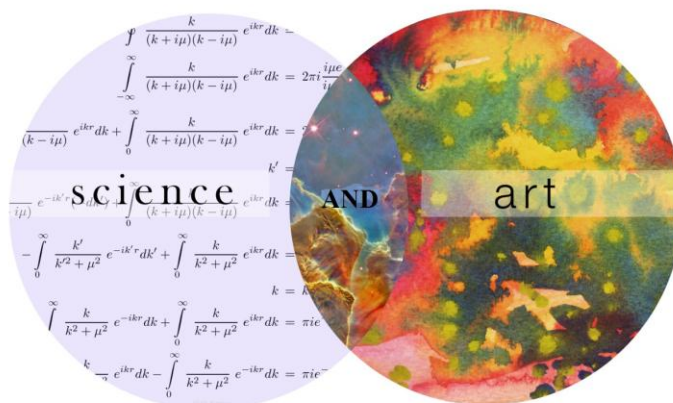# Paper 1: Fundamentals of Economics and Management (FEM)

Is Economics a Science or an Art?

Introduction

Answering whether economics is a Science or an Art is a challenging task because of numerous convincing arguments. Economists are significantly and divergently grouped on the subject whether economics can be considered as a science or as an art. In spite of this, few decide on a middle track claiming that it is both a science and an art.

Economics as a Science

Let us look at the perception of Prof. Robbins regarding economics. He looks at economics as a science. According to him, the last three letters of the word 'Economics' i.e., 'ics' suggest a transparent evidence that it must be a science like physics, mathematics, and dynamics. In his own words, "Economics thus derives its name from the fact that it is a science rather than an art." Science is a systematized body of education, which tracks the association between cause and effect.

The properties of a science are that:

- It is truly a systematized investigation of a subject matter.
- It determines the cause and effect association of elements.
- The laws are universal in nature.

Science is quantitative; on the contrary, the foundation of art is qualitative. Science is a perfect and descriptive; art is obscuring together with suggestive. Science looks for information and facts whereas art desires for

elegance. Furthermore, scientific research is impersonal and unbiased at the same time the appreciation of the art is intensely personalized and prejudiced.

The following justifications are advanced to take a look at economics as a science:

Systematized Analysis

The first crucial characteristic of a science is always that it needs to be a systematized research. The scientific method of research involves three significant phases, namely observation, reasoning and verification.

Similarly, in economics as well principles are generally developed after the appropriate details are methodically gathered, categorized and analyzed. Additionally, it is meticulously clubbed into five elements, namely consumption, production, exchange, distribution and public finance.

Scope for Experiments

In physical and natural sciences, tests can be carried out in laboratories. In economics, overall economy alone is a laboratory from which a number of laws and ideas could be examined. The several economic systems such as capitalism, socialism and mixed economy are the studies of economics. Similarly, price mechanism is an experiment in a free enterprise economy, which exhibits the way resources are efficiently dispersed without a central organizing authority. Additionally, numerous monetary and fiscal plans could be analyzed in an economy to determine their part in the economic activities.

Nature of Economic Law

A Science is not about collecting information, but it creates a relationship between cause and effect. Laws in physics and chemistry track down this cause and effect association very evidently. As an example, two atoms of hydrogen and one atom of oxygen will certainly structure water, all other things being the same. Similarly, Newton's law of gravitation describes the way things have a tendency to move downwards when nothing stops them. In economics, the law of demand claims that other things being equal, a decline in the price of a product results in an increase in demand and vice versa. In this case, decrease in price is the cause and rise in demand is its effect. Hence, the further qualification for a science is also satisfied.

Universal

The final necessity for a science is that its laws ought to be widely accepted. In economics as well, the law of demand, the law of diminishing returns etc., are universal anyway.

Unique Credibility

As emphasized by Marshall, the measuring rod of money has conferred a unique credibility to economics similar to other physical sciences perhaps even a position better than that of various other social sciences. In Marshall's phrases, "Just as the chemist's fine balance has made chemistry more exact than most other physical sciences; so this economist's balance (money) rough and imperfect as it is, has made economics more exact than any other branch of social science."

The following discussions are posed to prove that economics is not a science:

Universal Application

Economic laws are not universal in nature. The laws, that are relevant to capitalistic nations, are not appropriate to socialistic nations. The laws that are convincing in a developed economy may well not integrate with a developing economy.

Conflict of Interests

You find a fashionable statement – "lay six economists end to end and you will never reach a conclusion." Many economists debate that economics is not a science simply because economists differ.

Less Scope for Prediction

The tides in the ocean are the biggest on the night of the full moon. While the size of the moon diminishes, the size of the tides as well continues on abating. As a result, based on the scale of the moon, you can predict at what time the tides in the ocean will probably be the biggest, however this kind of judgment may also end up being absolutely wrong. Similarly, economic laws are merely documents of tendencies and are just approximate. On many occasions, the law may well not do business. In spite of this, economists claim that economics is a science mainly because it fulfills the attributes of a science.

Inexactness

In contrast to physical laws such as gravitation, economic laws are not precise and appropriate. Majority of the economic laws could function on condition that the qualifying assumption 'other things being equal' is valid. Physical sciences apart from biology work on lifeless stuffs such as fluid, gas, energy and so on. On the other hand, economics tackles people at large, whose behavior are not only varying but are also unpredictable. The inexactness in economics occurs because of numerous factors. The following are some of them:

- The laboratory study is very unlikely.
- The economy in which we dwell is complicated.
- The economist could be induced by his own bias and prejudices.

Economics as an Art

The organized application of scientific principles is an art. In this particular impression, economics is an art. Economics delivers solutions for several of the complications. The law of equimarginal utility assists an individual to resolve his difficulty of obtaining optimum satisfaction with small resources. The doctrine of consumer's surplus facilitates a finance minister in the area of taxation. Keynes' principle of employment offers the best way to solve unemployment. As reported by Robbins, the task of an economist should be to investigate and clarify economic impacts, however, the dilemma of value judgment needs to be left to the legislators and moral experts.

At the same time, a sensible and systematic technique would look at its science and art facets.The science of economics might not be significantly useful until it provides not only light but also fruit. The research of economics is going to be a trash if this cannot provide you with solutions to numerous challenges of the economy. However, Science without Art or Art without Science could be meaningless and prove disastrous. Since economics possess the characteristics of both, we may conclude that economics is both a science and an art.

Paper 2: Fundamentals of Accounting (FOA)

Joint Venture

What is Joint Venture?
A joint venture is an association of two or more persons who have combined for the execution of a specific business and divide the profit or loss thereof in the agreed ratio.

Features of Joint Venture
The main features of a joint venture are specifically made clear.

❏ Two or more person are needed.

❏ It is an agreement to execute a particular venture or a project.

❏ The joint venture business may not have a specific name.

❏ It is of temporary nature. So the agreement regarding the venture automatically stands terminated as soon as the venture is complete.

❏ The co-ventures share profit and loss in an agreed ratio. The profits and losses are to be shared equally if not agreed otherwise.

❏ The co-ventures are free to continue with their own business unless agreed otherwise during the life of joint venture

From the above we can say ,
- Joint Venture is a temporary form of business organization.

- There are certain business activities or projects that may involve higher risks; higher investments and even they demand multi-skills.

- In such cases, an individual person may not be able to master all resources. Hence two or more people having requisite skill sets come together to form a temporary partnership.

Difference between Joint Venture and Consignment

	Joint Venture	Consignment
Relationship	Is that of partners.	Is that of principal and agent.
Profit Earned	Belongs to the co- venturers.	Belongs to the consignor and not the consignee.
Finance	Money is contributed by all the co- venturers in certain proportion.	All money is invested by the consignor.
Risk	All money is invested by the co-venturers.	Sales are made at consignor's risk.
Management	Co- venturers enjoy full powers to manage the business	The consignee being an agent has no powers except he has to obey the instruction of the consignor.

Accounting Record
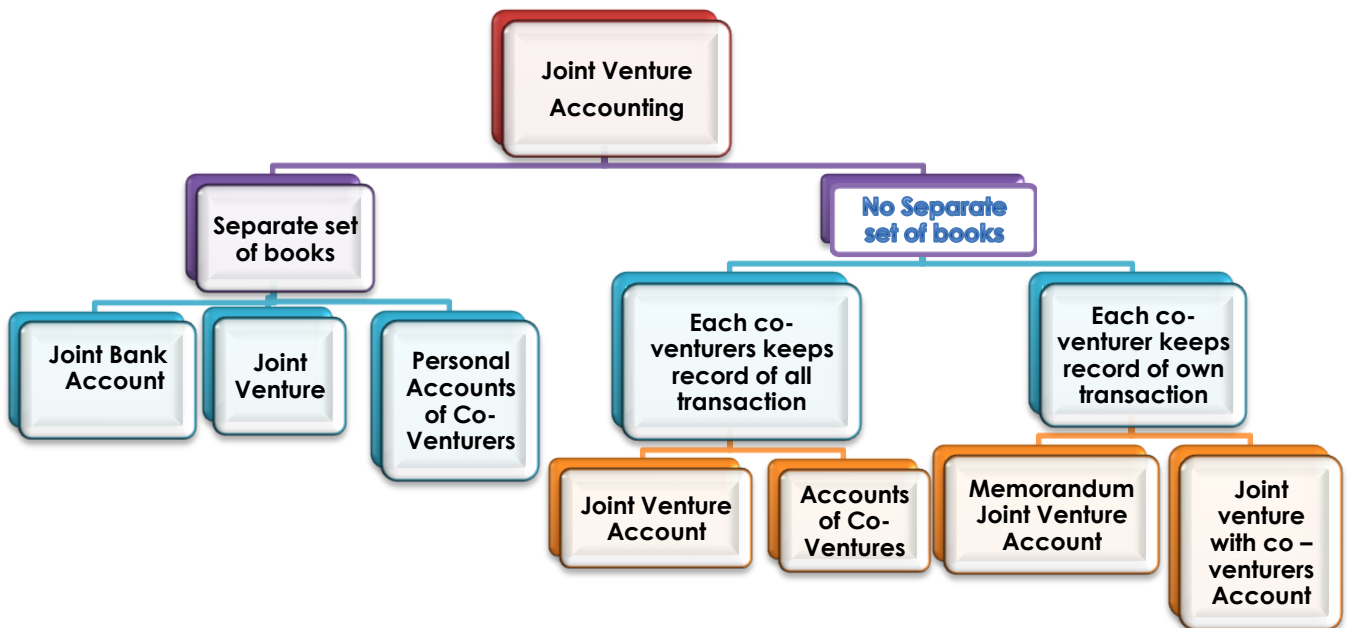
Here we discussed the situation when — Each Co – Venturer keeps record of own transaction when no separate set of books are maintained .

No Separate Set of Books

Where each Co–Venturer keeps record of own transaction.
• Where all venturers keep accounts.
• Each venturer will record only such transactions as directly concern him.
• Here only prepare **Joint Venture with co- venture Account and Memorandum Joint Venture Account.**

What is Memorandum Joint Venture Account?
Memorandum Joint Venture is,
❑ It is a similar of Normal Joint Venture Account i.e. all expenses on the debit side and incomes on the credit side.
❑ It contains entries of all co- venturers Account.
❑ It is not part of books of accounts.
❑ It is made just to determine to Profit.

What is Joint Venture with co- venture Account?
❑ It is a personal Account.
❑ The concerned venturer debits this account with all payments and goods supplied by him on behalf of the Joint Venture.
❑ After incorporating the items the balance represents the final settlement between the venturer.

Journal Entries

For Example A is venturer. The Journal entries would be:

1	**If goods are supplied by A (venturer), the entry being:**
	Memorandum Joint Venture A/c **Dr.**
	To A A/c
2	**If Goods are sold by A:**
	A A/c **Dr.**
	To Memorandum Joint Venture A/c.
3	**If goods are supplied by or expenses are incurred by A (venturer) in his book, the entry being:**
	Joint Venture with Co – venturers A/c **Dr.**
	To Bank/Goods Supplied A/c
4	**If Goods are sold by A:**
	Bank A/c **Dr.**
	To Joint Venture with Co Venturer A/c
5	**If Goods are taken by A:**
	Drawings/Goods Taken A/c **Dr.**
	To Joint Venture with Co – Venture A/c
6	**For Share of Profit:**
	Joint Venture with Co – Venture A/c **Dr.**
	To Profit and Loss A/c
7	**For final settlement:**
	(i) If payment is made to other Venturer:
	Joint Venture with Co – Venture A/c **Dr.**
	To Bank A/c
	(ii) If the amount is received from the other venturer:
	Bank A/c **Dr.**
	To Joint Venture with Co – Venture A/c

Let us take an example,

A and B entered into a Joint Venture to buy and sell of goods. On 01.07.2014 A sent a draft for ₹2,50,000 in favour of B and on 04.07.2014, the latter purchased 200 tons each at a cost of ₹2,000 each. The goods were sent to A by lorry for ₹ 2,000.

The sales were made by A in the following manner:

Date	Quantity (tons)	Sale price per ton(₹)
16.07.2014	20	3,000
31.07.2014	100	2,800
15.08.2014	80	2,700

On 25.08.2014, A settled the account by sending a draft in favour of B, profits being shared equally. Show in A's Account:
1. Joint venture with B Account
2. Memorandum Joint Venture Account

Solution:

Dr.	Joint Venture with B Account				Cr.
Date	**Particulars**	**Amount (₹)**	**Date**	**Particulars**	**Amount (₹)**
2014 July 1	To, Bank (Draft Sent)	2,50,000	2014 July 16	By, Bank A/c – Sale	60,000
July 15	To, Bank (Freight)	2,000	July 31	By, Bank A/c - Sale	2,80,000
Aug 25	To, P&L A/c (Share of profit)	77,000	Aug 15	By, Bank A/c	2,16,000
Aug 25	To, Bank A/c (Settlement)	2,27,000			
		5,56,000			5,56,000

Dr.	Memorandum Joint Venture Account			Cr.
Particulars	**Amount (₹)**	**Particulars**		**Amount (₹)**
To, Cost of 200 tonnes	4,00,000	By, Sale Proceed - 20 @ 3,000		60,000
To, Freight	2,000	- 100 @ 2,800		2,80,000
To, Profit - A - B	77,000 77,000	- 80 @ 2,700		2,16,000
	5,56,000			5,56,000

Paper 3: Fundamentals of Laws and Ethics (FLE)

PROHIBITED OCCUPATIONS & PROCESSES UNDER

THE CHILD LABOUR (PROHIBITION AND REGULATION) ACT, 1986

Prohibited Occupations

Occupations listed in Part A of Schedule I are prohibited occupations. Detail of such occupation is as under

1. Transport of passengers, goods; or mails by railway.

2. Cinder picking, clearing of an ash pit or building operation in the railway premise.

3. Work in a catering establishment at a railway station, involving the movement of vendor or any other employee of the establishment from one platform to another or into or out of a moving train.

4. Work relating to the construction of railway station or with any other work where such work is done in close proximity to or between the railway lines.

5. The port authority within the limits of any port.

6. Work relating to selling of crackers and fireworks in shops with temporary licenses.

7. Abattoirs/slaughter Houses.

8. Automobile workshops and garages. (9)   Founderies

9. Handling of taxies or inflammable substance or explosives.

10. Handloom and power loom industry.

11. Mines (Under ground and under water) and collieries.

12. Plastic units and Fiber glass workshop.

Prohibited Processes

Process included in part B of schedule 1 are prohibited process. Details of Processes mentioned in Part B are as under:

In any workshop wherein any of the following processes is carried on.

1. Beedi making
2. Carpet Weaving
3. Cement manufacture including bagging of cement
4. Cloth printing, dying and weaving
5. Manufacture of matches, explosive and fire works
6. Mica cutting and splitting
7. Shellac manufacture
8. Soap manufacture
9. Tanning.
10. Wool cleaning
11. Building and construction industry
12. Manufacture of slate pencils (including packing)
13. Manufacture of products of agate
14. Manufacturing processes using toxic metals and substances such as lead, mercury, manganese, chromium, cadmium, benzene, pesticides and asbestos (Section-3)
15. All hazardous process an defined in section 2(cb) and dangerous operations as notified in ruler made under section 87 of the factories Act 1948
16. Printing (as defined in section 2(k) of the factories Act 1948
17. Cashew and cashew nut descaling and processing
18. Soldering process in electronic industries
19. Agarbathi manufacturing
20. Automobile repairs and maintenance (namely welding lather work, dent beating and printing)
21. Brick kilns and Roof files units
22. Cotton ginning and processing and production of hosiery goods
23. Detergent manufacturing
24. Fabrication workshop (ferrous and non-ferrous)
25. Gem cutting and polishing
26. Handling of chromites and manganese ores
27. Jute textile manufacture and of coir making
28. Lime kilns and manufacture of lime
29. Lock making
30. Manufacturing process having exposure to lead such as primary and secondary smelting, welding etc.
31. Manufacturing of cement pipes, cement products, and other related work.

32. Manufacturing of glass, glass ware including bangles fluorescent tubes bulbs and other similar glass products

34. Manufacturing or handling of pesticides and insecticides

35. Manufacturing or processing and handling of corrosive and toxic substances, metal cleaning and photo enlarging and soldering processes in electronic industry

36. Manufacturing of burning coal and coal briquette

37. Manufacturing of sports goods involving to synthetic materials, chemicals and leather

38. Moulding and processing of fiberglass and plastics

39. Oil expelling and refinery

40. Paper making

41. Potteries and ceramic industry

42. Polishing, moulding, cutting welding and manufacture of brass goods in all forms.

43. Process in agriculture where tractors, threshing and harvesting machines are used and chaft cutting

44. Saw mill all process

45. Sericulture processing

46. Skinning, dyeing and process for manufacturing of leather and leather products

47. Stone breaking and stone crushing

48. Tobacco processing including manufacturing of tobacco, tobacco paste and handling of tobacco in any form

49. Tyre making, repairing, re-trading and graphite beneficiation

50. Utensils making polishing and metal buffing

51. Zari Making (all process)

52. Electroplating

53. Graphite powdering and incidental processing

54. Grinding or glazing of metals

55. Diamond cutting and polishing

56. Extraction of slate from mines

57. Rag picking and scavenging

Paper 4: Fundamentals of Business Mathematics and Statistics (FBMS)

Squaring Numbers

Squaring can be defined as 'multiplying a number by itself.'

There are many different ways of squaring numbers. Many of these techniques have their roots in multiplication as squaring is simply a process of multiplication.
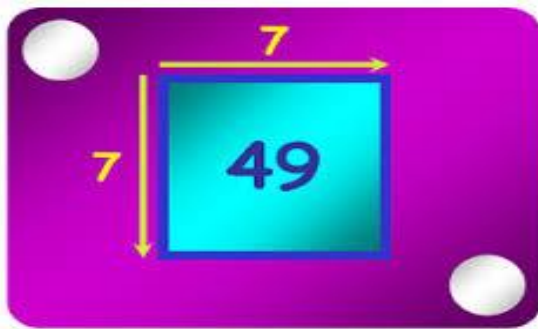
Examples: 3^2 is 3 multiplied by 3 which equals 9

4^2 is four multiplied by 4 which equals 16

The techniques that we will study are:

(A) Squaring of numbers using criss-cross system

(B) Squaring of number using formula

(A) SQUARING OF NUMBERS USING CRISS-CROSS SYSTEM

The Urdhva-Tiryak Sutra (the Criss-Cross system) is by far the most popular system of squaring numbers amongst practitioners of Vedic Mathematics. The reason for its popularity is that it can be used for any type of numbers.
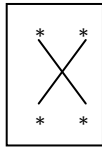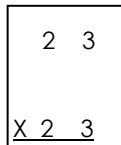
Ex.: Find the square of 23.

Ans:

(a)

(b)

```
 *    *
   ╲ ╱
    ╳
   ╱ ╲
 *    *
```

(c)

```
 │  *    *
 │
 │  *    *
```

```
  2   3
X 2   3
```
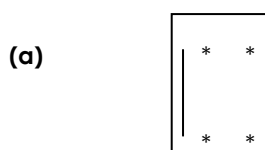
(a) First, we multiply 3 by 3 and get the answer as 9.

(Answer at this stage is _____ 9).

(b) Next, we cross multiply (2 x 3) and add it with (2 x 3).

The final answer is 12. We write down 2 and carry over 1.

(Answer at this stage is _____ 29).

(c) Thirdly, we multiply (2 x 2) and add the 1 to it. The answer is 5.

The final answer is 529.

Similarly, numbers of higher orders can be squared. Refer to the chapter on Criss-Cross system for further reference.

(B) FORMULA METHOD

There are various formulae used in general mathematics to square numbers instantly. Let us discuss them one by one.

(i) $(a + b)^2 = a^2 + 2ab + b^2$

This method is generally to square numbers which are near multiples of 10. In this method, a given number is expanded in such a number that the value of 'a' is a number which can be easily squared and the value of 'b' is a small number which too can be easily squared.

(Q) Find the square of 1009.

We represent the number 1009 as 100 + 9. Thus, we have converted it into a form of (a+b) where the value of a is 1000 and the value of b is 9.

$$(1000 + 9)^2 = (1000)^2 + 2\,(1000)\,(9) + (9)^2$$
$$= 1000000 + 18000 + 81$$
$$= \mathbf{1018081}$$

(Q) Find the square of 511.

The number 511 will be written as 500 + 11
$$(500 + 11)^2 = (500)^2 + 2\,(500)\,(11) + (11)^2$$
$$= 250000 + 11000 + 121$$
$$= \mathbf{261121}$$

The second formula that we will discuss is also very well known to the students. It is a part of the regular school curriculum. This formula is used to square numbers which can be easily expressed as a difference of two numbers 'a' and 'b' in such a way that the number 'a' is one which can be easily squared and the number 'b' is a small number which too can be easily squared. The formula is,

(ii) $(a - b)^2 = a^2 - 2ab + b^2$

This formula is very much like the first one. The only difference is that the middle term carries a negative sign in this formula.

(Q) Find the square of 995.

We will express the number 995 as (1000 – 5)

$$(1000 + 5)^2 = (1000)^2 + 2\,(1000)\,(5) + (5)^2$$
$$= 1000000 + 10000 + 25$$
$$= \mathbf{990025}$$

(Q) Find the square of 698.

We will express the number 698 as (700 – 2)

$(700 + 2)^2$ $= (200)^2 + 2\,(700)\,(2) + (2)^2$

                     $= 490000 + 2800 + 4$

                     $= \mathbf{487204}$

Thus, we see that the two formulae can help us find the squares of any number above and below a round figure respectively. There is another formula which is used to find the square of numbers, but it is not so popular. I discuss it below.

We know that:

$a^2 – b^2 = (a + b)\,(a – b)$

(Therefore) $a^2 = (a + b)\,(a – b) + b^2$

This is the formula that we will be using: $a^2 = (a + b)\,(a – b) + b^2$

METHOD

Suppose we are asked to find the square of a number. Let us call this number 'a'. Now in this case we will use another number 'b' in such a way that either (a + b) or (a – b) can be easily squared.

(Q) Find the square of 72.

Ans: In this case, the value of 'a' is 72. Now, we know that $a^2 = (a + b)\,(a – b) + b^2$

Substituting the value of 'a' as 72, we can write the above formula as:

$(72)^2 = (72 + b)\,(72 – b) + b^2$

We have substituted the value of 'a' as 72. However, we cannot solve this equation because a variable 'b' is still present. Now, we have to substitute the value of 'b' with such a number that the whole equation becomes easy to solve.

Let us suppose I take the value of 'b' as 2.
Then the equation becomes.

$(72)^2 = (72 + 2) (72 - 2) + (2)^2$

$= (74) (70) + 4$

In this case we can find the answer by multiplying 74 by 70 and adding 4 to it. However, if one finds multiplying 74 by 70 difficult, we can simplify it still further. First, multiply 70 by 70 and then multiply 4 by 70 and add both for the answer.

Let us continue the example given above.

$= (70 \times 70) + (4 \times 70) + 4$

$= 4900 + 280 + 4$

$= \textbf{5184}$

Thus, the square of 72 is 5184.

In this example we have taken the value of 'b' as 2. Because of this, the value of (a – b) because 70 and the multiplication procedure became easy (as the number 70 ends with a zero).

(Q) Find the square of 53.

Answer: Using the formula $a^2 = (a + b) (a - b) + b^2$ and taking the value of 'a' as 53, we have:

$(53)^2 = (53 + b) (53 - b) + (b)^2$

Now we have to find a suitable value for 'b'. if we taken the value of 'b' as 3, the expression (53 – 3) will be 50 and hence it will simplify the multiplication procedure. So we will take the value of 'b' as 3 and the equation will become:

$(53)^2 \quad = (53 + 3) (53 - 3) + (3)^2$

$= (56) (50) + 9$

$= (50 \times 50) + (6 \times 50) + 9$

$= 2500 + 300 + 9$

$= \textbf{2809}$

(Q) Find the square of 67.

Answer: In this case the value of 'a' is 67. Next, we will substitute 'b' with a suitable value. In this case, let us take the value of 'b' as 3 so that the value of (a + b) will become (67 + 3) which equals 70.

Thus: $(67)^2$

$= (67 + 3)(67 - 3) + (3)^2$

$= (70)(64) + 9$

$= (70 \times 60) + (70 \times 4) + 9$

$= 4200 + 280 + 9$

$= \textbf{4489}$

(Q) Find the square of 107.

Answer: In this case, we will taken the value of 'a' as 107 and taken the value of 'b' as 7. The equation becomes:

$(107)^2$

$= (107 + 7)(67 - 7) + (7)^2$

$= (114)(100) + 49$

$= 11400 + 9$

$= \textbf{11449}$

(Q) Find the square of 94.

Answer: In this example we will take the value of 'a' as 94. Next, we will take the value of 'b' as 6 so that the value of (a + b) becomes 100.

$(94)^2$

$= (94 + 6)(94 - 6) + (6)^2$

$= (100)(88) + 36$

$= \textbf{8836}$

Exercise:

Part A

Q. (1) Find the squares of the following numbers using the Criss- Cross System.

(1) 42

(2) 33

(3) 115

Part B

Q. (2) Find the squares of the numbers using the formula for $(a + b)^2$

(1) 205

(2) 2005

(3) 4050

Q. (3) Find the squares of the numbers using the formula for $(a - b)^2$

(1) 9991

(2) 9800

(3) 1090

Part C

Q. (4) Find the squares of the following numbers using the formula: $a^2 = (a + b)(a - b) + b^2$.

(1) 82

(2) 49

(3) 109

(4) 97