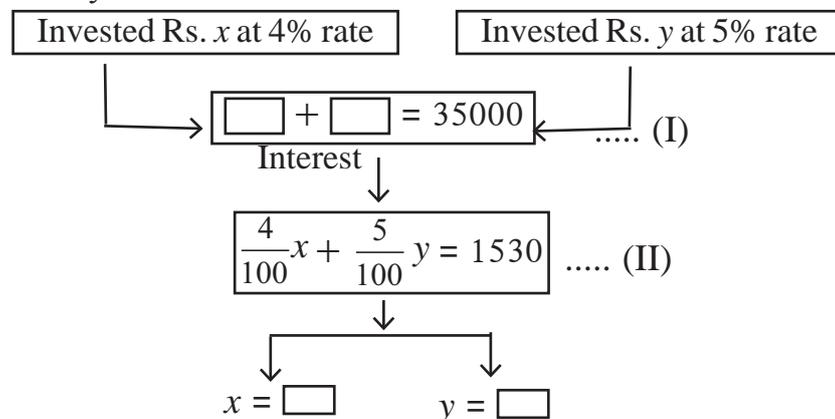
Aman's expenditure = $2y = 2 \times 5600 = 11,200$ rupees

\therefore Aman's savings = $16,800 - 11,200 = 5,600$ rupees

Aman's monthly income is Rs. 16,800 and Aman's saving is Rs. 5,600

Anil's monthly saving is 1,920 rupees.

Activity I : Amita invested some part of 35000 rupees at 4% and the rest at 5% interest for one year. Altogether her gain was Rs. 1530. Find out the amounts she had invested at the two different rates. Write your answer in words.



Activity: (1) With your parent's help write down the income and expenditure of your family for one week. Make 7 columns for the seven days of the week. Write all expenditure under such heads as provisions, education, medical expenses, travel, clothes and miscellaneous. On the credit side write the amount received for daily expenses, previous balance and any other new income.

(2) In the holidays, write the accounts for the whole month.

Activity II : Study the Income Expenditure of Govind on page no.52 Discuss the methods a farmer may use who does dry land farming to enhance his income. Some students have expressed their opinions.

Sohil : Farmers get money only when they sell their produces. This profit must be sufficient to sustain for the whole year. So, financial planning is very important for him.

Prakash : His income will increase if agricultural products gets a reasonable price.

Nargis : A law of economics states that if the supply of a commodity far exceeds its demand then its price falls. Naturally profits will also be reduced.

Rita : If the farm production is in excess and if there is a fear of fall in prices, it can be stocked and sent to the market only when prices recover again.

Azam : For that, we need good warehouses.

Reshma : Credit should be easily available to farmers at low rates of interest.

Vatsala : Other farm based businesses like dairy and poultry can provide additional income. Besides, dung and urine obtained from farm animals, can also provide good quality manure.

Kunal : If then start agro-processing units and make preserves like squashes, jams, pickles, pulps or dried vegetables they could sell these packed products all the year round. They could even start producing more of those tins which can be exported.

Practice set 6.1

1. Alka spends 90% of the money that she receives every month, and saves Rs. 120. How much money does she get monthly ?
2. Sumit borrowed a capital of Rs. 50,000 to start his food products business. In the first year he suffered a loss of 20%. He invested the remaining capital in a new sweets business and made a profit of 5%. How much was his profit or loss computed on his original capital ?
3. Nikhil spent 5% of his monthly income on his children's education, invested 14% in shares, deposited 3% in a bank and used 40% for his daily expenses. He was left with a balance of Rs. 19,000. What was his income that month ?
4. Mr. Sayyad kept Rs. 40,000 in a bank at 8% compound interest for 2 years. Mr. Fernandes invested Rs. 1,20,000 in a mutual fund for 2 years. After 2 years, Mr. Fernandes got Rs. 1,92,000. Whose investment turned out to be more profitable ?
5. Sameera spent 90% of her income and donated 3% for socially useful causes. If she left with Rs. 1750 at the end of the month, what was her actual income ?



What is a tax ? Which are different types of taxes ? Find out more information on following websites.


ICT Tools or Links
www.incometaxindia.gov.in,
 www.mahavat.gov.in,
 www.gst.gov.in


Let's learn.

Levying of taxes or Taxation

The government makes many plans for the development of the country. It requires large amounts of money for implementing these schemes. By charging different types of taxes the funds are generated for implementation of these schemes.

Utility of taxes

- Provision of infrastructure / basic amenities.
- Implementing various welfare schemes.
- Implementing schemes of development and research in various fields.
- Maintaining law and order.
- Giving aid to people affected by natural disasters.
- Defence of the country and its citizens etc.

Types of taxes

Direct taxes	Indirect taxes
Taxes which are paid directly by the taxpayer are called direct taxes. Examples : Income tax, wealth tax, professional tax, etc.	Taxes which are not paid directly by the taxpayer are called indirect taxes Examples : Central sales tax, value added tax, service tax, excise duty, customs duty, etc.

The types of taxes listed above are in accordance with the existing tax structure.

Project : Obtain more information about different types of taxes from employees and professionals who pay taxes.



Let's learn.

Income tax

If the income earned in India by an individual, institute or authorised industry exceeds the limit specified under the Income Tax Act, income tax is levied on it. In this chapter, we shall consider only those taxes which are to be paid by individuals. Income tax is levied by the central Government in India, income tax is levied under following two acts.

- (1) Income Tax Act 1961 which came into force on. 01.04.1962.
- (2) The act passed every year by parliament which makes financial provisions.

Every year sometime in February the finance Minister presents the budget for the next financial year. It has proposals for the income tax rates. Once parliament passes the budget the proposed rates become applicable in the following year.

Income tax rates are fixed every year in the budget.

Some Income tax related terms :

- **An assessee** : Any person liable to pay income tax according to the Income Tax Rules is termed an assessee.
- **Financial year** : The period of one year during which the taxable income has been earned is called a financial year. In our country, at present, the financial year is from 1st April to 31st March.
- **Assessment year** : The financial year immediately following a particular financial year is called the assessment year. The tax payable for the previous financial year is calculated during the current year. i.e. the assessment year.

Financial year and Assessment year will be clear from the table below.

Financial Year	Assessment Year
2016-17 : 01-04-2016 to 31-03-2017	2017-18
2017-18 : 01-04-2017 to 31-03-2018	2018-19

- **Permanent Account Number (PAN)** : On applying for it, every tax-payer gets a unique ten digit alphanumeric number from the Income Tax Department. (PAN). We are required to mention this number in many important documents and financial transactions.

Use of the PAN : It is binding to write our PAN on the challan used for paying our income tax to the IT Department or our Income Tax Returns and other official correspondence. PAN card can also be used as a proof of identity.





Let's learn.

Computation of income tax

As income tax is a tax levied on income, it is necessary to know about the different sources of income.

There are five main heads of income.

- | | |
|--|--------------------------------|
| (1) Income from salary | (2) Income from house/property |
| (3) Income from business or profession | (4) Income from Capital gain |
| (5) Income from other sources | |

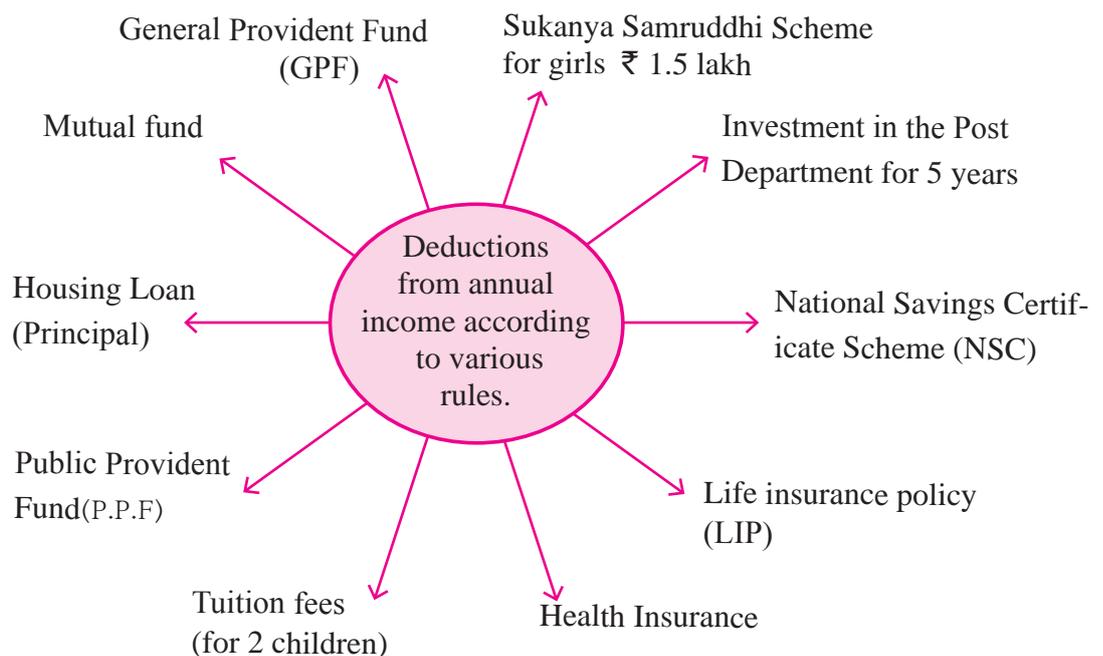
Important considerations for computing the income tax payable by a salaried employee :

The total annual income (Gross Total Income) is taken into account for calculating the tax payable. According to the sections 80C, 80D, 80G etc. of the Income Tax Act some deductions can be availed from the total annual income. The amount remaining after these deductions are made, is called taxable income. Income tax is levied on this taxable income.

Every year, the rules for computing income tax are changed. Hence, it is important to know the latest rules when actually calculating the tax payable.

No tax is levied up to a certain limit of taxable income. This is called the basic exemption limit.

- Farmer's income from agricultural produce is exempt from taxation.
- Under section 80 G of IT Act donations to the Prime Minister's relief fund, Chief Minister's Relief Fund and certain other donations recognized to institutions/ organizations are exempt from taxation.
- Under section 80 D, installments of premium for health insurance are exempt from taxation.
- Generally, the maximum premissible deduction to various kinds of savings under section 80C is Rs. 1,50,000.



Tax rates according to age of taxpayers are fixed in each year's budget. Samples of tables showing tax rates for different income slabs are given below.

Table I

Individuals (up to the age of 60 years)			
Taxable Income slabs (In Rupees)	Income Tax	Education cess	Secondary and Higher Educa- tion cess
Up to 2,50,000	Nil	Nil	Nil
2,50,001 to 5,00,000	5% (On taxable income minus two lakh fifty thousand)	2% of Income tax	1% of Income tax
5,00,001 to 10,00,000	₹ 12,500 + 20% (On taxable income minus five lakh)	2% of Income tax	1% of Income tax
More than 10,00,000	₹ 1,12,500 + 30% (On taxable income minus ten lakh)	2% of Income tax	1% of Income tax
(Surcharge equal to 10% of income tax payable by individuals having an annual income of 50 lakh to one crore rupees and 15% of income tax by individuals having an annual income greater than one crore rupees)			

Activity : Use Table I given above and write the appropriate amount/figure in the boxes for the example given below.

Ex. Mr. Mehta's annual income is Rs. 4,50,000

- If he does not have any savings by which he can claim deductions from his income, to which slab does his taxable income belong ?
- What is the amount on which he will have to pay income tax and at what percent rate ?
on ₹ percentage
- On what amount will the cess be levied ?

Table II

Senior citizens (Age 60 to 80 years)			
Taxable Income slabs (In Rupees)	Income Tax	Education cess	Secondary and Higher Educa- tion cess
Upto 3,00,000	Nil	Nil	Nil
3,00,001 to 5,00,000	5% (On taxable income minus three lakh)	2% of Income tax	1% of Income tax
5,00,001 to 10,00,000	₹ 10,000 + 20% (On taxable income minus five lakh)	2% of Income tax	1% of Income tax
More than 10,00,000	₹ 1,10,000 + 30% (On taxable income minus ten lakh)	2% of Income tax	1% of Income tax
(Surcharge equal to 10% of income tax payable by individuals having an annual income of 50 lakh to one crore rupees and 15% of income tax by individuals having an annual income greater than one crore rupees)			

Activity : Use table II to carry out the following activity

Ex. Mr. Pandit is 75 years of age. Last year his annual income was 13,25,000 rupees. How much is his taxable income ? How much tax does he have to pay ?

$$13,25,000 - 10,00,000 = 3,25,000$$

According to the table he must first pay Rs. 1,10,000 as income tax. In addition, on 3,25,000 rupees he has to pay 30% income tax.

$$3,25,000 \times \frac{30}{100} = \boxed{} \text{ rupees.}$$

Therefore, his total income tax amounts to $\boxed{} + \boxed{} = \boxed{}$

Besides this, education cess will be 2% of income tax $\boxed{} \times \frac{2}{100} = \boxed{}$.

A secondary and higher education cess at 1% of income tax = $\boxed{} \times \frac{1}{100} = \boxed{}$

\therefore Total income tax = Income tax + education cess + secondary and higher education cess.

$$= \boxed{} + \boxed{} + \boxed{}$$

$$= \boxed{\text{₹ 2,13,725}}$$

Table III

Super senior citizens (Age above 80 years)			
Taxable Income slabs (In Rupees)	Income Tax	Education cess	Secondary and Higher Education cess
Upto 5,00,000	Nil	Nil	Nil
5,00,001 to 10,00,000	20% (On taxable income minus five lakh)	2% of Income tax	1% of Income tax
More than 10,00,000	₹ 1,00,000 + 30% (On taxable income minus ten lakh)	2% of Income tax	1% of Income tax

(Surcharge equal to 10% of income tax payable by individuals having an annual income of 50 lakh to one crore rupees and 15% of income tax by individuals having an annual income greater than one crore rupees)

Project : Obtain information about sections 80C, 80G, 80D of the Income Tax Act.

Study a PAN card and make a note of all the information it contains..

Obtain information about all the devices and means used for carrying out cash minus transactions.

From the following solved examples we will learn how the tables given and the deductions available to individuals are used to compute income tax.

Ex(1) Mr. Mhatre is 50 years old. His gross total income is Rs. 12,00,000. He has invested in the following amounts in different schemes.

- (i) Insurance premium : ₹ 90,000 (ii) Investment in provident fund : ₹ 25,000
 (iii) Investment in PPF : ₹ 15,000 (iv) National Savings Certificate : ₹ 20,000

Find out the permissible deductions, taxable income, and the income tax payable.

Solution : (1) Total Yearly income = 12,00,000 rupees.

(2) Total savings under section 80C.

Savings	Amount of Savings (rupees)
(i) Insurance premium	90,000
(ii) Provident Fund	25,000
(iii) Public Provident Fund	15,000
(iv) National Savings Certificate	20,000
Total	1,50,000

According to section 80C, a maximum deduction of Rs. 1,50,000 is permissible.

(3) ∴ Taxable Income = Amount in [1] – Amount in [2]

$$= 12,00,000 - 1,50,000 = 10,50,000$$

(4) We shall use Table I to calculate Mr. Mhatre's total income tax .

Mr. Mhatre's taxable income = ₹ 10,50,000 which is greater than ten lakh rupees.

∴ According to Table (I) Income tax = ₹ 1,12,500 + 30% (of total income minus 10 lakh)

$$∴ 10,50,000 - 10,00,000 = 50,000$$

$$∴ \text{Income tax} = 1,12,500 + 50,000 \times \frac{30}{100}$$

$$= 1,12,500 + 15,000$$

$$= 1,27,500$$

We must also include 2% education cess and 1% secondary and higher education cess.

$$\text{Education cess} = 1,27,500 \times \frac{2}{100} = 2550 \text{ rupees}$$

$$\text{Secondary and higher education cess} = 1,27,500 \times \frac{1}{100} = 1275 \text{ rupees}$$

$$∴ \text{Total income tax} = 1,27,500 + 2550 + 1275 = 1,31,325 \text{ rupees}$$

Mr. Mhatre's tax payable = ₹ 1,31,325

Ex(2) Mr. Ahmed, a 62 year old senior citizen is employed in a private company. His total annual income is Rs.6,20,000. He has contributed Rs. 1,00,000 to the Public Provident Fund and paid a premium of Rs. 80,000 for the year for health insurance and a donation of Rs. 10,000 to CM's Relief Fund. What is tax payable ?

Solution : (1) Total Yearly income = 6,20,000 rupees

(2) Total deduction (According to 80C)

(i) Public Provident Fund = 1,00,000 rupees

(ii) Insurance = 80,000 rupees

1,80,000 rupees

(iii) Section 80C permits a maximum deduction of Rs. 1,50,000 rupees.

(3) Amt. given to CM's Relief Fund (According to 80 G) = 10000 rupees.

(4) Taxable income = (1) – [(2) + (3)]
 = 6,20,000 – [1,50,000 + 10000]
 = 4,60,000 rupees

From table II we see that the taxable income is in the slab 3 lakh to 5 lakh rupees.

$$\begin{aligned} \therefore \text{Income tax} &= (\text{Taxable income} - 3,00,000) \times \frac{5}{100} \\ &= (4,60,000 - 3,00,000) \times \frac{5}{100} \\ &= 1,60,000 \times \frac{5}{100} \\ &= 8000 \text{ rupees} \end{aligned}$$

Education cess is levied on income tax.

$$\text{Education cess} = 8,000 \times \frac{2}{100} = 160$$

$$\text{Secondary and higher education cess} : 8,000 \times \frac{1}{100} = 80$$

$$\therefore \text{Total Income tax} = 8000 + 160 + 80 = ₹ 8,240$$

\therefore tax payable by Mr. Ahmed is ₹ 8,240.

Ex(3) Mrs. Hinduja's age is 50 years. Last year her taxable income was Rs. 16,30,000. How much income tax has she to pay ?

Solution : Mrs Hinduja's taxable income is in the bracket of Rs. 10,00,000 and above.

Let us use Table I to compute her income tax. Accordingly, for income greater than Rs. 10,00,000.

$$\text{Income tax} = \text{Rs. } 1,12,500 + 30\% \text{ of total income minus ten lakh}$$