



8th Standard

Based on the New Textbook & New Syllabus for 2019-20



Term-wise Guide as per the New Textbook for the year 2019-20, for Term - III

Complete Solutions to Textbook Exercises.

Exhaustive Additional Questions in all Units.

Chapter-wise Unit Tests.

Sura's Public Exam Model Question Papers (Based on 3 terms) for the year 2019 - 20 are given with Answers.



Chennai

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It gives me great pride and pleasure in bringing to you for
for . It is prepared as per the New Syllabus and New Textbook
for Term-III for the year 2019-20.

This guide encompasses all the requirements of the students to comprehend the text and the evaluation of the textbook.

- ◆ Additional questions have been provided exhaustively for clear understanding of the units under study.
- ◆ Chapter-wise Unit Test are given.

In order to learn effectively, I advise students to learn the subject section-wise and practice the exercises given. It will be a teaching companion to teachers and a learning companion to students.

Though these salient features are available in this Guide, I cannot negate the indispensable role of the teachers in assisting the student to understand the subject thoroughly.

I sincerely believe this guide satisfies the needs of the students and bolsters the teaching methodologies of the teachers.

I pray the almighty to bless the students for consummate success in their examinations.

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NUMBERS

The square numbers end in 0, 1, 4, 5, 6 or 9 only.

If a number ends with 1 or 9, its square ends with 1.

If a number ends with 2 or 8, its square ends with 4.

If a number ends with 3 or 7, its square ends with 9.

If a number ends with 4 or 6, its square ends with 6.

If a number ends with 5 or 0 its square also ends with 5 or 0 respectively.

Square of an odd number is always odd and the square of an even number is always even.

Numbers that end with 2,3,7 and 8 are not perfect squares.

A natural number n is called a square number, if we can find another natural number m such that $n = m^2$

We have $4^2 = 16$ this says real as 4 squared is 16. Here 2 at the top stands for squared and it indicates the number of times the number 4 appears in the product $4 \times 4 = 4^2 = 16$.

$$(1 + 2 + 3 + \dots + n)^2 = 1^3 + 2^3 + 3^3 + \dots + n^3$$

The sum of the first n consecutive odd natural numbers is n^2

The square of an odd number can be written as the sum of two consecutive natural numbers.

A perfect number (positive number which is equal to sum of its divisors excluding the number itself) cannot be a square number.

Three numbers a, b, c make a pythagorean triplet, if the sum of the squares of any two equals the square of the third (i.e.) $a^2 + b^2 = c^2$ (or) $b^2 + c^2 = a^2$ or $c^2 + a^2 = b^2$

The square root of a number n , written as $\sqrt{n}$ or $n^{\frac{1}{2}}$ is the number that gives n when multiplied by itself. (eg) $\sqrt{81} = 9$, because $9 \times 9 = 81$.

VIII Std - Mathematics

The cube root of a number is the value that when cubed, gives the original number.

Cube root of a number x is denoted as $\sqrt[3]{x}$ or $x^{\frac{1}{3}}$.

An expression that represents repeated multiplication of the same factor is called a power.

The exponent corresponds to the number of times the base is used as a factor

Laws of exponent:

$$(i) \quad a^m \times a^n = a^{m+n} \qquad (ii) \quad \frac{a^m}{a^n} = a^{m-n}$$

$$(iii) \quad (a^m)^n = a^{mn}$$

Some more results:

$$(i) \quad a^0 = 1 \text{ (if } a \neq 0) \qquad (ii) \quad a^{-m} = \frac{1}{a^m}$$
$$(iii) \quad a^m \times b^m = (ab)^m \qquad (iv) \quad \frac{a^m}{b^m} = \left(\frac{a}{b}\right)^m$$

To write in scientific notation, follow the form $N \times 10^a$ where N is a number between 1 and 10 but not 10 itself and a is an integer.



Page No. 3

1. Is the square of a prime number, prime?

No, the square of a prime number 'P' has at least 3 divisors 1, P and P^2 . But a prime number is a number which has only two divisors, 1 and the number itself. So square of a prime number is not prime.

2. Will the sum of two perfect squares, always a perfect square? What about their difference and their product?

The sum of two perfect squares, need not be always a perfect square. Also the difference of two perfect squares need not be always a perfect square. But the product of two perfect square is a perfect square.



Page No. 3

Consider the following square numbers: (i) 441 (ii) 225 (iii) 289 (iv) 1089. Express each of them as the sum of two consecutive positive integers.

- (i) $441 = 220 + 221$
- (ii) $225 = 112 + 113$
- (iii) $289 = 144 + 145$
- (iv) $1089 = 544 + 545$



Verify the following statements:

- (i) The square of a natural number, other than 1, is either a multiple of 3 or exceeds a multiple of 3 by 1.

Square number	Remainder when divided by 3
$2^2 = 4 = 3 \times 1 + 1$	1
$3^2 = 9 = 3 \times 3 + 0$	0
$4^2 = 16 = 3 \times 5 + 1$	1
$5^2 = 25 = 3 \times 8 + 1$	1
$6^2 = 36 = 3 \times 12 + 0$	0
$7^2 = 49 = 3 \times 16 + 1$	1
$8^2 = 64 = 3 \times 21 + 1$	1
$\vdots$	$\vdots$

Hence verified that the square of a natural number other than 1, is either a multiple of 3 or exceeds a multiple of 3 by 1.

- (ii) The square of a natural number, other than 1, is either a multiple of 4 or exceeds a multiple of 4 by 1.

Square number	Remainder when divided by 4
$2^2 = 4 = 4 \times 1 + 0$	0
$3^2 = 9 = 4 \times 2 + 1$	1
$4^2 = 16 = 4 \times 4 + 0$	0
$5^2 = 25 = 4 \times 6 + 1$	1
$6^2 = 36 = 4 \times 9 + 0$	0
$7^2 = 49 = 4 \times 12 + 1$	1
$8^2 = 64 = 4 \times 16 + 0$	0
$9^2 = 81 = 4 \times 20 + 1$	1
$\vdots$	$\vdots$

So a perfect square leaves remainder 0 or 1 on division by 4.

- (iii) The remainder of a perfect square when divided by 3, is either 0 or 1 but never 2.

Square number	Remainder when divided by 3
$2^2 = 4 \Rightarrow 4 \div 3 \Rightarrow Q = 1; R = 1$	1
$3^2 = 9 \Rightarrow 9 \div 3 \Rightarrow Q = 3; R = 0$	0
$4^2 = 16 \Rightarrow 16 \div 3 \Rightarrow Q = 5; R = 1$	1
$5^2 = 25 \Rightarrow 25 \div 3 \Rightarrow Q = 8; R = 1$	1

2.

- | | |
|--|--------------|
| (i) When a square number ends in 6, its square root will have 6 in the unit's place. | True |
| (ii) A square number will not have odd number of zeros at the end. | True |
| (iii) The number of zeros in the square of 961000 is 9. | False |
| (iv) (7, 24, 25) is a Pythagorean triplet. | True |
| (v) The square root of 221 is 21. | False |

3. What will be the ones digit in the squares of the following numbers?

(i) 36 (ii) 252 (iii) 543

- (i) If a number ends with 6, its square ends with 6.
 $\therefore$ Ones' digit in the square of 36 is 6.
- (ii) If a number ends with 2, its square ends with 4.
 $\therefore$ Ones' digit in the square of 252 is 4
- (iii) If a number ends with 3, its square ends with 9.
 $\therefore$ Ones' digit in the square of 543 is 9.

4. Study the given numbers and justify why each of them obviously cannot be a perfect square.

(i) 1000 (ii) 34567 (iii) 408

We know that the numbers end with odd number of zeros, 7 and 8 not perfect squares.
 $\therefore$ 1000, 34567 and 408 cannot be perfect squares.

5. Find the sum without actually adding the following odd numbers:

(i) $1 + 3 + 5 + 7 + \dots + 35$

(ii) The first 99 odd natural numbers.

$1 + 3 + 5 + 7 + \dots + 35$.

Here there are 18 odd numbers from 1 to 35.

Sum of first n consecutive odd natural numbers = n^2

$\therefore$ Sum of first 18 consecutive odd

$$\text{natural numbers} = 18^2 = 18 \times 18 = 324$$

(ii) The first 99 odd natural numbers.

Sum of first n consecutive natural numbers = n^2

$\therefore$ Sum of 99 odd natural numbers = $99^2 = 99 \times 99 = 9801$

6. Express (i) 15^2 and (ii) 19^2 as the sum of two consecutive positive integers.

(i) $15^2 = 225$

$$15^2 = \frac{15^2 - 1}{2} + \frac{15^2 + 1}{2}$$

$$15^2 = \frac{225 - 1}{2} + \frac{225 + 1}{2}$$

$$15^2 = \frac{224}{2} + \frac{226}{2} \Rightarrow 15^2 = 112 + 113$$

18
 $\times 18$
 144
 18
 324
 99
 $\times 99$
 891
 891
 9801

2. Find the square root of

(i) 19.36 (ii) 1.2321 (iii) 116.64

(i) 19.36

$$\begin{array}{r} \sqrt{} \\ 4 \overline{) 19.36} \\ \underline{16} \\ 3 \\ \underline{3} \\ 0 \end{array}$$

$$\sqrt{19.36} = 4.4$$

(ii) 1.2321

$$\begin{array}{r} \sqrt{} \\ 1 \overline{) 1.2321} \\ \underline{1} \\ 23 \\ \underline{21} \\ 21 \\ \underline{21} \\ 0 \end{array}$$

$$\sqrt{1.2321} = 1.11$$

(iii) 116.64

$$\begin{array}{r} \sqrt{} \\ 1 \overline{) 116.64} \\ \underline{1} \\ 16 \\ \underline{16} \\ 0 \\ 64 \\ \underline{64} \\ 0 \end{array}$$

$$\sqrt{116.64} = 10.8$$



$\sqrt{36} = 6$	$\sqrt{9} \times \sqrt{4} = 3 \times 2 = 6$	Is $\sqrt{36} = \sqrt{9} \times \sqrt{4}$? -
$\sqrt{144} =$	$\sqrt{9} \times \sqrt{16} = \times =$	Is $\sqrt{144} = \sqrt{9} \times \sqrt{16}$? -
$\sqrt{100} =$	$\sqrt{25} \times \sqrt{4} = \times =$	Is $\sqrt{100} = \sqrt{25} \times \sqrt{4}$? -
$\sqrt{81} =$	$\sqrt{9} \times \sqrt{9} = \times =$	Is $\sqrt{81} = \sqrt{9} \times \sqrt{9}$? -
$\sqrt{144} =$	$\sqrt{36} \times \sqrt{4} = \times =$	Is $\sqrt{144} = \sqrt{36} \times \sqrt{4}$? -
$\sqrt{1225} =$	$\sqrt{25} \times \sqrt{49} = \times =$	Is $\sqrt{1225} = \sqrt{25} \times \sqrt{49}$? -



Attempt to prepare a table of square root problems as in the above case to show that if a and b are two perfect square numbers, then $\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$ ($b \neq 0$) We can use this idea to compute easily certain square-root problems.

$\sqrt{25} = 5$	$\frac{\sqrt{625}}{\sqrt{25}} = \frac{\quad}{\quad} =$	Is $\sqrt{25} = \sqrt{5} \times \sqrt{5}$? -
$\sqrt{625} =$	$\frac{\sqrt{15625}}{\sqrt{625}} = \frac{\quad}{\quad} =$	Is $\sqrt{625} = \sqrt{25} \times \sqrt{25}$? -
$\sqrt{15,625} =$	$\frac{\sqrt{625}}{\sqrt{25}} = \frac{\quad}{\quad} =$	Is $\sqrt{15625} = \sqrt{125} \times \sqrt{125}$? -
$\sqrt{81} =$	$\frac{\sqrt{9}}{\sqrt{9}} = \frac{\quad}{\quad} =$	Is $\sqrt{9} = \sqrt{\frac{81}{9}}$? -

12. The number of digits in the square root of 123454321 is

- (a) 4 (b) 5 (c) 6 (d) 7 5

$$= \frac{n+1}{2} = \frac{10}{2} = 5$$



Page No. 17

Find the ones digit in the cubes of each of the following numbers.

(i) 17 (ii) 12 (iii) 38 (iv) 53 (v) 71 (vi) 84

(i) 17

17 ends with 7, so its cube ends with 3
i.e, ones digit in 17^3 is 3.

(ii) 12

12 ends with 2, so its cube ends with 8
i.e, ones digit in 12^3 is 8.

(iii) 38

38 ends with 8, so its cube ends with 2
i.e, ones digit in 38^3 is 2.

(iv) 53

53 ends with 3, so its cube ends with 7.
i.e, ones digit in 53^3 is 7.

(v) 71

71 ends with 1, so its cube ends with 1
i.e, ones digit in 71^3 is 1

(vi) 84

84 ends with 4, so its cube ends with 4
i.e, ones digit in 84^3 is 4.



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Find the smallest number by which 675 must be divided to obtain a perfect cube.

$$\begin{aligned} \text{We find that } 675 &= 3 \times 3 \times 3 \times 5 \times 5 \\ &= 3 \times 3 \times 3 \times 5 \times 5 \end{aligned}$$

Here we have an ungrouped 5×5 .

So if we divide 675 by 5×5 then the new number will be a perfect cube.

$$\text{ie. } 675 \div 25 = 27$$

The new number is 27

$$\sqrt[3]{27} = \sqrt[3]{3 \times 3 \times 3} = 3$$

3	675
3	225
3	75
5	25
5	5
	0

3. Evaluate : (i) $\left(\frac{1}{2}\right)^3$

$$\left(\frac{1}{2}\right)^3 = \frac{1^3}{2^3} = \frac{1}{2 \times 2 \times 2} = \frac{1}{8}$$

(ii) $\left(\frac{1}{2}\right)^{-5}$

$$\left(\frac{1}{2}\right)^{-5} = \frac{1^{-5}}{2^{-5}} = \frac{1}{2^{-5}} = 2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32$$

(iii) $(-3)^{-3}$

$$(-3)^{-3} = \frac{1}{(-3)^3} = \frac{1}{-3 \times -3 \times -3} = \frac{1}{-27} = -\frac{1}{27}$$

(iv) $(-3)^4$

$$(-3)^4 = -3 \times -3 \times -3 \times -3 = 81$$

(v) $\left(\frac{-5}{6}\right)^{-3}$

$$\left(\frac{-5}{6}\right)^{-3} = \frac{(-5)^{-3}}{6^{-3}} = \frac{6^3}{(-5)^3} = \frac{6 \times 6 \times 6}{-5 \times -5 \times -5} = -\frac{216}{125}$$

(vi) $(2^{-5} \div 2^7) \times 2^{-2}$

$$\begin{aligned} (2^{-5} \div 2^7) \times 2^{-2} &= (2^{-5-7}) \times 2^{-2} \\ &= 2^{-12} \times 2^{-2} \\ &= 2^{-12+(-2)} \\ &= 2^{-14} \end{aligned}$$

(vii) $(2^{-1} \times 3^{-1}) \div 6^{-2}$

$$\begin{aligned} (2^{-1} \times 3^{-1}) \div 6^{-2} &= (2 \times 3)^{-1} \div 6^{-2} \\ &= (6)^{-1} \div 6^{-2} \\ &= 6^{(-1)-(-2)} = 6^1 = 6 \end{aligned}$$

(viii) $\left(-\frac{1}{3}\right)^{-2}$

$$\begin{aligned} \left(-\frac{1}{3}\right)^{-2} &= \left(-\frac{3}{1}\right)^2 = \frac{(-3)^2}{1^2} = \frac{-3 \times -3}{1} \\ &= 9 \end{aligned}$$

4. Evaluate : (i) $\left(\frac{2}{5}\right)^4 \times \left(\frac{2}{5}\right)^2$

$$\left(\frac{2}{5}\right)^4 \times \left(\frac{2}{5}\right)^2 = \left(\frac{2}{5}\right)^{4+2} = \left(\frac{2}{5}\right)^6$$

VIII Std - Mathematics

$$\begin{aligned}\text{Area of the liner} &= \text{Area of big square} - \text{Area of small square} \\ &= (5041 - 4489) \text{ cm}^2 \\ &= 552 \text{ cm}^2\end{aligned}$$

3. **2401 plants are planted in a garden such that each contains as many plants as the number of rows. Find the number of rows and the number of plants in each row.**

Given number of plants in a row = Number of rows.

Number of rows $\times$ number of plants in a row = Total plants

$$\begin{aligned}\text{Total plants} &= 2401 \\ &= 7 \times 7 \times 7 \times 7 \\ &= 7^2 \times 7^2 \\ &= 49 \times 49\end{aligned}$$

$$\therefore \text{Number of rows} = 49$$

$$\text{Number of plants in a row} = 49$$

7	2401
7	343
7	49
7	7
	1

4. **If $\sqrt[3]{1906624} \times \sqrt{x} = 3100$, find x .**

$$\sqrt[3]{1906624} \times \sqrt{x} = 3100$$

$$\sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 31 \times 31 \times 31} \times \sqrt{x} = 3100$$

$$\sqrt[3]{2^3 \times 2^3 \times 31^3} \times \sqrt{x} = 3100$$

$$2 \times 2 \times 31 \times \sqrt{x} = 3100$$

$$\sqrt{x} = \frac{3100}{2 \times 2 \times 31} = \frac{3100}{122} = 25$$

$$\sqrt{x} = 25$$

Squaring on both sides

$$(\sqrt{x})^2 = 25^2$$

$$x = 625$$

5. **If $(625)^x = 15625$, find x^2 and x^3**

$$(625)^x = 15625$$

$$(5 \times 5 \times 5 \times 5)^x = 5 \times 5 \times 5 \times 5 \times 5 \times 5$$

$$(5^4)^x = 5^6$$

$$5^{4 \times x} = 5^6$$

$$5^{4x} = 5^6$$

Comparing the powers of 5 both sides

$$4x = 6$$

$$x = \frac{6}{4}$$

2	1906624
2	953312
2	476656
2	238328
2	119164
2	59582
31	29791
31	961
31	31
	1

5	15625
5	3125
5	625
5	125
5	25
5	5
	1

4. Write a Pythagorean triplet whose one number is 110

$$\text{Here let } 2m = 110$$

$$m = 55$$

$$m^2 - 1 = 55^2 - 1$$

$$= 3025 - 1 = 3024$$

$$m^2 + 1 = 55^2 + 1$$

$$= 3025 + 1$$

$$= 3026$$

∴ Pythagorean triplet is 110, 3024, 3026.

55
55
275
275
3025

5. Find the square root of $10\frac{2}{3}$ correct to three places of decimal.

$$10\frac{2}{3} = 10.6666.....$$

$$\begin{array}{r} 3.2659 \\ 3 \overline{) 10.666666} \\ \underline{9} \phant{000000} \\ 166 \phant{00000} \\ \underline{124} \phant{00000} \\ 4266 \phant{000} \\ \underline{3876} \phant{000} \\ 39066 \\ \underline{32625} \\ 644166 \\ \underline{587781} \\ 56385 \end{array}$$

$$\sqrt{10\frac{2}{3}} = 3.2659 \Rightarrow \sqrt{10\frac{2}{3}} = 3.266 \text{ correct to three places of decimal.}$$

6. Find the square root of 0.053361

$$\begin{array}{r} 0.231 \\ 2 \overline{) 0.053361} \\ \underline{04} \phant{0000} \\ 133 \phant{000} \\ \underline{129} \phant{000} \\ 461 \phant{00} \\ \underline{461} \\ 0 \end{array}$$

$$\sqrt{0.053361} = 0.231$$

5. If 35 women can do a piece of work in 16 days, in how many days will 28 women do the same work?

Inverse proportion

$$\text{No. of days} = x$$

$$k = 35 \times 16$$

$$\therefore 28 \times x = 35 \times 16$$

$$x = \frac{\overset{5}{\cancel{35}} \times \overset{4}{\cancel{16}}}{\underset{4}{\cancel{28}}} = 20 \text{ days}$$

6. A farmer has food for 14 cows which can last for 39 days. How long would the food last, if 7 more cows join his cattle?

Inverse variation

$$k = xy = 14 \times 39$$

$$\text{No. of cow} = 14 + 7 = 21$$

$$\text{No. of days} = x$$

$$21 \times x = 14 \times 39$$

$$x = \frac{\overset{2}{\cancel{14}} \times \overset{13}{\cancel{39}}}{\underset{3}{\cancel{21}}} = 26 \text{ days.}$$

7. Identify the type of proportion and fill in the blank boxes:

x	1	2		4	6	8		12	15		24
y	20		60		120		180		300	360	

Direct proportion

$$\frac{x}{y} = k = \frac{1}{20}$$

(i) $x = 2; y = ?$

$$\frac{2}{y} = \frac{1}{20} \Rightarrow y = 2 \times 20 = 40$$

(ii) $x = ?; y = 60$

$$\frac{x}{60} = \frac{1}{20} \Rightarrow x = \frac{60}{20} = 3$$

(iii) $x = 4; y = ?$

$$\frac{4}{y} = \frac{1}{20} \Rightarrow y = 80$$



Identify the different variations present in the following questions:

1. **24 men can make 48 articles in 12 days. Then, 6 men can make _____ articles in 6 days.**

Let the required no. of articles be x

Men (P)	Days (D)	Articles (W)
24	12	48
6	6	x

- (i) Men and days are Indirect variables.
 (ii) Men and Articles are direct variables
 (iii) Days and articles are also direct variables using formula.

Let $P_1 = 24$ $D_1 = 12$ $W_1 = 48$

$P_2 = 6$ $D_2 = 6$ $W_2 = x$

$$\frac{P_1 \times D_1}{W_1} = \frac{P_2 \times D_2}{W_2}$$

$$\frac{24 \times 12}{48} = \frac{6 \times 6}{x}$$

$$x = \frac{6 \times 6 \times 48}{24 \times 12}$$

$$x = 6 \text{ Articles}$$

$$\begin{array}{r} 1 \quad 2 \quad 1 \\ 6 \times 6 \times 48 \\ \hline 24 \times 12 \\ 1 \quad 2 \quad 1 \end{array}$$

2. **15 workers can lay a road of length 4 km in 4 hours. Then, _____ workers can lay a road of length 8 km in 8 hours.**

Let the required number of workers be x

Length (work)	Hours	Workers
4 km	4 hrs	15
8 km	8 hrs	x

- (i) Length and workers are direct variable as more length need more workers.

The proportion is $4 : 8 :: 15 : x$ -----(1)

- (ii) Hours and workers are indirect variables as more working hours need less men.

$\therefore$ The proportion is $8 : 4 :: 15 : x$ -----(2)

Combining (1) and (2)

$$\left. \begin{array}{l} 4 : 8 \\ 8 : 4 \end{array} \right\} :: 15 : x$$

Product of the extremes = Product of the means

$$4 \times 8 \times x = 8 \times 4 \times 15$$

6. A can do a piece of work in 12 hours, B and C can do it 3 hours whereas A and C can do it in 6 hours. How long will B alone take to do the same work?

Time taken by A to complete the work = 12 hrs.

$$\therefore \text{A's 1 hr work} = \frac{1}{12} \text{ -----(1)}$$

(B + C) complete the work in 3 hrs.

$$\therefore \text{(B + C)'s 1 hour work} = \frac{1}{3} \text{ -----(2)}$$

(1) + (2) $\Rightarrow$

$$\therefore \text{(A + B + C)'s 1 hour work} = \frac{1}{12} + \frac{1}{3} = \frac{1+4}{12} = \frac{5}{12}$$

Now (A + C) complete the work in 6 hrs.

$$\therefore \text{(A + C)'s 1 hour work} = \frac{1}{6}$$

$$\begin{aligned} \therefore \text{B's 1 hour work} &= \text{(A + B + C)'s 1 hour work} - \text{(A + C)'s 1 hr work} \\ &= \frac{5}{12} - \frac{1}{6} = \frac{5-2}{12} = \frac{3}{12} = \frac{1}{4} \end{aligned}$$

$\therefore$ B alone take 4 days to complete the work.

7. A and B can do a piece of work in 12 days, while B and C can do it in 15 days whereas A and C can do it in 20 days. How long would each take to do the same work?

(A + B) complete the work in 12 days.

$$\therefore \text{(A + B)'s 1 day work} = \frac{1}{12} \text{ -----(1)}$$

(B + C) complete the work in 15 days

$$\therefore \text{(B + C)'s 1 day work} = \frac{1}{15} \text{ -----(2)}$$

(A + C) complete the work in 20 days

$$\therefore \text{(A + C)'s 1 day work} = \frac{1}{20} \text{ -----(3)}$$

Now (1) + (2) + (3) $\Rightarrow$

$$[(A + B) + (B + C) + (A + C)]\text{'s 1 day work} = \frac{1}{12} + \frac{1}{15} + \frac{1}{20}$$

$$(2A + 2B + 2C)\text{'s 1 day work} = \frac{5}{60} + \frac{4}{60} + \frac{3}{60}$$

$$2(A + B + C)\text{'s 1 day work} = \frac{5+4+3}{60}$$

$$(A + B + C)\text{'s 1 day work} = \frac{12}{60 \times 2}$$

$$(A + B + C)\text{'s 1 day work} = \frac{1}{10}$$

5	12,15,20
4	12,3,4
3	3,3,1
	1,1,1

$$\begin{aligned} \text{LCM} &= 5 \times 4 \times 3 \\ &= 60 \end{aligned}$$

7. A small – scale company undertakes an agreement to produce 540 motor pumps in 150 days and employs 40 men for the work. After 75 days, the company could make only 180 motor pumps. How many more men should the company employ so that the work is completed on time as per the agreement?

Let the number of men to be appointed more be x .

	Motor pumps	Days	Employees
Planned	540	150	40
Produced	180	75	40
Remaining	360	75	$40 + x$

To produce more pumps more men required

∴ It is direct variation.

∴ The multiplying factor is $\frac{360}{180}$

More days means less employees needed.

∴ It is Indirect proportion.

∴ The multiplying factor is $\frac{75}{75}$

$$\text{Now } 40 + x = 40 \times \frac{360}{180} \times \frac{75}{75}$$

$$40 + x = 80$$

$$x = 80 - 40$$

$$x = 40$$

40 more man should be employed to complete the work on time as per the agreement.

8. A can do a work in 45 days. He works at it for 15 days and then, B alone finishes the remaining work in 24 days. Find the time taken to complete 80% of the work if they work together.

A can do a work in 45 days.

$$\text{A's 1 day work} = \frac{1}{45}$$

$$\therefore \text{A's 15 days work} = 15 \times \frac{1}{45} = \frac{1}{3}$$

$$\text{Remaining work} = 1 - \frac{1}{3} = \frac{2}{3}$$

B alone completes the remaining $\frac{2}{3}$ work in 24 days

$$\therefore \text{B completes the whole work in } \frac{24}{\frac{2}{3}} \text{ days} = 24 \times \frac{3}{2} = 36 \text{ days.}$$

$$\therefore \text{B's 1 day's work} = \frac{1}{36}$$

$$\therefore \text{(A + B)'s together complete the work in } \frac{ab}{a+b} \text{ days} = \frac{45 \times 36}{45 + 36} = \frac{45 \times 36}{81}$$

$$\begin{array}{r} 5 \quad 4 \\ \cancel{45} \times \cancel{36} \\ \hline 81 \\ \cancel{81} \\ \hline 1 \end{array}$$

Whole work will be completed by (A + B) in = 20 days.

$$\therefore 80\% \text{ of the work will be completed in } \frac{80 \times 20}{100} = 16 \text{ days.}$$

Rhombus is a parallelogram in which all its sides are congruent.

Rectangle is a parallelogram whose all its angles are right angles.

Square is a parallelogram in which all its sides and angles are equal.

Area of a rhombus = $\frac{1}{2} \times d_1 \times d_2$ sq.units. Where d_1 and d_2 are diagonals.

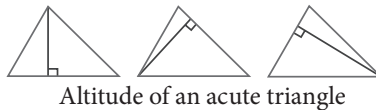
Area of the rectangle = $l \times b$ sq.units. $l \rightarrow$ length, $b \rightarrow$ breadth.

Area of the square = a^2 sq. units. a – side



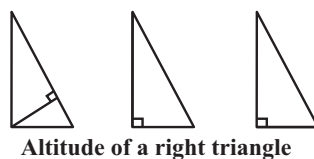
Page No. 53

1. In any acute angled triangle, all three altitudes are inside the triangle. Where will be the orthocentre? In the interior of the triangle or in its exterior?



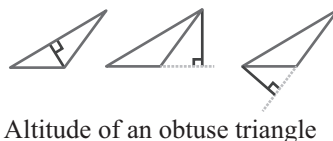
Interior of the triangle.

2. In any right angled triangle, the altitude perpendicular to the hypotenuse is inside the triangle; the other two altitudes are the legs of the triangle. Can you identify the orthocentre in this case?



Vertex containing 90°

3. In any obtuse angled triangle, the altitude connected to the obtuse vertex is inside the triangle, and the two altitudes connected to the acute vertices are outside the triangle. Can you identify the orthocentre in this case?



Exterior of the triangle.

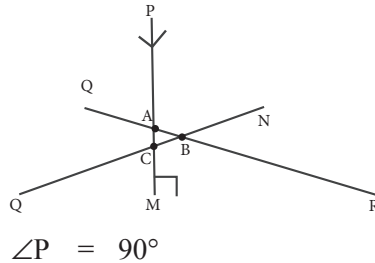
VIII Std - Mathematics

In $\triangle PQR$, $PT = TR \Rightarrow QT$ is a median from vertex Q .

$QS = SR \Rightarrow PS$ is a median from vertex P .

QT and PS meet at W and therefore W is the centroid of $\triangle PQR$.

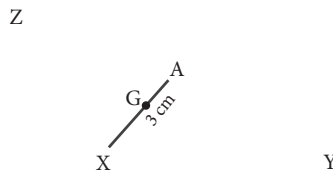
2. Name the orthocentre of $\triangle PQR$.



This is a right triangle

$\therefore$ orthocentre = P [$\because$ In right triangle orthocentre is the vertex containing 90°]

3. In the given figure, A is the midpoint of YZ and G is the centroid of the triangle XYZ . If the length of GA is 3 cm, find XA .



Given A is the midpoint of YZ .

$$\therefore ZA = AY$$

G is the centroid of $\triangle XYZ$ centroid divides each median in a ratio $2 : 1 \Rightarrow XG : GA = 2:1$

$$\frac{XG}{GA} = \frac{2}{1}$$

$$\frac{XG}{3} = \frac{2}{1}$$

$$XG = 2 \times 3$$

$$XG = 6 \text{ cm}$$

$$XA = XG + GA = 6 + 3 \Rightarrow XA = 9 \text{ cm}$$

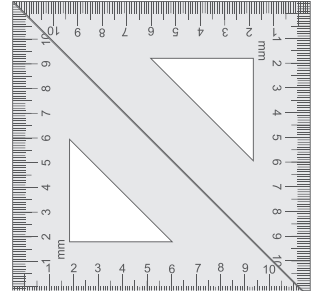


4. Find the length of an altitude on the hypotenuse of a right angled triangle of legs of length 15 feet and 20 feet.

$$\text{Since } \angle B = 90^\circ$$

Repeat the above activity, this time with a pair of $45^\circ-45^\circ-90^\circ$ set-squares.

- (i) How does the figure change now? Is it a parallelogram? It becomes a square! (How did it happen?)
- (ii) What can we say about its lengths of sides, angles and diagonals? Discuss and list them out.

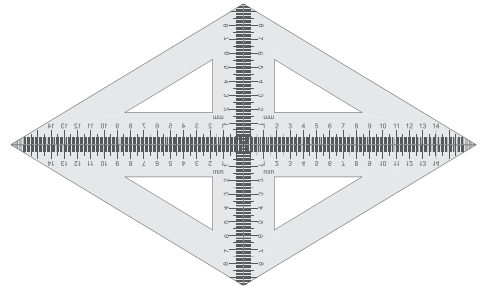


- (iii) How does it differ from the list we prepared for the rectangle?

We again use four identical $30^\circ-60^\circ-90^\circ$ set-squares for this activity.

Note carefully how they are placed touching one another.

- (i) Do we get a parallelogram now?
- (ii) What can we say about its lengths of sides, angles and diagonals?



- (iii) What is special about their diagonals?



1.

- | | |
|--------------------------------------|------|
| (a) A square is a special rectangle. | True |
| (b) A square is a parallelogram. | True |
| (c) A square is a special rhombus. | True |
| (d) A rectangle is a parallelogram | True |

2.

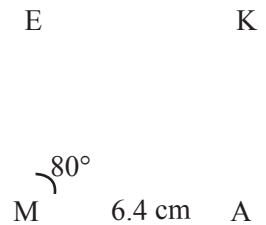
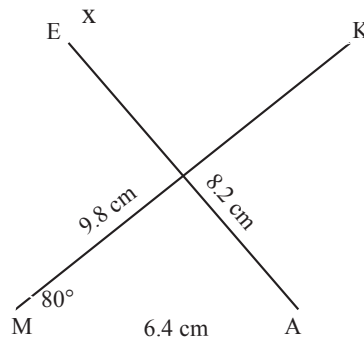
- (a) Which have diagonals bisecting each other.
Square, rectangle, parallelogram, rhombus.
- (b) In which the diagonals are perpendicular bisectors of each other.
Rhombus and square.

- (i) Drawn a line segment $CA = 5$ cm.
- (ii) At A on AC, made $\angle CAX = 65^\circ$
- (iii) With A as centre, drawn arc of radius 5 cm. Let it cut AX at K.
- (iv) With K and C as centres, drawn arcs of radius 5 cm each and let them cut at E.
- (v) Joined KE and CE.
- (vi) CAKE is the required rhombus.

$$\begin{aligned}
 \text{Area of the rhombus} &= \frac{1}{2} \times d_1 \times d_2 \text{ sq.units} \\
 &= \frac{1}{2} \times 5.4 \times 8.5 \text{ cm}^2 \\
 &= 22.95 \text{ cm}^2
 \end{aligned}$$

- (iv) **MAKE, $MA = 6.4$ cm and $\angle M = 80^\circ$**

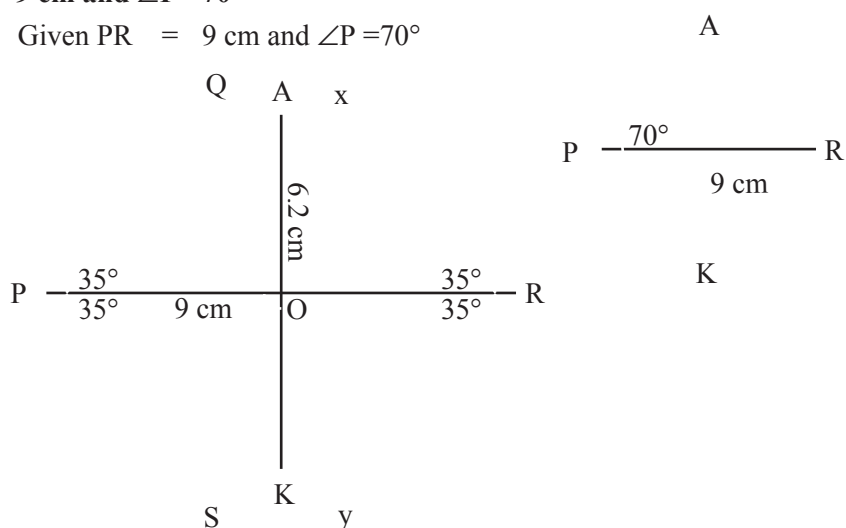
Given $MA = 6.4$ cm and $\angle M = 80^\circ$



- (i) Drawn a line segment $MA = 6.4$ cm.
- (ii) At M on MA, made $\angle AMX = 80^\circ$
- (iii) With M as centres, drawn arc of radius 6.4 cm. Let it cut MX at E.
- (iv) With E and A as centres, drawn arcs of radius 6.4 cm each and let them cut at K.
- (v) Joined EK and AK.
- (vi) MAKE is the required rhombus.

(vii) **PARK**, $PR = 9 \text{ cm}$ and $\angle P = 70^\circ$

Given $PR = 9 \text{ cm}$ and $\angle P = 70^\circ$

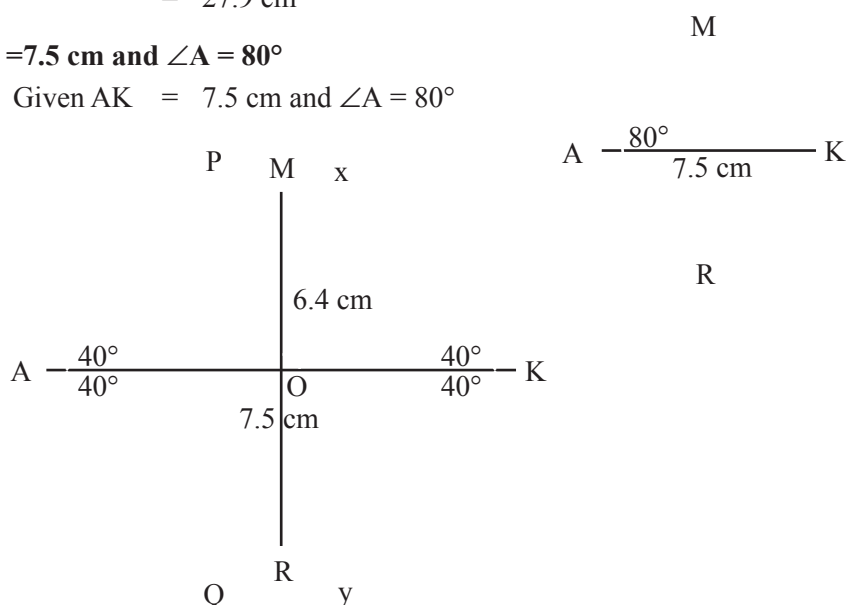


- (i) Drawn a line segment $PR = 9 \text{ cm}$.
- (ii) At P, made $\angle RPX = \angle RPY = 35^\circ$ on either side of PR.
- (iii) At R, made $\angle PRQ = \angle PRS = 35^\circ$ on either side of PR
- (iv) Let PX and RQ cut at A and PY and RS at K.
- (v) PARK is the required rhombus

$$\begin{aligned} \text{Area of the rhombus} &= \frac{1}{2} \times d_1 \times d_2 \text{ sq.units} = \frac{1}{2} \times 9 \times 6.2 \text{ cm}^2 \\ &= 27.9 \text{ cm}^2 \end{aligned}$$

(viii) **MARK**, $AK = 7.5 \text{ cm}$ and $\angle A = 80^\circ$

Given $AK = 7.5 \text{ cm}$ and $\angle A = 80^\circ$

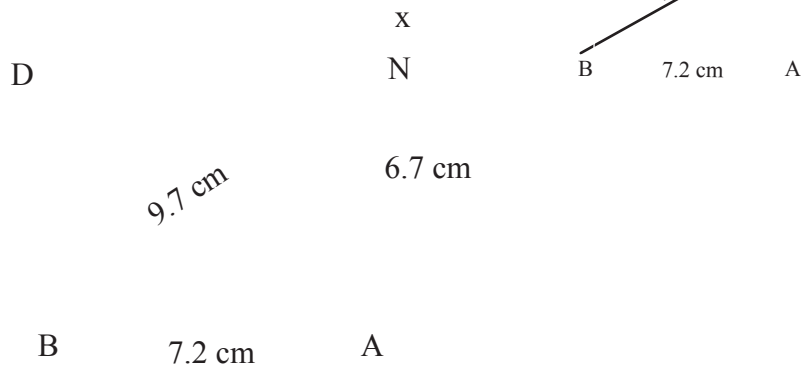


- (i) Drawn a line segment $LA = 8$ cm.
- (ii) At L, constructed $LX \perp LA$.
- (iii) With A as centre, drawn an arc of radius 10 cm and let it cut at LX at D.
- (iv) With A as centre and LD as radius drawn an arc. Also with D as centre and LA as radius drawn another arc. Let then cut at N.
- (v) Joined DN and AN.
- (vi) LAND is the required rectangle.

$$\begin{aligned}
 \text{Area of the rectangle LAND} &= l \times b \text{ sq.units} \\
 &= 8 \times 5.8 \text{ cm}^2 \\
 &= 46.4 \text{ cm}^2
 \end{aligned}$$

- (iv) **BAND, BA = 7.2 cm and BN = 9.7 cm**

$$\text{Given} = 7.2 \text{ cm and BN} = 9.7 \text{ cm}$$



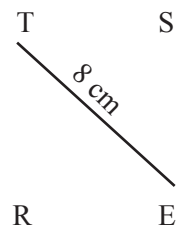
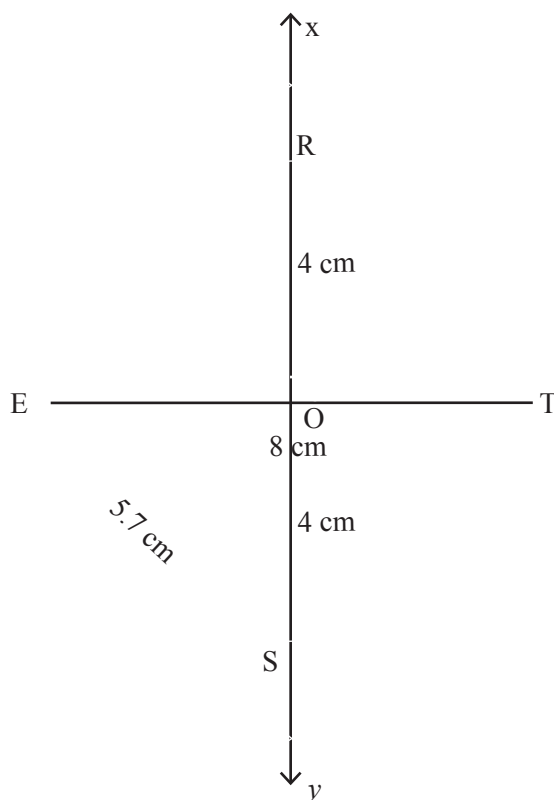
- (i) Drawn a line segment $BA = 7.2$ cm.
- (ii) At A, constructed $NA \perp AB$.
- (iii) With B as centre, drawn an arc of radius 9.7 cm and let it cut at AX at N.
- (iv) With B as centre and AN as radius drawn an arc. Also with N as centre and BA as radius drawn another arc. Let then cut at D.
- (v) Joined ND and BD.
- (vi) BAND is the required rectangle.

$$\begin{aligned}
 \text{Area of the rectangle BAND} &= l \times b \text{ sq.units} \\
 &= 7.2 \times 6.7 \text{ cm}^2 \\
 &= 48.24 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{Area of the square WEST} &= a^2 \text{ sq.units} \\
 &= 5.3 \times 5.3 \text{ cm}^2 \\
 &= 28.09 \text{ cm}^2
 \end{aligned}$$

(iv) **REST, ET = 8 cm**

Given diagonal = 8 cm



- (i) Drawn a line segment $ET = 8 \text{ cm}$.
- (ii) Drawn the perpendicular bisector XY to ET . Let it bisect ET at O .
- (iii) With O as centre, drawn an arc of radius 4 cm on either side of O which cut OX at R and OY at S .
- (iv) Joined ES , ST , TR and ER .
- (v) $REST$ is the required square.

$$\begin{aligned}
 \text{Area of the square REST} &= a^2 \text{ sq.units} \\
 &= 5.7 \times 5.7 \text{ cm}^2 \\
 &= 32.49 \text{ cm}^2
 \end{aligned}$$

STATISTICS

Data is the basic unit in Statistics. Data is a collection of facts such as numbers, words, measurements and observations.

These are the data that are collected in person for the first time for a specific purpose is called primary data.

Secondary data are the data that are sourced from some place that has originally collected it. This kind of data has already been collected by some other persons.

The number of times an observation occurs in the given data is called the frequency of the observation.

Range = Largest value – smallest value

A frequency distribution is the arrangement of the given data in the form of the table showing frequency with which each variable occurs.

The range of the variable is grouped into number of classes, and each group is known as class interval (C.I). The difference between the upper limit (U) and the lower limit (L) of the class is known as class size.

Number of class intervals possible = $\frac{\text{Range}}{\text{Class size}}$

In the class-intervals, if the upper limit and lower limit are included in that class interval then it is called inclusive series.

In the class intervals, if the upper limit of one class interval is the lower limit of the next class interval then it is called exclusive series.

A pie chart is a circular graph which shows the total value with its components.

In a pie chart the central angle of a component

$$= \frac{\text{Value of the component}}{\text{Total value}} \times 360$$

The central angle of a component = $\frac{\text{Percentage value of the component}}{100} \times 360$

Pie charts are widely used by the business and the media people.

With the help of Pie charts, one can show how the expenditure of the Government or Industry is distributed over different heads.

Research people use these type of charts to show their results.

Discontinuous series	Continuous series
15 – 25	13.5 – 26.5
28 – 38	26.5 – 39.5
41 – 51	39.5 – 52.5
54 – 64	52.5 – 65.5



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If we want to represent the given data by 5 classes, then how shall we find the interval?

We can find the class size by the formula

$$\text{Number of class intervals} = \frac{\text{Range}}{\text{Class size}}$$



Page No. 82

- 1. Prepare a frequency table for the data : 3, 4, 2, 4, 5, 6, 1, 3, 2, 1, 5, 3, 6, 2, 1, 3, 2, 4**

Ascending order of the given data.

1, 1, 1, 2, 2, 2, 2, 3, 3, 3, 3, 4, 4, 4, 5, 5, 6, 6

The distribution table :

Data	Tally marks	Frequency
1		3
2		4
3		4
4		3
5		2
6		2

∴ Frequency Table :

Data	1	2	3	4	5	6
Frequency	3	4	4	3	2	2

- 2. Prepare a grouped frequency table for the data :**

10, 9, 3, 29, 17, 34, 23, 20, 39, 42, 5, 12, 19, 47, 18, 19, 27, 7, 13, 40, 38, 24, 34, 15, 40

Largest value = 47

Smallest value = 3

Range = Largest value – Smallest value

= 47 – 3 = 44

Suppose we take class size as 10, then Number of class intervals possible

$$= \frac{\text{Range}}{\text{Class size}} = \frac{44}{10} = 4.4$$

≈ 5

VIII Std - Mathematics

iv) Percentage of students liked red colour

$$= 20\%$$

Percentage of students did not like red colour

$$= 100\% - 20\%$$

$$= 80\%$$

∴ Number of students did not like red colour

$$= 80\% \text{ of } 500$$

$$= \frac{80}{100} \times 500 = 400$$

400 students did not like red colour.

v) Students liked pink or blue = students liked pink + students liked blue.

$$= 30\% \text{ of } 500 + 25\% \text{ of } 500$$

$$= \frac{30}{100} \times 500 + \frac{25}{100} \times 500$$

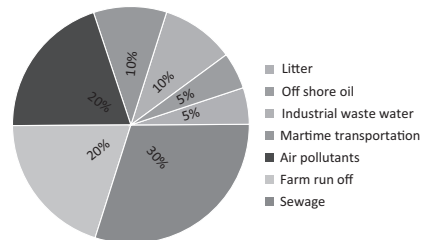
$$= 150 + 125$$

$$= 275$$

vi) Total number of students = 500.

500 students were asked about their favourite colour.

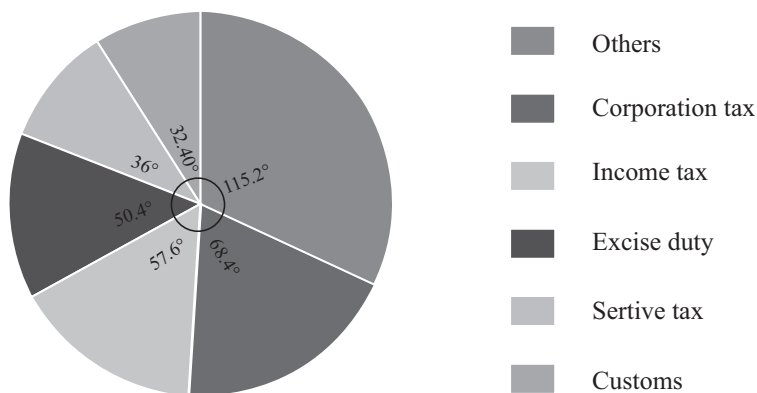
7. Write any five points from the given pie chart information regarding pollutants entering in the oceans.



1. The pie chart gives the information about the amount of pollutants entering in oceans from various sources.
2. 30% of ocean is polluted by sewage.
3. 20% of ocean is polluted by air.
4. Farm run off equally contribute as much as air in polluting ocean.
5. The observation is about off shore oil, litter, Industrial waste water, Maritime transportation, Air pollution, Farm run off and sewage.

Source	Income Tax (in paise)	Central angle
Corporation tax	19	$\frac{19}{100} \times 360^\circ = 68.4^\circ$
Income tax	16	$\frac{16}{100} \times 360^\circ = 57.6^\circ$
Customs	9	$\frac{9}{100} \times 360^\circ = 32.4^\circ$
Excise duty	14	$\frac{14}{100} \times 360^\circ = 50.4^\circ$
Service tax	10	$\frac{10}{100} \times 360^\circ = 36^\circ$
Others	32	$\frac{32}{100} \times 360^\circ = 115.2^\circ$
Total	100	360°

Income from various sources for Government of India in a rupee.



11. Monthly expenditure of Kumaran's family is given below. Draw a suitable Pie chart.

Particulars	Food	Education	Rent	Transport	Miscellaneous
Expenses (in%)	50%	20%	15%	5%	10%

Also

- Find the amount spent for education if Kumaran spends ₹ 6000 for Rent.
- What is the total salary of Kumaran?
- How much did he spend more for food than education?

VIII Std - Mathematics

(iii) Are people using cell phone for less than 1 hour?

No.

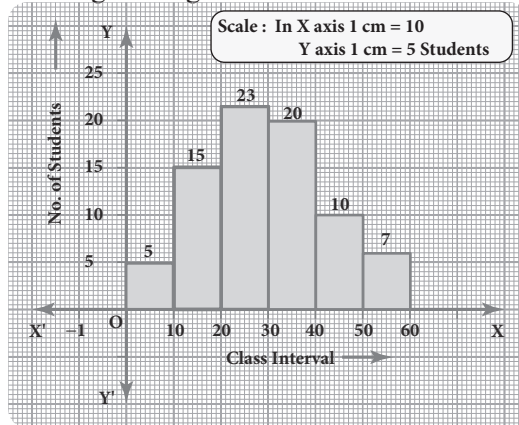
(iv) Give your suggestions on the data.

People should minimise the usage of cell phones.

4. Draw a histogram for the following data.

Class interval	0-10	10-20	20-30	30-40	40-50	50-60
No. of students	5	15	23	20	10	7

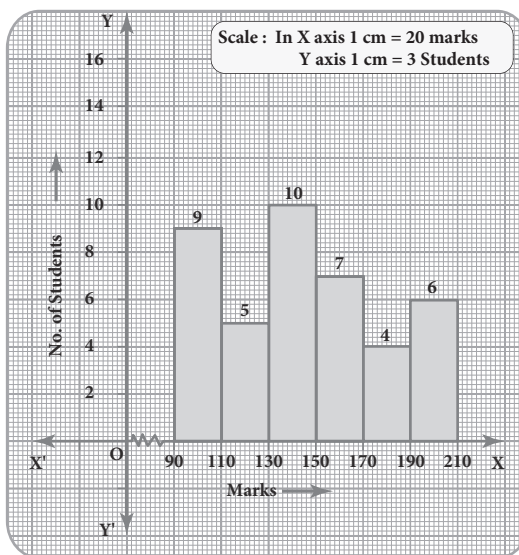
The given data is continuous frequency distribution taking class intervals on X axis and No. of students on Y-axis, the histogram is given below.



5. Construct a histogram from the following distribution of total marks of 40 students in a class.

Marks	90-110	110-130	130-150	150-170	170-190	190-210
No. of students	9	5	10	7	4	6

The given distribution is continuous taking marks on X axis and No. of students on Y-axis the histogram is constructed.



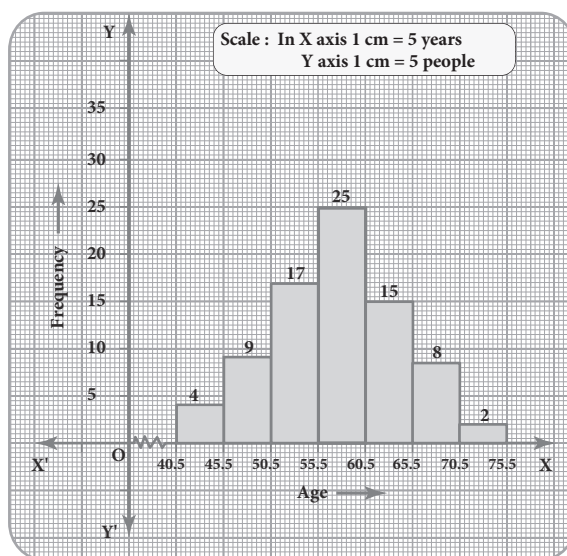
9. **Data is a collection of _____.**
(a) numbers (b) words (c) measurements (d) all the three
all the three
10. **The number of times an observation occurs in the given data is called _____.**
(a) tally marks (b) data (c) frequency (d) none of these
frequency
11. **The difference between the largest value and the smallest value of the given data is _____.**
(a) range (b) frequency (c) variable (d) none of these
range
12. **The data that can take values between a certain range is called _____.**
(a) ungrouped (b) grouped (c) frequency (d) none of these
grouped
13. **Inclusive series is a _____ series.**
(a) continuous (b) discontinuous (c) both (d) none of these
discontinuous
14. **In a class interval the upper limit of one class is the lower limit of the other class. This is _____ series.**
(a) Inclusive (b) exclusive (c) ungrouped (d) none of these
exclusive
15. **The graphical representation of ungrouped data is _____.**
(a) histogram (b) frequency polygon
(c) pie chart (d) all the three
pie chart
16. **Histogram is a graph of a _____ frequency distribution.**
(a) continuous (b) discontinuous (c) discrete (d) none of these
continuous
17. **A _____ is a line graph for the graphical representation of the continuous frequency distribution.**
(a) frequency polygon (b) histogram
(c) pie chart (d) bar graph
frequency polygon
18. **The graphical representation of grouped data is -----.**
(a) bar graph (b) pictograph (c) pie chart (d) histogram
histogram

$$= 41 - \frac{1}{2}(1) = 40.5$$

$$\begin{aligned}\text{Upper boundary} &= \text{Upper limit} + \frac{1}{2}(\text{gap between the adjacent class interval}) \\ &= 45 + \frac{1}{2}(1) = 45.5\end{aligned}$$

Now continuous frequency table is as below

Age	40.5-45.5	45.5-50.5	50.5-55.5	55.5-60.5	60.5-65.5	65.5-70.5	70.5-75.5
Frequency	4	9	17	25	15	8	2



4. Draw a histogram and the frequency polygon in the same diagram to represent the following data.

Weight (in kg)	50-55	56-61	62-67	68-73	74-79	80-85	86-91
No. of person	15	8	12	17	9	10	6

The given distribution is discontinuous.

$$\begin{aligned}\text{Lower boundary} &= \text{lower limit} - \frac{1}{2}(\text{gap between the adjacent class interval}) \\ &= 50 - \frac{1}{2}(1) = 49.5\end{aligned}$$

$$\begin{aligned}\text{Upper boundary} &= \text{Upper limit} + \frac{1}{2}(\text{gap between the adjacent class interval}) \\ &= 55 + \frac{1}{2}(1) = 55.5\end{aligned}$$

∴ The continuous frequency table is as below.

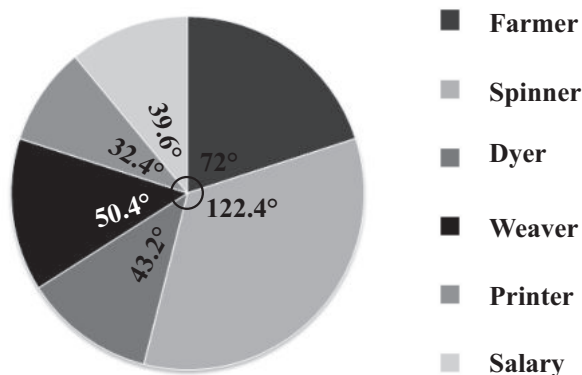
Weight (in kg)	49.5-55.5	55.5-61.5	61.5-67.5	67.5-73.5	73.5-79.5	79.5-85.5	85.5-91.5
No. of persons	15	8	12	17	9	10	6

VIII Std - Mathematics

1 Rupee = 100 paise.

Particulars	Paise	Central angle
Farmer	20	$\frac{20}{100} \times 360^\circ = 72^\circ$
Spinner	34	$\frac{34}{100} \times 360^\circ = 122.4^\circ$
Dyer	12	$\frac{12}{100} \times 360^\circ = 43.2^\circ$
Weaver	14	$\frac{14}{100} \times 360^\circ = 50.4^\circ$
Printer	09	$\frac{09}{100} \times 360^\circ = 32.4^\circ$
Salary	11	$\frac{11}{100} \times 360^\circ = 39.6^\circ$
Total	100%	360°

Expenditure of a cloth manufacturing company.



8. Draw a histogram for the following data.

Mid value (x)	15	25	35	45	55	65	75
Frequency (f)	12	24	30	18	26	10	8

Since mid values are given, the given distributors is discontinuous.

$$\begin{aligned}
 \text{Lower boundary} &= \text{lower limit} - \frac{1}{2} (\text{gap between the adjacent class interval}) \\
 &= 15 - \frac{1}{2} (10) = 10
 \end{aligned}$$

Price List				
S.No.	Description	Price/ 1 kg (₹)	Quantity kg	Amount (₹)
1.	Rice	37.50	1	37.50
2.	Toor dal	62.00	2	124.00
3.	Wheat	26.50	2	53.00
Total Bill Amount				214.50

Price List				
S.No.	Description	Price/ 1 kg (₹)	Quantity kg	Amount (₹)
1.	Rice	37.50	3	112.50
2.	Toor dal	62.00	1	62.00
3.	Sugar	32.50	1	32.50
Total Bill Amount				207.00

Price List				
S.No.	Description	Price/ 1 kg (₹)	Quantity kg	Amount (₹)
1.	Toor dal	62.00	2	124.00
2.	Rice	37.50	1.50	56.25
3.	Wheat	26.50	1.50	39.75
Total Bill Amount				220.00

The teacher divides the class into four groups and setup a mock market in the class room and ask the students to involve in role play as two groups of businessmen and two groups of consumers. Consumers have to buy products at different shops and prepare a price list.

The two supermarkets in which the two groups buy are Star Food Mart and Super Provisions. Th is week they each have got a special deal on some products. At Star Food Mart, you can buy items at discount prices. At Super Provisions, there are some “BUY ONE GET ONE” deals. Have a look at their deal:

Star Food Mart





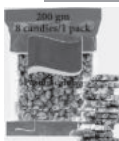

Chocolate Biscuits worth ₹114 per packet at ₹30 off

Peanut candies worth ₹90 now at ₹20 off

Protein milk worth ₹60 now at ₹20 off

Badam nuts worth ₹450 now at ₹150 off

Super Provisions



Chocolate Biscuits worth ₹180 per packet Buy one get one free

Peanut candies worth ₹150 Buy one get one free

Protein milk worth ₹80 Buy one get one free

Badam nuts worth ₹580 Buy one get one free

Now, answer the following questions.

I. Here is your shopping list:

4 bottles of Protein Milk (200 ml size), 2 packets of Peanut candies(200 gm), 1 packet of Chocolate biscuits and 1 packet of Badam nuts (500 gm)

- (i) If you buy all the items in one shop, where will you get the best price?
- (ii) If you buy the items from different shops, how will you do it to spend the least amount of money?

II. You have ₹1000/- to spend to buy the following shopping list:

6 bottles of Protein Milk (200 ml size), 3 packets of Peanut candies (200 gm), 3 packets of Chocolate biscuits and 1 packet of Badam nuts (250 gm).

- (i) How can you do this so that you don't go over your budget amount ₹1000?
- (ii) Which shop offers you the best value for money on each item?
- (iii) Is the “BUY ONE GET ONE” deal at Super Provisions the same as “50% off” deal?

Sl. No	Vegetables & Fruits	Quantity (kg)	Shop 1			Shop 2	
			Price (₹)	Offer (₹) @ 15%	Amount (₹) Price offer	Price	Amount (₹)
1.	Apple	$1\frac{1}{2}$	$168 \times 1\frac{1}{2} = 252$	37.80	214.20	$148 \times 1\frac{1}{2}$	222
2.	Pomegranate	2	$82 \times 2 = 164$	24.60	139.40	75×2	150
3.	Banana	2	$45 \times 2 = 90$	13.50	76.50	43×2	86
4.	Mango	3	$39 \times 3 = 117$	17.55	99.45	35×3	105
5.	Onion	3	$22 \times 3 = 66$	9.90	56.10	21×3	63
6.	Tomato	$1\frac{1}{2}$	$46 \times 1\frac{1}{2} = 69$	10.35	58.65	$38 \times 1\frac{1}{2}$	57
7.	Papaya	$\frac{1}{2}$	$36 \times \frac{1}{2} = 18$	2.70	15.30	$30 \times \frac{1}{2}$	15
8.	Carrot	1	$19 \times 1 = 19$	2.85	16.15	17×1	17
				Total	675.75	Total	715

$$\text{Price in shop 2 - Shop 1} = 715 - 675.75$$

$$= ₹ 39.25$$

We can save ₹ 39.25 in shop 1 compared to shop 2.

6. When you plan to buy a shirt, one shop offers a discount of ₹200 on MRP ₹1000 and another shop offers 15% discount on the same MRP. Where would you buy?

$$\text{Price in I}^{\text{st}} \text{ shop} = ₹1000 - ₹200 = ₹800$$

$$\text{Price in II}^{\text{nd}} \text{ shop} = \frac{85}{100} \times 1000 = ₹850$$

In shop I.

7. Amazing park is offers a package deal of 5 entrance passes for ₹130. If one entrance pass normally costs ₹30, how much will you save by taking advantage of this special deal?

$$\text{Cost of one entrance pass} = ₹ 30$$

$$\therefore \text{Cost of 5 entrance passes} = 5 \times 30$$

$$= ₹ 150$$

$$\text{But special deal price} = ₹ 130$$

$$\text{Amount of saving} = 150 - 130 = ₹ 20$$

3. A plumber wishes to cut the following sections from standard size of pipe each of length 6m.

No. of pipes	1	2	3	4	5	6	7	8	9	10	11	12
Size of length	1	1	1.5	1.5	1.5	1.5	2	2	2	3	3.5	3.5

Find the

- (a) To cut according to the first-fit method calculate the wastage of the pipe length.
 (b) To cut according to the first-fit decreasing method calculate the wastage of the pipe length.
 (a) First fit method :

				Pipe Length 1	Pipe Length 2	Pipe Length 3	Pipe Length 4	Pipe Length 5
1	1	1.5	1.5	1	1	1.5	1.5	3
1.5	1.5	2	2	1.5	1.5	2	2	
2	3	3.5	3.5	3.5	3.5	2		
Size of length (m)				6 m	6 m	5.5 m	3.5 m	3 m
Waste of pipe length				0	0	0.5 m	2.5 m	3 m

- (b) First fit decreasing method.

				Pipe Length 1	Pipe Length 2	Pipe Length 3	Pipe Length 4
3.5	3.5	3	2	1	1	1.5	2
2	2	1.5	1.5	1.5	1.5	1.5	2
1.5	1.5	1	1	3.5	3.5	3	2
Size of length (m)				6	6	6	6
Maximum length (m)				6	6	6	6
Wastage of pipe length (m)				0	0	0	0

ADDITIONAL QUESTIONS AND ANSWERS

1. Which one is the best buy of the following purchases.

A pack of 5 soaps for ₹ 180 or 4 soaps for ₹ 128.

From the pack,

$$\text{Cost of 5 soaps} = ₹ 180$$

$$\therefore \text{Cost of 1 soap} = \frac{180}{5} = ₹ 36.$$

16. $\frac{1}{0}$ - Association property of addition
17. $2x - 5 = 3 - x$ - Distributive property of multiplication over addition
18. $7x - 4 - 8x = 20$ - Does not exist
19. $\frac{-1}{3}\left(\frac{1}{4} + \frac{2}{3}\right) = \left(\frac{-1}{3} \times \frac{1}{4}\right) + \left(\frac{-1}{3} \times \frac{2}{3}\right)$ - $x = -24$
20. $\left(\frac{5}{6} + -1\right) + \frac{-3}{4} = \frac{5}{6} + \left(-1 + \frac{-3}{4}\right)$ - $x = \frac{8}{3}$

Part - B

21. Write four rational numbers equivalent to $\frac{-3}{5}$
22. Expand: (i) $5x(2y - 3)$
23. Prove that $\triangle GUM \sim \triangle BOX$ from the given figure.
24. What is 25% of 30% of 400?
25. At what time will a sum of ₹ 3000 will amount to ₹ 3993 at 10% p.a compounded annually?
26. Find x : $\frac{2x}{3} - 4 = \frac{10}{3}$
27. Check whether given sides are the sides of right-angled triangles, using Pythagoras theorem. 8, 15, 17
28. Find a Pythagorean triplet whose: largest member is 65
29. Find the smallest number by which 10985 should be divided so that the quotient is a perfect square.
30. Find the smallest number by which 200 should be multiplied to make it a perfect cube.
31. Evaluate: $\left(\frac{2}{5}\right)^4 \times \left(\frac{2}{5}\right)^2$
32. A greeting card has an area 90 cm^2 . Between what two whole numbers is the length of its side?
33. A camp had provisions for 490 soldiers for 65 days. After 15 days, more soldiers arrived and the remaining provisions lasted for 35 days. How many soldiers joined the camp?
34. In triangle ABC, line l_1 is a perpendicular bisector of BC. If $BC=12 \text{ cm}$, $SM=8 \text{ cm}$, find CS.
35. If I is the incentre of $\triangle XYZ$, $\angle IYZ=30^\circ$ and $\angle IZY=40^\circ$, find $\angle YXZ$.

