पुष्पना International School
Shree Swaminarayan Gurukul, Zundal

Grade – 8
MATHS
Specimen copy
Year 21-22

INDEX

CHAPTER NO. - 5

CHAPTER NAME – DATA HANDLING

KEY POINTS TO REMEMBER –

- **Data Handling:** Deals with the process of collecting data, presenting it and getting result.
- Data mostly available to us in an unorganised form is called raw data.
- Grouped data can be presented using histogram. Histogram is a type of bar diagram, where the class intervals are shown on the horizontal axis and the heights of the bars show the frequency of the class interval. Also, there is no gap between the bars as there is no gap between the class intervals.
- In order to draw meaningful inferences from any data, we need to organise the data systematically.
- Frequency gives the number of times that a particular entry occurs.
- Raw data can be 'grouped' and presented systematically through 'grouped frequency distribution'.
- **Statistics**: The science which deals with the collection, presentation, analysis and interpretation of numerical data.
- **Observation**: Each entry (number) in raw data.
- **Range**: The difference between the lowest and the highest observation in a given data.
- **Array**: Arranging raw data in ascending or descending order of magnitude.
- Data can also present using circle graph or pie chart. A circle graph shows the relationship between a whole and its part.
- There are certain experiments whose outcomes have an equal chance of occurring.
- A random experiment is one whose outcome cannot be predicted exactly in advance.
- Outcomes of an experiment are equally likely if each has the same chance of occurring.
- **Frequency**: The number of times a particular observation occurs in the given data.
- **Class Interval:** A group in which the raw data is condensed.

  (i) **Continuous**: The upper limit of a class interval coincides with the lower limit of the next class.

  (ii) **Discontinuous**: The upper limit of a class interval does not coincide with the lower limit of the next class.
- **Class Limits:** Each class in a bounded by two figures which are called class limits.

  (i) **Upper Class Limit**: The upper value of a class interval.

  (ii) **Lower Class Limit**: The lower value of a class interval.
- **Class Size or width:** The difference between the upper class limit and lower class limit of a class.
- **Class Mark:** The mid-value of a class-interval.
- Class mark= $\frac{\text{Upper limit} + \text{Lower limit}}{2}$
- **Graphic representation of data:**

  (i) **Pictograph:** Pictorial representation of data using symbols.

(ii) **Bar Graph:** A display of information using bars of uniform width, their heights proportional to the respective values.

(iii) **Double Bar Graph:** A bar graph showing two sets of data simultaneously. It is useful for the comparison of the data.

(iv) **Histogram:** a graphical representation of frequency distribution in the form of rectangles with class intervals as bases and heights proportional to corresponding frequencies such that there is no gap between any successive rectangles.

(v) **Circle Graph or Pie Chart:** A pictorial representation of the numerical data in the fomr of sectors of a circle such that area of each sector is proportional to the magnitude of the data represented by the sector.

- **Probability:** The chance of occurring of a certain event when measured quantitatively.

  Probability of an event = $\frac{Number\ of\ outcomes\ that\ make\ an\ event}{Total\ number\ of\ outcomes\ of\ the\ experiment}$, when the outcomes are equally likely.

  (i) **Experiment:** An operation which can produce some well-defined outcomes.

  (ii) **Trial:** The performance of an experiment.

  (iii) **Random Experiment:** An experiment in which all possible outcomes are known and the exact outcome cannot be predicted in advance.

  (iv) **Equally Likely Outcomes:** Certain experiments whose outcomes have an equal chance of occurring.

  (v) **Event:** Each outcome of an experiment or a collection of outcomes is called an event.

- **Chances and probability are related to real life**.

Ex : 5.1

1. For which of these would you use a histogram to show the data?

a. **The number of letters for different areas in a postman's bag.**
b. **The height of competitors in an athletics meet.**
c. **The number of cassettes produced by 5 companies.**

d. The number of passengers boarding trains from 7:00 a.m. to 7:00 p.m. at a station.

Give reasons for each.

Sol.

After observing the given data carefully, we can conclude that data in (b) and (d) can be represented using a histogram. Now, these data can be arranged in class intervals. This is what is required to depict a histogram. There should be no gap between the two bars.

a. The number of letters for different areas in a postman's bag: - This situation cannot be represented in histogram form because we cannot deduce the class interval.

b. The height of competitors in an athletics meet: - This situation can be represented by histogram, because the height of competitors will give continuous class intervals.

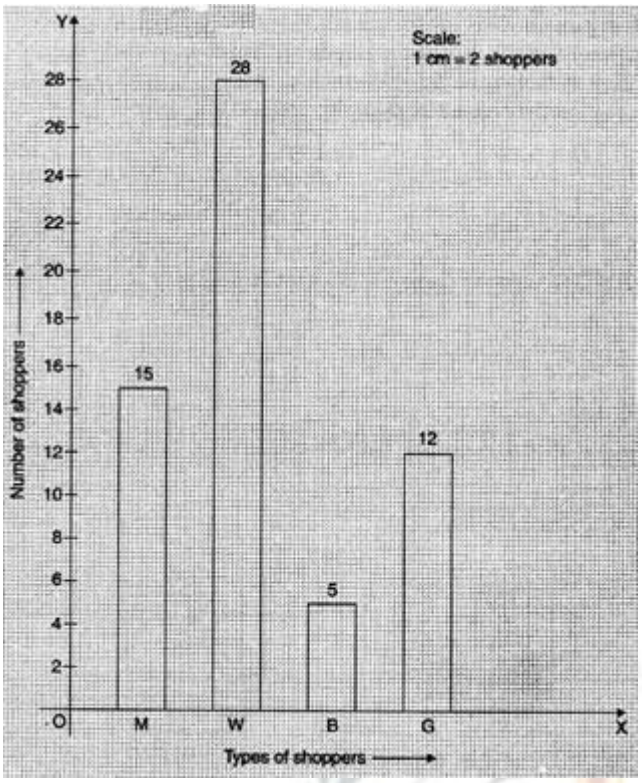
c. The number of cassettes produced by 5 companies: - Now the number of cassettes in this situation can be in any amount and therefore, the class interval is not defined.

d. The number of passengers boarding trains from 7:00 a.m. to 7:00 p.m. at a station: - As the time is predefined from 7:00 am to 7:00 pm, the class interval for this period can be easily formed and therefore, it can be represented by histogram.

2. The shoppers who come to a departmental store are marked as: man (M), woman (W), boy (B) or girl (G). The following list gives the shoppers who came during the first hour in the morning.W W W G B W W M G G M M W W W W G B M WB G G M W W M M W W W M W B W G M W W W W G W M M W W M W G W M G W M M B G G WMake a frequency distribution table using tally marks. Draw a bar graph to illustrate it.

Sol.

Types of shoppers	Tally marks	Number of shoppers
W	𝍸 𝍸 𝍸 𝍸 𝍸 | | |	28
M	𝍸 𝍸 𝍸	15
B	𝍸	5
G	𝍸 𝍸 | |	12



3. The weekly wages (in ₹) of 30 workers in a factory are :830, 835, 890, 810, 835, 836, 869, 845, 898, 890, 820, 860, 832, 833, 855, 845, 804, 808, 812, 840, 885, 835, 835, 836, 878, 840, 868, 890, 806, 840 Using tally marks construct a frequency table with intervals as 800–810, 810–820 and so on.

Sol.

Class Intervals	Tally Marks	Frequency
800–810	III	3
810–820	II	2
820–830	I	1
830–840	𝍸 IIII	9
840–850	𝍸	5
850–860	I	1
860–870	III	3
870–880	I	1
880–890	I	1
890–900	IIII	4
	Total	30

4(1).Draw a histogram for the frequency table given below and answer the question.

Class Interval (Daily income in ₹)	Frequency (No. of Workers)
800 – 820	5
820 – 840	10
840 – 860	6
860 – 880	4
880 – 900	5

Which group has maximum number of workers?

Sol.

The required histogram can be represented as below:

The group which has the maximum number of workers = 820 – 840

4(2). Draw a histogram for the frequency table given below and answer the question.

Class Interval (Daily income in ₹)	Frequency (No. of Workers)
800 – 820	5
820 – 840	10
840 – 860	6
860 – 880	4
880 – 900	5

How many workers earn ₹ 860 and more?

Sol.

The required histogram can be represented as:

The number of workers earns ₹ 860 and more = 4 + 5 = 9

4(3).Draw a histogram for the frequency table given below and answer the question .

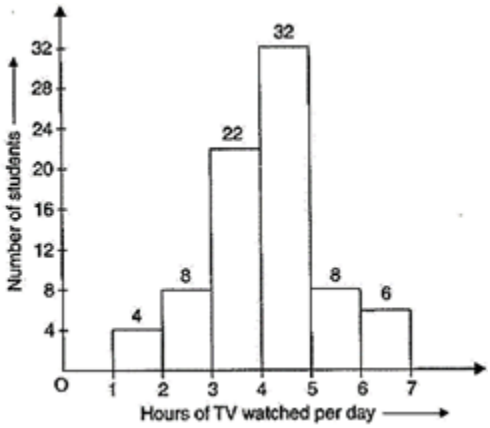
Class Interval (Daily income in ₹)	Frequency (No. of Workers)
800 – 820	5
820 – 840	10
840 – 860	6
860 – 880	4
880 – 900	5

How many workers earn less than ₹ 860?

Sol. The required histogram can be represented as below:

The number of workers earn less than ₹ 860 = 5 + 10 + 6 = 21

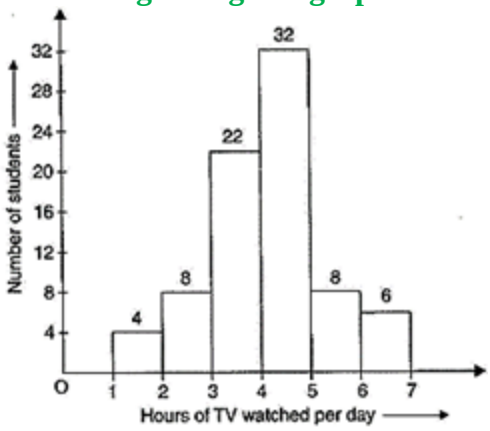
5(1). The number of hours for which students of a particular class watched television during holidays is shown in the given graph:



For how many hours did the maximum number of students watch TV.

Sol. From the graph, it is clear that the maximum number of students watch TV for 4 to 5 hours.

5(2). The number of hours for which students of a particular class watched television during holidays is shown through the given graph:



How many students watch TV for less than 4 hours?

Sol.
From the graph, it is clear that students watch TV for less than 4 hours = 4 + 8 + 22 = 34

5(3). The number of hours for which students of a particular class watched television during holidays is shown through the given graph:

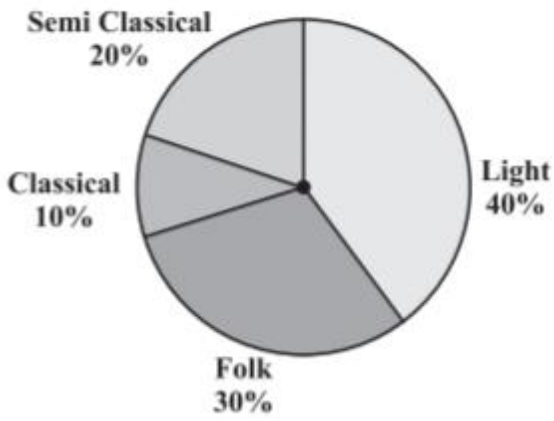
How many students spent more than 5 hours watching TV?

Sol.

From the graph it is clear that students spend more than 5 hours in watching TV = 8 + 6 = 14

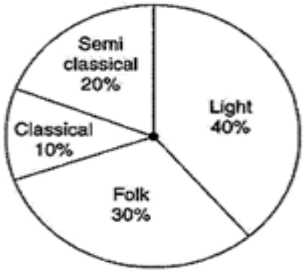
Ex : 5.2

1(1). A survey was made to find the type of music that a certain group of young people liked in a city. The adjoining pie chart shows the findings of this survey.



From this pie chart answer. If 20 people liked classical music, how many young people were surveyed?

Sol.



Suppose that x young people were surveyed.
Then, the number of young people who liked classical music = 10% of x

$= x \times 10/100$

$= 10\ x$

According to the question,

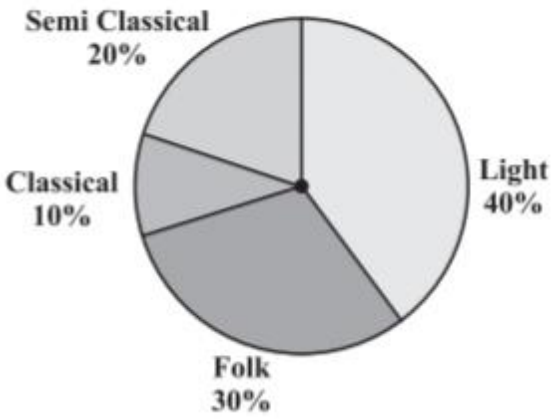
$x10=20x10=20$

$\therefore x=20\times10\therefore x=20\times10$

$\therefore\ x = 200$

hence, 200 young people were surveyed.

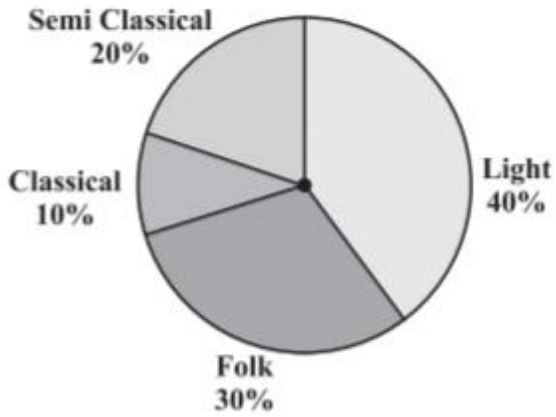
1(ii). A survey was made to find the type of music that a certain group of young people liked in a city. The adjoining pie chart shows the findings of this survey.



From this pie chart which type of music is liked by the maximum number of people?

Sol.
From the graph it is clear that light music is liked by the maximum number of people.

1(iii). A survey was made to find the type of music that a certain group of young people liked in a city. The adjoining pie chart shows the findings of this survey.



From this pie chart answer. If a cassette company were to make 1000 CD's, how many of each type would they make?

Sol.

We have,

The total numbers of cassette = 1000

Number of CD's of semi-classical music = 20% of 1000

$=1000\times20/100$

$= 1000 \times20 / 100$

$=200$

Number of CD's of classical music = 10% of 1000

$=1000\times10 / 100$

$=100$

Number of CD's of Folk music = 30% of 1000

$=1000\times30 / 100$

$=300$

Number of CD's of Light music = 40% of 1000

$= 1000\times40 / 100$

$= 400$

2(i). A group of 360 people were asked to vote for their favourite season from the three seasons rainy, winter and summer.

Season	No. of votes
Summer	90
Rainy	120
Winter	150

Which season got the most votes?

Sol.
From the given information, it is clear that the winter season got the most votes.

2(ii). A group of 360 people were asked to vote for their favourite season from the three seasons rainy, winter and summer.

Season	No. of votes
Summer 	90
Rainy 	120
Winter 	150

Find the central angle of each sector?

Sol.
We have,

Central angle of winter season

= (Number of people who vote for winter season / Total number of people) × 360^0

= (150 / 360)×360^0

= 150^0

Central angle of summer season

= (Number of people who vote for summer season / Total number of people) × 360^0

= (90 / 360) × 360^0

= 90^0

Central angle of rainy season

= (Number of people who vote for rainy season / Total number of people) × 360^0

= (120 / 360) × 3600 = (120 /360) × 360^0

= 120^0

2(iii). A group of 360 people were asked to vote for their favourite season from the three seasons rainy, winter and summer.

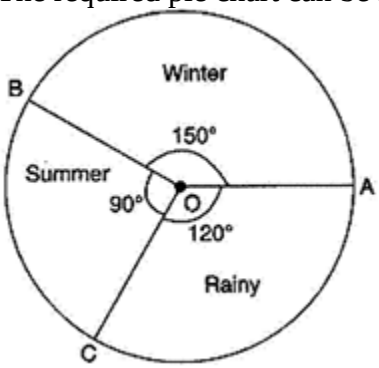
Season	No. of votes
Summer 	**90**

Rainy 	**120**
Winter 	**150**

Draw a pie chart to show this information.

Sol.

The required pie chart can be shown as below:



Season	People who voted for it	In fraction	fractions of 360°
Winter	150	150 / 360	150 / 360 of 360° = 150^{o}
Summer	90	90 / 360	90 / 360 of 360° = 90^{o}
Rainy	120	120 / 360	120 / 360 of 360° = 120^{o}

3. Draw a pie chart showing the following information. The table shows the colours preferred by a group of people.

Colours	Number of people
Blue	18
Green	9
Red	6
Yellow	3
Total	36

Find the proportion of each sector.

For example,

Blue is 18 / 36 = 1/ 2;

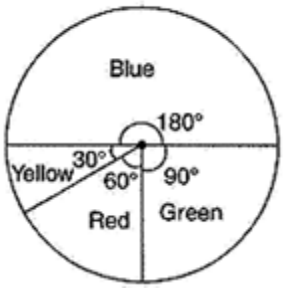
Green is 9 / 36 = 1 /4 and so on.

Use this to find the corresponding angle.

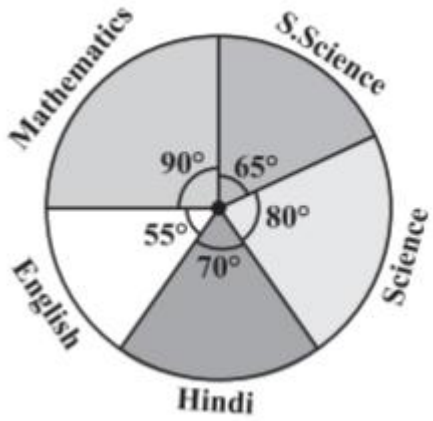
Sol.

Colours	Number of people	Proportion	Corresponding angle
Blue	18	18 / 36 = 1/ 2	$1 / 2 \times 360^0 = 180^0$
Green	9	9 / 36 = 1 / 4	$1/ 4 \times 360^0 = 90^0$
Red	6	6 / 36 = 1/ 6	$1/ 6 \times 360^0 = 60^0$
Yellow	3	3/ 36 = 1/ 12	$1/ 12 \times 360^0 = 30^0$
Total	36		

Pie chart



4(i). The adjoining pie chart gives the marks scored in an examination by a student in Hindi, English, Mathematics, Social Science and Science. If the total marks obtained by the students were 540, answer the question.



In which subject did the students score 105 marks? (Hint: for 540 marks, the central angle = 360°. So, for 105 marks, what is the central angle?)

360^0 /540

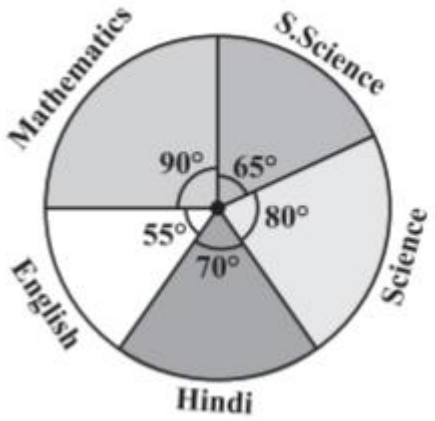
Sol.

From the graph it is clear that For 540 marks, the central angle = 360°

∴ For 105 marks, the central angle = $\frac{360^0}{540} \times 105 = 70^0$

hence, the student scored 105 marks in Hindi.

4(ii). The adjoining pie chart gives the marks scored in an examination by a student in Hindi, English, Mathematics, Social Science and Science. If the total marks obtained by the students were 540, answer the question.



How many more marks were obtained by the student in Mathematics than in Hindi?

Sol.

We have,

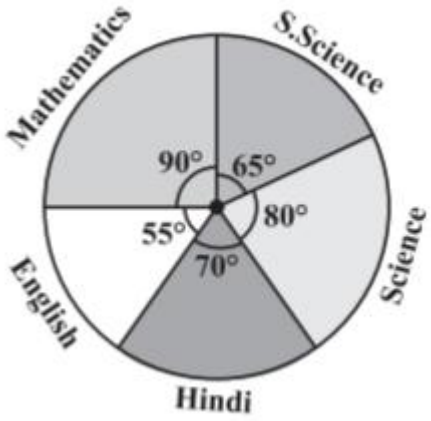
Marks obtained by the students in Mathematics

$= 90^{0}/ 360^{0} \times 540 = 135$

Marks obtained by the students in Hindi $= 70^{0} /360^{0} \times 540 = 105$

Therefore, the student obtained 135 – 105 = 30 marks more in Mathematics than in Hindi.

4(iii). The adjoining pie chart gives the marks scored in an examination by a student in Hindi, English, Mathematics, Social Science and Science. If the total marks obtained by the students were 540, answer the question.



Examine whether the sum of the marks obtained in Social Science and Mathematics is more than that in Science and Hindi. (Hint: Just study the central angles).

Sol.

From the graph it is clear that

Sum of the central angles for Social Science and Mathematics.

= 65° + 90°

= 155°

Sum of the central angles for Science and Hindi.

= 80° + 70°

= 150°

Hence, the sum of the marks obtained in Social Science and Mathematics is more than in Science and Hindi.

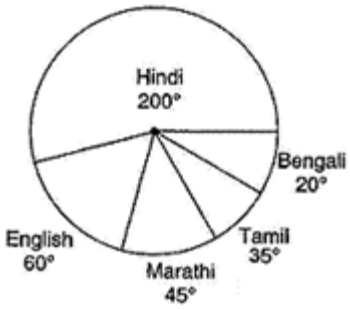
5. The number of students in a hostel, speaking different languages is given below. Display the data in a pie chart.

Language	Hindi	English	Marathi	Tamil	Bengali	Total
Number of Students	40	12	9	7	4	72

Sol.

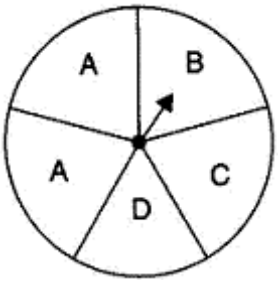
Language	Number of students	In Fraction	Central angle
Hindi	40	40/ 72 = 5/ 9	59×59× 360° = 200^0
English	12	12/ 72 = 1/ 6	16×16× 360° = 60^0
Marathi	9	9/ 72 = 1/ 8	18×18× 360° = 45^0
Tamil	7	7 / 72	7/ 72× 360° = 35^0
Bengali	4	4/ 72 =1/18	1/18× 360° = 20^0
Total	72	1	360°

The pie chart accordingly:



Ex 5.3

1. List the outcome you can see in the experiment: Spinning a wheel



Sol. (a) We get,

Outcomes = A, B, C and D

1(b). List of the outcome you can see in the experiment: Tossing two coins together

Sol.
HT, HH, TH, TT (Here HT unless Head on first coin and tail on another coin and TH means tail on first coin and head on second coin.)

2(a). When a die in thrown, list the outcome of an event of getting a prime number.

Sol. 2, 3, 5

2(b). When a die is thrown, list the outcome of an event of getting not a prime number.

Sol. 1, 4, 6

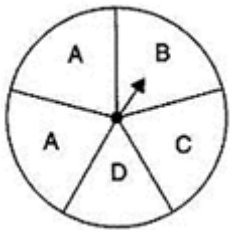
2(c). When a die is thrown, list the outcome of an event of getting a number greater than 5.

Sol. 6

2(d). When a die is thrown, list the outcome of an event of getting a number not greater than 5.

Sol. 1, 2, 3, 4, 5

3(a). Find the probability of the pointer stopping on D in



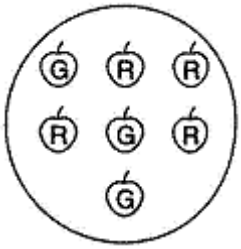
Sol. There are in all 5 sector of the event. The pointer stopping on D has only 1 outcome

∴ The probability of the pointer stopping and D = $\frac{1}{5}$

3(b). Find the probability of getting an ace from a well shuffled deck of 52 playing cards ?

Sol. Probability of getting an ace from a well shuffled deck of 52 playing cards =452=113=452=113 [∵∵ There are in all 4 ace cards]

3(c). Find the Probability of getting a red apple.



Sol. Let the probability of red apples be n

P(n) = No of favourable outcome/No of the possible outcome

No of red apple = 4

No of possible outcome=7

P(n) = $\frac{4}{7}$ [∵ There are in all 7 apples cut of which 4 are red.]

4(i). Numbers 1 to 10 are written on ten separate slips (one number on one slip), kept in a box and mixed well. One slip is chosen from the box without looking into it. What is the probability of getting a number 6?

Sol. There are all 10 outcomes of the event. Getting a number 6 has one outcome only.

So the probability of getting a number (6) = $\mathbf{\frac{1}{10}}$.

4(ii). Numbers 1 to 10 are written on ten separate slips (one number on one slip), kept in a box and mixed well. One slip is chosen from the box without looking into it. What is the probability of getting a number less than 6?

Sol. There are all 10 outcomes of the event. Getting a number less than 6 has five outcomes as there are five

Numbers (1, 2, 3, 4, and 5) less than 6.

So the probability of getting a number less than 6

P(getting a number less than 6) = $\frac{5}{10}$

4(iii). Numbers 1 to 10 are written on ten separate slips (one number on one slip), kept in a box and mixed well. One slip is chosen from the box without looking into it. What is the probability of getting a number greater than 6?

Sol. Getting a number greater than 6 has four outcomes as there are four numbers (7, 8, 9 and 10) greater than 6

Probability of getting a number greater than 6 = $\frac{4}{10} = \frac{2}{5}$

4(iv). Numbers 1 to 10 are written on ten separate slips (one number on one slip), kept in a box and mixed well. One slip is chosen from the box without looking into it. What is the probability of getting a 1-digit number?

Sol. Total outcomes = 10

One-digit number = 9

We know that, Probability of an event = Favourable outcomes / total outcomes

∴ Probability of getting a one-digit number = 9 / 10

5. If you have a spinning wheel with 3 green sectors, 1 blue sector and 1 red sector, what is the probability of getting a green sector ? What is the probability of getting a non blue sector ?

Sol. There are in all 3 + 1 + 1 = 5 outcomes of the event

probability of getting a green sector. [Getting a green sector has 3 outcomes as there are in all 3 green sectors]

= 3/5

Getting a non blue sector has 3 + 1 = 4 outcomes as there are 3 green sectors and 1 red sector

∴ Probability of getting a non blue sector =3+1 / 5 = 4 / 5

6(a). A dice is rolled. Find the probability of the given event a prime number.

Sol.

We know that in throwing a die, possible outcomes of the number appearing on top face = (1, 2, 3, 4, 5, 6) = 6

Prime numbers in the outcomes = (2, 3, 5) = 3

Probability of getting a prime number = Favourable outcomes total outcomes Favourable outcomes total outcomes = 3 / 6 = 1 / 2

6(b). A dice is rolled. Find the probability of the event, not a prime number.

Sol. We know that in throwing a die, possible outcomes of the number appearing on top face = (1, 2, 3, 4, 5, 6) = 6

Non-prime numbers in the outcomes = (1, 4, 6) = 3

Probability of getting a non-prime number = Favourable outcomes / total outcomes = 3 / 6 = 1 / 2

6(c). A dice is rolled. Find the probability of the event, a number greater than 5.

Sol. In throwing a die, possible outcomes of the number appearing on top face = (1, 2, 3, 4, 5, 6) = 6

Numbers greater than 5 = (6) = 1

Probability of getting number greater than 5

= Favourable outcomes / total outcomes = 1/ 6

6(d). A dice is rolled. Find the probability of the event that a number not greater than 5

Sol. In throwing a die, possible outcomes of the number appearing on top face = (1, 2, 3, 4, 5, 6) = 6

Numbers not greater than 5(including 5) = (1, 2, 3, 4, 5) = 5

Probability of getting a number not greater than 5 = Favourable outcomes / total outcomes = 5 / 6

ANSWER IN ONE WORD –

Question 1:

(i) A coin is tossed. What are all possible outcomes?
(ii) Two coins are tossed simultaneously. What are all possible outcomes?
(iii) A die is thrown. What are all possible outcomes?
(iv) From a well-shuffled deck of 52 cards, one card is drawn at random. What is the number of all possible outcomes?

ANSWER:

(i) The possible outcomes are head (*H*) and tail (*T*).

(ii) The possible outcomes are *HH, HT, TH and TT*.

(iii) The possible outcomes are 1, 2, 3, 4, 5 and 6.

(iv) The total number of possible outcomes is 52.

Question 2: In a single throw of a coin, what is the probability of getting a tail?

ANSWER: The possible outcomes in a coin toss are *H* and *T*.

Total number of outcomes = 2

Number of tails = 1

∴ P(tail)= 1 / 2

Question 3:

In a single throw of two coins, find the probability of getting

(i) both tails, (ii) at least 1 tail, (iii) at the most 1 tail.

ANSWER: The outcomes when two coins are tossed are *HH, HT, TH* and *TT*.

i.e., total no. of possible outcomes = 4

(i) Getting both tails means *TT*.

Number of outcomes with two tails = 1
∴ P(both tails) = 1 / 4

(ii) Getting at least 1 tail means *HT, TH* and *TT*.

With at least one tail, total number of outcomes = 3

∴ P (at least 1 tail) = 3 / 4

(iii) Getting at most 1 tail means *HH*, *HT* and *TH*.

The number of outcomes for at most 1 tail = 3

∴P(at most 1 tail) = 3 / 4

Q 4 The range of the data: 6,14,20,16,6,5,4,18,25,15 and 5 is

(a) 4 (b) 21 (c) 25 (d) 20

Q 5. The class mark of the class 20-30 is

(a) 20 (b) 30 **(c) 25** (d) 10

Q 6. The difference between the highest and the lowest value of the observations in a data is called:

(a) Mean (b) Mode **(c) Range** (d) Median

Q 7. in the interval 35-45, 45 is called

(a) Upper limit **(b) Lower limit** (c) Range (d) None

FILL IN THE BLANKS

1. The class marks of the interval 40 -50 is **45.**
2. The lower limit of the class interval 0-5 is **0,5**
3. In the pie chart the total angle of the centre of a circle is **360**
4. **Double bar** graph is useful for comparison of the data.

Chapter – 6
Squares and Square Roots

- **Square**: Number obtained when a number is multiplied by itself. It is the number raised to the power 2. $2^2 = 2 \times 2 = 4$(square of 2 is 4).
- If a natural number m can be expressed as n^2, where n is also a natural number, then m is a **square number.**
- All square numbers end with **0, 1, 4, 5, 6 or 9** at unit's place.
- Square numbers can only have **even number of zeros** at the end.
- **Square root is the inverse operation of square.**
- There are two integral square roots of a perfect square number.
- Positive square root of a number is denoted by the symbol√ For example, $3^2 = 9$ gives $\sqrt{9} = 3$
- **Perfect Square or Square number**: It is the square of some natural number. If $m = n^2$, then m is a perfect square number where m and n are natural numbers. Example: $1 = 1 \times 1 = 1$, $4 = 2 \times 2 = 2^2$.
- **Properties of Square number**:

  (i) A number ending in **2, 3, 7 or 8** is never a perfect square.

  Example: 152, 1028, 6593 etc.

  (ii) A number ending in **0, 1, 4, 5, 6 or 9** may not necessarily be a square number.

  Example: 20, 31, 24, etc.

  (iv) Square of odd numbers are odd. Example: $5^2 = 25$, $9^2 = 81$, etc.

  (v) A number ending in an **odd number of zeroes** cannot be a perfect square. Example: 10, 1000, 900000, etc.

  (vi) The difference of squares of two consecutive natural number is equal to their sum.

  $(n + 1)^2 - n^2 = n+1+n$. Example: $4^2 - 3^2 = 4 + 3 = 7$. $12^2 - 11^2 = 12+11 = 23$, etc.

  (vii) A triplet (m, n, p) of three natural numbers m, n and p is called Pythagorean triplet,

  if $m^2 + n^2 = p^2$: $3^2 + 4^2 = 25 = 5^2$

EX ; 6.1

1(i). What will be the unit digit of the square of 81?

Sol. The unit digit of the square of the number 81 will be 1.

1(ii). What will be the unit digit of the square of 272?

Sol. The unit digit of the square of the number 272 will be 4.

1(iii). What will be the unit digit of the square of 799?

Sol. The number 799 contains its unit's place digit 9. So, square of 9 is 81. Hence, unit's digit of square of 799 is 1.

1(iv). What will be the unit digit of the square of 3853 ?

Sol. The unit digit of the square of the number 3853 will be 9.

1(v). What will be the unit digit of the square of 1234 ?

Sol. The unit digit of the square of the number 1234 will be 6.

1(vi). What will be the unit digit of the square of 26387 ?

Sol. The unit digit of the square of the number 26387 will be 9.

1(vii). What will be the unit digit of the square of 52698 ?

Sol. The unit digit of the square of the number 52698 will be 4.

1(viii). What will be the unit digit of the square of 99880?

Sol. The unit digit of the square of the number 99880 will be 0.

1(ix). What will be the unit digit of the square of 12796?

Sol. The unit digit of the square of the number 12796 will be 6.

1(x). What will be the unit digit of the square of 55555?

Sol. The unit digit of the square of the number 55555 will be 5.

2(i). The number 1057 is obviously not perfect square. Give reason.

Sol. 1057. The number 1057 is not a perfect square because it ends with 7 whereas the square numbers end with 0,

1, 4, 5, 6 or 9.

2(ii). The number 23453 is obviously not a perfect square. Give a reason.

Sol. The number 23453 is not a perfect square because it ends with 3 whereas the square of a number end with 0,

1, 4, 5, 6 or 9.

2(iii). The number 7928 is obviously not perfect square. Give a reason?

Sol. The number 7928 is not a perfect square because it ends with 8 whereas the square numbers end with 0, 1, 4,

5, 6 or 9.

2(iv). The number 222222 is obviously not a perfect square. Give reason.

Sol. 222222. The number 222222 is not a perfect square because it ends with 2 where as the square numbers end

with 0, 1, 4, 5, 6 or 9.

2(v). The number 64000 is obviously not perfect square. Give reason.

Sol. 64000. The number 64000 is not a square number because the number of zero at the end of a square numbers

ending with zeroes is always even.

2(vi). The number 89722 is obviously not a perfect square. Give a reason.

Sol. The number 89722 is not a square number because it ends in 2 whereas the square numbers end with 0, 1, 4,

5, 6 or 9.

2(vii). The number 222000 is obviously not perfect square. Give reason.

Sol. 222000. The number 222000 is not a square number because the number of zeroes at end of a square number

ending with zeros is always even.

2(viii). The number 505050 is obviously not a perfect square. Give reason.

Sol. The number 505050 is not a square number because the number of zeroes at the end of a square number

ending with zero is always even.

3(i). Is the square of 431 will be an odd number?

Sol.

∴ 431 is an odd number

∴ Its Square will also be an odd number.

3(ii). Is the square of 2826 will be an odd number?

Sol. Because 2826 is an even number, therefore its square will not be an odd number.

3(iii). Is the square of 7779 will be an odd number?

Sol. Because 7779 is an odd number, therefore its square will be an odd number.

3(iv). Is the square of 82004 will be an odd number?

Sol. 82004 – Unit's digit of given number is 4 and square of 4 is 16.

Therefore, the square of 82004 would not be an odd number.

4. Observe the following pattern and find the missing digits.

$11^2 = 121$
$101^2 = 10201$
$1001^2 = 1002001$
$100001^2 = 1$ _____ 2 _____ 1
$10000001^2 =$ _____?

Sol. $112^2 = 121$

$1012^2 = 10201$

$10012^2 = 1002001$

$1000012^2 = 10000200001$

$100000012^2 = 100000020000001$

5. Observe the following pattern and find the missing numbers:

$11^2 = 121$
$101^2 = 10201$
$10101^2 = 102030201$
$1010101^2 =$ _____
_____ $^2 = 10203040504030201$

Sol. $112^2 = 121$

$1012^2 = 10201$

$101012^2 = 102030201$

$10101012^2 = 1020304030201$

$1010101012^2 = 10203040504030201$

6. Using the given pattern, find the missing numbers:

$1^2 + 2^2 + 2^2 = 3^2$
$2^2 + 3^2 + 6^2 = 7^2$
$3^2 + 4^2 + 12^2 = 13^2$
$4^2 + 5^2 + \_^2 = 21^2$
$5^2 + \_^2 + 30^2 = 31^2$
$6^2 + 7^2 + \_\_\_^2 = \_\_\_^2$

Sol. $4^2 + 5^2 + \underline{20}^2 = 21^2$

$5^2 + \underline{6}^2 + 30^2 = 31^2$

$6^2 + 7^2 + \underline{42}^2 = \underline{43}^2$

7(i). Without adding, find the sum: 1 + 3 + 5 + 7 + 9

Sol. As per the question, we have to find the sum of first five odd natural numbers.

Therefore, $1 + 3 + 5 + 7 + 9 = 5^2 = 25$

7(ii). Without adding, find the sum: 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 +17 + 19

Sol. We know that the sum of first n odd natural numbers = n^2

Therefore, $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 = 10^2 = 100$

7(iii). Without adding, find the sum: 1 + 3 + 5 + 7 + 9 + 11 +13 + 15 + 17 + 19 + 21 + 23

Sol. As per the question, we have to calculate the sum of first twelve odd natural numbers

Therefore, $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21 + 23 = 12^2 = 144$

8(i). Express 49 as the sum of 7 odd numbers.

Sol. $49 (= 7^2) = 1 + 3 + 5 + 7 + 9 + 11 + 13$

8(ii). Express 121 as the sum of 11 odd numbers.

Sol. $121 (= 11^2) = 1 + 3 + 5 + 7 + 9 + 11 + 13 +15 +17 + 19 + 21.$

9(i). How many number lie between square of the 12 and 13?

Sol. 12 and 13

Here, n = 12

∴ 2n = 2 ×× 12 = 24

So, 24 numbers lie between squares of the numbers 12 and 13.

9(ii). How many number lie between square of the 25 and 26?

Sol. Here, n = 25

∴2n = 2××25 = 50

So, 50 numbers lie between squares of the numbers 25 and 26.

9(iii). How many numbers lie between square of the 99 and 100?

Sol. Here, n = 99

∴ 2n = 2 ×× 99 = 198

So, 198 numbers lie between squares of the numbers 99 and 100.

EX : 6.2

1(i). Find the square of 32

Sol. 32 = 30 + 2

Therefore, $32^2 = (30 + 2)^2 = 900 + 2 \times 60 + 4 = 1024$

1(ii). Find the square of 35

Sol. 35 = 30 + 5

Therefore, $35^2 = (30 + 5)^2$

= 900 + 150 + 150 +25

= 1225

1(iii). Find the square of 86

Sol. 86 = 80 +6

Therefore, $86^2 = (80 + 6)^2$

= 6400 + 480 + 480 +36

= 7396

1(iv). Find the square of 93

Sol. 93 = 90 +3

Therefore, $93^2 = (90 + 3)^2$

= 8100 + 270 + 270 + 9

= 8649

1(v). Find the square of 71

Sol. 71

71 = 70 + 1

Therefore, $71^2 = (70 + 1)^2$

= 4900 + 70 + 70 + 1

= 5041

1(vi). Find the square of 46

Sol. 46 = 40 + 6

Therefore, $46^2 = (40 + 6)^2$

= 1600 + 240 + 240 + 36

= 2116

2(i). Write a Pythagorean triplet whose one number is 6

Sol. 2m = 6

∴ m = 6 / 2 = 3

$m^2 – 1 = 3^2 – 1 = 9 – 1 = 8$

and $m^2 + 1 = 3^2 + 1 = 9 + 1 = 10$

So, a Pythagorean triplet, whose one member is 6, is 6, 8, 10.

2(ii). Write a Pythagorean triplet whose one number is 14

Sol. Here, 2m = 14

∴ m=14 / 2 = 7

∴ $m^2 – 1 = 7^2 – 1 = 49 – 1 = 48$

And $m^2 + 1 = 7^2 + 1 = 49 + 1 = 50$

So, a Pythagorean triplet, whose one member is 14, is 14, 48, and 50.

2(iii). Write a Pythagorean triplet whose one number is 16

Sol. Here, 2m = 16

∴ m=162=8m=162=8

∴ $m^2 – 1 = 8^2 – 1 = 64 – 1 = 63$

and, $m^2 + 1 = 8^2 + 1 = 64 + 1 = 65$

So, a Pythagorean triplet, whose one member is 16 is 16, 63, 65.

2(iv). Write a Pythagorean triplet whose one number is 18

Sol. Here, 2m = 18

∴ m=182=9m=182=9

∴ $m^2 – 1 = 9^2 – 1 = 81 – 1 = 80$

And, $m^2 + 1 = 9^2 + 1 = 81 + 1 = 82$

So, a Pythagorean triplet, whose one member is 18, is 18, 80, and 82.

EX : 6.3

1(i). What could be the possible 'one's' digits of the square root of 9801?

Sol. The units digit of the square root of the number 98101 could be 1 or 9.

1(ii). What could be the possible 'one's' digits of the square root of 99856?

Sol. The units digit of the square root of the number 99856 could be 4 or 6.

1(iii). What could be the possible 'one's' digits of the square root of 998001.

Sol. The units digit of the square root of the number 998001 could be 1 or 9.

1(iv). What could be the possible 'one's' digits of the square root of 657666025?

Sol. The units digit of the square root of the number 657666025 could be 5.

2(i). Without any calculation, find whether 153 is a perfect square or not.

Sol. The number 153 is not a perfect square because it ends in 3 whereas the square numbers end with 0, 1, 4, 5, 6 or 9.

2(ii). Without any calculation, find whether 257 is a perfect square.

Sol. The number 257 is not a perfect square because it ends in 7 whereas the square numbers end with 0, 1, 4, 5, 6 or 9.

2(iii). Without any calculation, find whether 408 is a perfect square.

Sol. The number 408 is not a perfect square because it ends in 8 whereas the square numbers end with 0, 1, 4, 5, 6 or 9.

2(iv). Without any calculation, find whether 441 is a perfect square.

Sol. The number may be a perfect square as the square numbers end with 0, 1, 4, 5, 6 or 9.

Given number 441 has its digit 1. So it would be a perfect square number.

3(i). Find the square root of 169 by the method of repeated subtraction.

Sol.

169 – 1 = 168

168 – 3 = 165

165 – 5 = 160

160 – 7 = 153

153 – 9 = 144

144 – 11 = 133

133 – 13 = 120

120 – 15 = 105

105 – 17 = 88

88 – 19 = 69

69 – 21 = 48

48 – 23 = 25

25 – 25 = 0

Since from 169 we subtracted successive odd numbers starting from 1 and obtained 0 at the 13th step,

Therefore, 169−−−√169 = 13.

3(ii). Find the square root of 100 by the method of repeated subtraction.

Sol. 100

100 – 1 = 99

99 – 3 = 96

96 – 5 = 91

91 – 7 = 84

84 – 9 = 75

75 – 11 = 64

64 – 13 = 51

51 – 15 = 36

36 – 17 = 19

19 – 19 = 0

Since from 100 we subtracted successive odd numbers starting from 1 and obtained 0 at the 10th step.
Therefore, 100−−−√100 = 10.

4(i). Find the square root of 729 by the Prime Factorisation Method.

Sol. The prime factorisation of 729 is

729 = 3 × 3 × 3 × 3 × 3 × 3

By pairing the prime factors, we get

729 = 3 ×× 3 ×× 3 ×× 3 ×× 3 ×× 3

3	729
3	243
3	81
3	27
3	9
	3

So, 729−−−√729 = 3 ×× 3 ×× 3 = 27

4(ii). Find the square root of 400 by the Prime Factorisation Method.

Sol. 400

The prime factorisation of 400 is

400 = 2 ×× 2 ×× 2 ×× 2 ×× 5 ×× 5

By pairing the prime factors, we get

400 = 2 ×× 2 ×× 2 ×× 2 ×× 5 ×× 5

2	400
2	200
2	100
2	50
5	25
	5

Therefore, 400−−−√400 = 2 ×× 2 ×× 5 = 20

4(iii). Find the square root of 1764 by the Prime Factorisation Method.

Sol. 1764

The prime factorisation of 1764 is

1764 = 2 ×× 2 ×× 3 ×× 3 ×× 7 ×× 7

By pairing the prime factors, we get

2	1764
2	882
3	441
3	147
7	49
	7

1764 = 2 ×× 2 ×× 3 ×× 3 ×× 7 ×× 7

So, 1764−−−−√1764 = 2 ×× 3 ×× 7= 42

4(iv). Find the square root of 4096 by the Prime Factorisation Method.

Sol. 4096

The prime factorisation of 4096 is

4096 = 2 ×× 2 ×× 2 ×× 2 ×× 2 ×× 2 ××2 ×× 2 ×× 2 ×× 2 ×× 2 ×× 2

By pairing the prime factors, we get

2	4096
2	2048
2	1024
2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
	2

4096 = 2 ×× 2 ×× 2 ×× 2 ××2 ×× 2 ×× 2 ×× 2 ××2 ××2 ×× 2 ×× 2

So, 4096−−−−√4096 = 2 ×× 2 ×× 2 ×× 2 ×× 2 ×× 2 = 64

4(v). Find the square root of 7744 by the Prime Factorisation Method.

Sol. The prime factorisation of 7744 is

7744 = 2 ×× 2 ×× 2 ×× 2 ×× 2 ×× 2×× 11 ×× 11

By pairing the prime factors, we get

2	7744
2	3872
2	1936
2	968
2	484
2	242
11	121
	11

7744 = 2 ×× 2 ×× 2 ×× 2×× 2 ×× 2×× 11 ×× 11

So, 7744−−−−√7744 = 2 2 ×× 2××11 = 88

4(vi). Find the square root of 9604 by the Prime Factorisation Method.

Sol. The prime factorisation of 9604 is

9604 = 2 ×× 2 ×× 7 ×× 7 ×× 7 ×× 7

By pairing the prime factors, we get

2	9604
2	4802
7	2401
7	343
7	49
	7

9604 = 2 ×× 2 ×× 7 ×× 7 ××7 ×× 7

So, 9604−−−−√9604 = 2 ×× 7 ×× 7 = 98

4(vii). Find the square root of 5929 by the Prime Factorisation Method.

Sol. The prime factorisation of 5929 is

5929 = 7 ×× 7 ×× 11 ×× 11

By pairing the prime factors, we get

7	5929
7	847
11	121
	11

5929 = 7 ×× 7 ×× 11 ×× 11

So, 5929−−−−√5929 = 7 ×× 11 = 77

4(viii). Find the square root of 9216 by the Prime Factorisation Method.

Sol. The prime factorisation of 9216 is

9216 = 2 ×× 2 ×× 2 ×× 2 ×× 2 ×× 2 ×× 2 ×× 2 ×× 2 ×× 2 ×× 3 ×× 3

By pairing the prime factors, we get

2	9216
2	4608
2	2304
2	1152
2	576
2	288

2	144
2	72
2	36
2	18
3	9
	3

9216 = 2 ×× 2 ×× 2 ×× 2 ×× 2 ×× 2 ×× 2 ×× 2 ×× 2 ×× 2 ×× 3 ×× 3

So, 9216−−−−√9216 = 2 ×× 2 ××2 ×× 2 ×× 2 ×× 3

4(ix). Find the square root of 529 by the Prime Factorisation Method.

Sol. The prime factorisation of 529 is

529 = 23 ×× 23

By pairing the prime factors, we get

23	529
	23

529 = 23 ×× 23

So, 529−−−√529 = 23

4(x). Find the square root of 8100 by the Prime Factorisation Method.

Sol. The prime factorisation of 8100 is

8100 = 2 ×× 2 ×× 3 ×× 3 ×× 3 ×× 3 ×× 5 ×× 5

By pairing the prime factors, we get

2	8100
2	4050
3	2025
3	675
3	225
3	75
5	25
	5

8100 = 2 ×× 2 ×× 3 ×× 3 ×× 3 ×× 3 ×× 5 ×× 5

So, 8100−−−−√8100 = 2 ×× 3 ×× 3 ×× 5 = 90.

EX : 6.4

1(i). Find the square root of 2304 by Division method.

Sol.

```
      48
   ---------
4 | 23  04
  | -16
  ---------
88|  7  04
  | -7  04
  ---------
  |   0
```

Therefore, 2304−−−−√2304 = 48

1(ii). Find the square root of 4489 by Division method.

Sol.

```
      67
   ---------
6 | 44  89
  | -36
  ---------
127|  8  89
   | -8  89
   ---------
   |   0
```

Therefore, 4489−−−−√4489 = 67

1(iii). Find the square root of 3481 by Division method.

Sol.

```
      59
   ---------
5 | 34  81
  | -25
  ---------
109|  9  81
   | -9  81
   ---------
   |   0
```

Therefore, 3481−−−−√3481 = 59

1(iv) Find the square root of 529 by Division method.

Sol.

```
      23
   ┌──────
 2 │ 5 29
   │ -4
   ├──────
43 │  1 29
   │ -1 29
   ├──────
   │  0
```

Therefore, 529−−−√529 = 23

1(v) Find the square root of 3249 by Division method.

Sol.

```
      57
   ┌──────
 5 │ 32 49
   │ -25
   ├──────
107 │  7 49
   │ -7 49
   ├──────
   │  0
```

Hence, the square root of 3249 is 57.

1(vi). Find the square root of 1369 by Division method.

Sol.

```
      37
   ┌──────
 3 │ 13 69
   │ -9
   ├──────
67 │  4 69
   │ -4 69
   ├──────
   │  0
```

Therefore, 1369−−−−√1369=37

1(vii). Find the square root of 5776 by Division method.

Sol.

```
      76
   ┌──────
 7 │ 57 76
   │ -49
   ├──────
146 │  8 76
   │ -8 76
   ├──────
   │  0
```

Therefore, 5776−−−−√5776=76

1(viii). Find the square root of 7921 by Division method.

Sol.

```
      89
   ┌──────
 8 │ 79 21
   │ -64
   ├──────
169│  15 21
   │ -15 21
   ├──────
   │   0
```

Therefore, 7921−−−−√7921=89

1(ix). Find the square root of 576 by Division method.

Sol.

```
      24
   ┌──────
 2 │ 5 76
   │ -4
   ├──────
44 │  1 76
   │ -1 76
   ├──────
   │   0
```

Therefore, 576−−−√576=24

1(x). Find the square root of 1024 by Division method.

Sol.

```
      32
   ┌──────
 3 │ 10 24
   │ -9
   ├──────
62 │  1 24
   │ -1 24
   ├──────
   │   0
```

Therefore, 1024−−−−√1024=32

1(xi). Find the square root of 3136 by Division method.

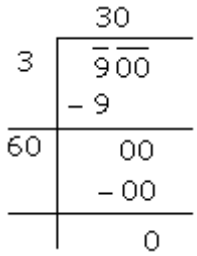
Sol.

```
      56
   ┌──────
 5 │ 31 36
   │ -25
   ├──────
106│  6 36
   │ -6 36
   ├──────
   │   0
```

Therefore, 3136−−−−√3136=56

1(xii). Find the square root of 900 by Division method.

Sol.



Therefore, 900−−−√900=30

2(i). Find the number of digits in the square root of 64 (without any calculation).

Sol. Number (n) of digits in 64 = 2 which is even.

∴ Number of digits in the square root of 64= n / 2 = 1

2(ii). Find the number of digits in the square root of 144 (without any calculation).

Sol. Number(n) of digits in 144 = 3 which is odd.

∴ Number of digits in the square root of 144 = $\frac{n+1}{2} = \frac{3+1}{2} = \frac{4}{2} = 2$

2(iii). Find the number of digits in the square root of 4489 (without any calculation).

Sol. Number (n) of digits in 4489 = 4 which is even.

∴ Number of digits in the square root of 4489 = $\frac{n}{2} = \frac{4}{2} = 2$

2(iv). Find the number of digits in the square root of 27225 (without any calculation).

Sol. Number (n) of digits in 27225 = 5 which is odd.

∴ Number of digits in the square root of 27225 = = $\frac{n+1}{2} = \frac{5+1}{2} = \frac{6}{2} = 3$

2(v). Find the number of digits in the square root of 390625 (without any calculation).

Sol. Number (n) of digits in 390625 = 6 which is even.

∴ Number of digits in the square root of 390625 = = $\frac{n}{2} = \frac{6}{2} = 3$

3(i). Find the square root of 2.56 decimal number.

Sol.

$$\begin{array}{r|l} & 1.6 \\ \hline 1 & \overline{2}.\overline{56} \\ & -1 \\ \hline 26 & 1\ 56 \\ & -1\ 56 \\ \hline & 0 \end{array}$$

Hence, 2.56−−−−√2.56=1.6

3(ii). Find the square root of 7.29 decimal number.

Sol.

$$\begin{array}{r|l} & 2.7 \\ \hline 2 & 7.\overline{29} \\ & -4 \\ \hline 47 & 3\ 29 \\ & -3\ 29 \\ \hline & 0 \end{array}$$

Hence, 7.29−−−−√7.29=2.7

3(iii). Find the square root of 51.84 decimal number.

Sol.

$$\begin{array}{r|l} & 7.2 \\ \hline 7 & 51.84 \\ & -49 \\ \hline 142 & 2\ 84 \\ & -2\ 84 \\ \hline & 0 \end{array}$$

Hence, 51.84−−−−√51.84=7.2

3(iv). Find the square root of 42.25 decimal number.

Sol.

$$\begin{array}{r|l} & 6.\ \ 5 \\ \hline 6 & \overline{42}.\overline{25} \\ & -36 \\ \hline 125 & 6\ 25 \\ & -6\ 25 \\ \hline & 0 \end{array}$$

Hence, 42.25−−−−√42.25=6.5

3(v). Find the square root of 31.36 decimal number.

Sol.

```
      5. 6
   ┌──────
 5 │ 31. 36
   │ -25
   ├──────
106│   6 36
   │ - 6 36
   ├──────
   │     0
```

Hence $\sqrt{31.36} = 5.6$

4(i). Find the least number which must be subtracted from 402 so as to get a perfect square. Also find the square root of the perfect square so obtained.

Sol.

```
      2  0
   ┌──────
 2 │ 4 02
   │ - 4
   ├──────
40 │   02
   │ - 00
   ├──────
   │   2
```

This shows that 20^2 is less than 402 by 2. This means, if we subtract the remainder from the number, we get a perfect square, So, the required least number is 2.

Therefore, the required perfect square is 402 – 2 = 400.

Hence, 400−−−√400=20.

4(ii). Find the least number which must be subtracted from 1989 so as to get a perfect square. Also find the square root of t perfect square so obtained.

Sol.

```
      4 4
   ┌──────
 4 │ 19 89
   │ - 16
   ├──────
84 │   3 89
   │ - 3 36
   ├──────
   │    53
```

This shows that 44^2 is less than 1989 by 53. This means, if we subtract the remainder from the number, we

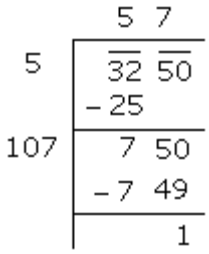
get a perfect square, So, the required least number is 53.

Therefore, the required perfect square is 1989 – 53 = 1936.

Hence, 1936−−−−√1936=44.

4(iii). Find the least number which must be subtracted from 3250 so as to get a perfect square. Also find the square root of the perfect square so obtained.

Sol.



This shows that 57^2 is less than 3250 by 1. This means, if we subtract the remainder from the number, we

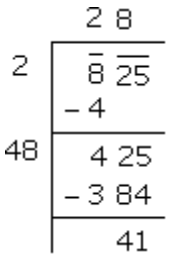
get a perfect square, So, the required least number is 1.

Therefore, the required perfect square is 3250 – 1 = 3249

Hence, 3249−−−−√3249=57.

4(iv). Find the least number which must be subtracted from 825 so as to get a perfect square. Also find the square root of the perfect square so obtained.

Sol.



This shows that 28^2 is less than 825 by 41. This means, if we subtract the remainder from the number, we

get a perfect square, So, the required least number is 41.

Therefore, the required perfect square is 825 – 41 = 784

Hence, 784−−−√784=28.

4(v). Find the least number which must be subtracted from 4000 so as to get a perfect square. Also find the square root of the perfect square so obtained.

Sol.

```
        63
    ---------
 6  | 40 00
    | -36
    ---------
123 |  4 00
    | -3 69
    ---------
    |    31
```

This shows that 63^2 is less than 4000 by 31. This means, if we subtract the remainder from the number, we

get a perfect square, So, the required least number is 31.

Therefore, the required perfect square is 4000 – 31 = 3969.

Hence, 3969−−−−√3969=63.

5(i). Find the least number which must be added to 525 so as to get a perfect square. Also find the square root of the perfect square so obtained.

Sol.

```
       22
    -------
 2  | 5 25
    | -4
    -------
42  | 1 25
    |  -84
    -------
    |   41
```

This shows that $22^2 < 525$.

Next perfect square is $23^2 = 529$.

Hence, the number to be added is $23^2 – 525 = 529 – 525 = 4$

Therefore, the perfect square so obtained is 525 + 4 = 529.

Hence, 529−−−√529=23.

5(ii). Find the least number which must be added to 1750 so as to get a perfect square. Also find the square root of the perfect square so obtained.

Sol.

```
       41
    --------
 4  | 17 50
    | -16
    --------
81  |  1 50
    | -  81
    --------
    |    69
```

This shows that $41^2 < 1750$

Next perfect square is $42^2 = 1764$

Hence, the number to be added is $42^2 – 1750 = 1764 – 1750 = 14$

Therefore, the perfect square so obtained is 1750 + 14 = 1764.

Hence, 1764−−−−√1764= 42.

5(iii). Find the least number which must be added to 252 so as to get a perfect square. Also find the square root of the perfect square so obtained.

Sol.

```
     15
   ------
1 | 2 52
  - 1
  ------
25| 1 52
  - 1 25
  ------
    27
```

This shows that $15^2 < 252$

Next perfect square is $16^2 = 256$

Hence, the number to be added is $16^2 – 252 = 256 – 252 = 4$

Therefore, the perfect square so obtained is 252 + 4 = 256

Hence, 256−−−√256 = 16.

5(iv). Find the least number which must be added to 1825 so as to get a perfect square. Also find the square root of the perfect square so obtained.

Sol.

```
     42
   ------
4 | 18 25
  - 16
  ------
82|  2 25
  - 1 64
  ------
     61
```

This shows that $42^2 < 1825$

Next perfect square is $43^2 = 1849$

Hence, the number to be added is $43^2 – 1825 = 1849 – 1825 = 24$

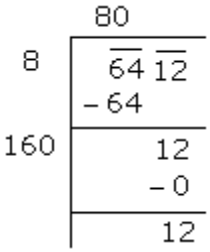
Therefore, the perfect square so obtained is 1825 + 24 = 1849

Hence, 1849−−−−√1849 = 43.

5(v). Find the least number which must be added to 6412 so as to get a perfect square. Also find the

square root of the perfect square so obtained.

Sol.



This shows that $80^2 < 6412$

Next perfect square is $81^2 = 6561$

Hence, the number to be added is $81^2 - 6412 = 6561 - 6412 = 149$

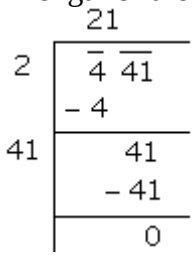
Therefore, the perfect square so obtained is $6412 + 149 = 6561$

Hence, $6561 \overline{\quad\quad} \sqrt{} = 816561 = 81$.

6. Find the length of the side of a square where area is 441 m^2.

Sol. Area of the square = 441 m^2

∴ Length of the side of the square $= 441 \overline{\quad\quad} \sqrt{} m = 441 m$



Therefore, $= 441 \overline{\quad\quad} \sqrt{} = 21 = 441 = 21$.

Hence, the length of the side of the square is 21 m.

7(i). In a right triangle ABC, ∠∠B = 90°. If AB = 6 cm, BC = 8 cm, find AC.

Sol. In the right triangle ABC,

∵ ∠B = 90° . . . . [given]

∴ By Pythagoras theorem

∴ $AC^2 = AB^2 + BC^2$

$\therefore AC^2 = 6^2 + 8^2$

$\therefore AC^2 = 36 + 64$

$\therefore AC^2 = 100$

$\therefore AC = 100 - - - \sqrt{100}$

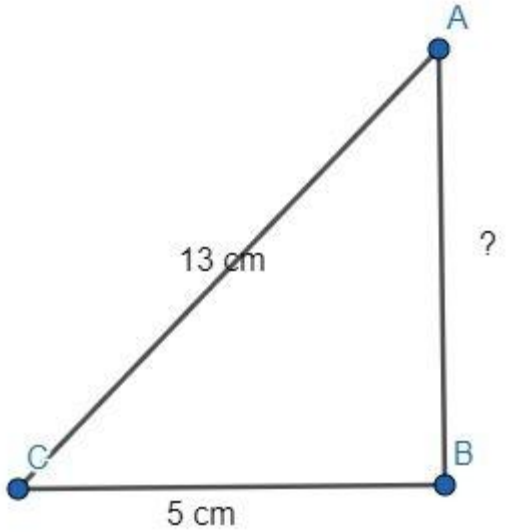
$$
\begin{array}{r|l}
 & 10 \\
\hline
1 & \overline{1}\,\overline{00} \\
 & -1 \\
\hline
20 & 00 \\
 & -0 \\
\hline
 & 0
\end{array}
$$

Therefore, $100 - - - \sqrt{} = 10100 = 10$.

Hence, AC is equal to 10 cm.

7(ii). In a right triangle ABC, ∠B=90∘∠B=90∘. If AC = 13 cm, BC = 5 cm, find AB.

Sol.



It is given that △ABC△ABC is right-angled at B

Pythagoras Theorem: In a right angles triangle, the square of the hypotenuse is equal to the sum of squares of the other two sides.

Therefore, by using Pythagoras theorem, we get: $AC^2 = AB^2 + BC^2$

$\Rightarrow 13^2 = AB^2 + 5^2$

$\Rightarrow AB^2 = 169 - 25$

$\Rightarrow AB^2 = 144$

$\Rightarrow \sqrt{AB} = 144$

AB = 12

Therefore, AB = 12 cm

8. A gardener has 1000 plants. He wants to plant these in such a way that the number of rows and the number of columns remain same. Find the minimum number of plants he needs more for this.

Sol. Let the number of rows be x

Then the number of columns in x

So, the number of plants is x ×× x = x^2

which is a perfect square.

Let us find out the square root of 1000 by division method.

```
          31
    |-----------
  3 | ‾‾ ‾‾
    | 10 00
    |-9
    |-----------
 61 | 100
    | -61
    |-----------
    |   39
```

This shows that $31^2 < 1000$.

Next perfect square number is $32^2 = 1024$.

Hence, the minimum number of plants he needs more for this = 1024 – 1000 = 24.

9. There are 500 children in a school. For a P.T. drill they have to stands in such a manner that the number of rows is equal to number of columns. How many children would be left out in this arrangement.

Sol. Let the number of rows be x

Then the number of columns in x

So, the number of plants is x ×× x = x^2

which is a perfect square.

Let us find out the square root of 500 by division method.

```
        22
   ┌─────────
 2 │  5̄  0̄0̄
   │ -4
   ├─────────
42 │  100
   │ - 84
   ├─────────
   │   16
```

We get the remainder 16. It shows that 22^2 is less than 500 by 16.

This means that 16 children would be left out in this arrangement.

Worksheet
Class 08 - Mathematics (Square and square roots)

General Instructions: All questions are compulsory.

Q.1 to Q.2 carries one mark each.

Q.3 to Q.7 carries two marks each.

Q.8 and Q.9 carries three marks each.

Q.10 to Q.12 carries four marks each.

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1. What will be the unit digit of the square of 55555 ?
2. Without calculating square roots, find the number of digits in the square root of 36864.
3. **State true or false:**
    1. 24 numbers lie between squares of the number 12 and 13.
    2. The value of $\sqrt{1.030225}$ is 1.015
    3. The smallest number by which 32 should be multiplied so as to get perfect square is 2.
    4. If $10^2 = 100$, then the square root of 100 is 1000.
4. **Fill up the following:**

    a. 49 as the sum of odd number is ______.

b. The square root of 1.21 is _____.
c. The square root of 20 lies the pair of whole numbers between _____.
d. The square root of 196 is _____.

5. The following numbers are obviously not perfect squares. Give reason.
   (i) 222000
   (ii) 505050
6. Is 1069 perfect square ? How do we know ?
7. Find the least number which must be added to 252 so as to get a perfect square. Also find the square root of the perfect square so obtained.
8. Find the least number which must be subtracted from 402 so as to get a perfect square. Also find the square root of the perfect square so obtained.
9. By what number should 14700 be divided to get a perfect square? Also find the square root of the perfect square obtained.
10. Find the smallest whole number with which 252 should be divided so as to get a perfect square. Also find the square root of the square number so obtained.