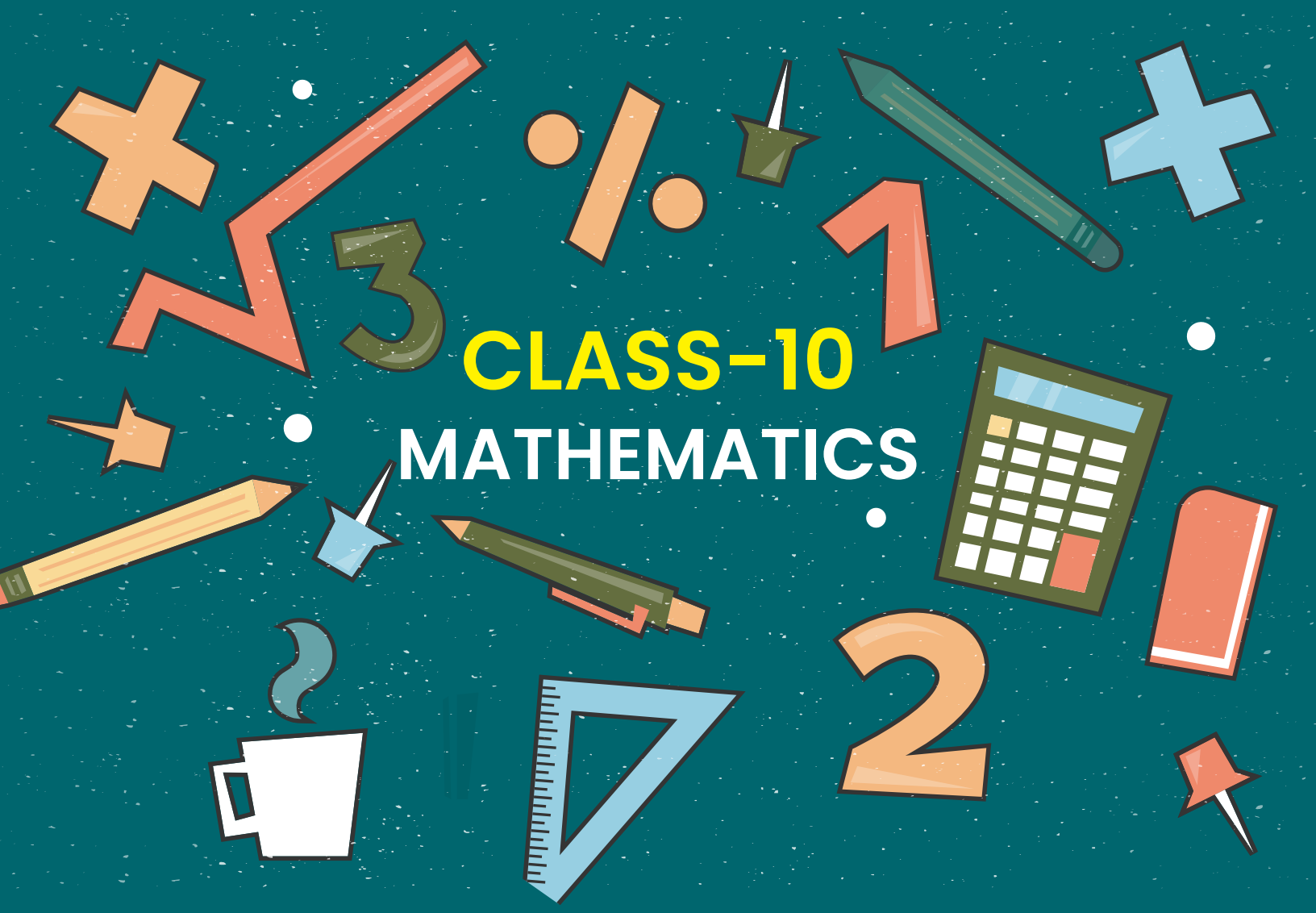
RCSCE
Rajasthan Council of School Education
Department of School Education Govt. of Rajasthan

WORK BOOK

Practice book for filling learning gaps
(based on learning outcomes)



CLASS-10
MATHEMATICS

Rajasthan State Council of Educational Research and Training, Udaipur

अनजान व्यक्ति घर में भी आ सकता है

घर पर कोई बड़ा न हो तो ज्यादा सतर्क रहें -

- सम्भव हो तो नए अनजान लोगों को गेट तक ही रोकें और आप ज्यादा घुले मिलें नहीं
- उसे घर के डिटेल/ सुरक्षा के उपाय तथा अकेले होने की जानकारी ना दें
- यदि पार्सल अदि आया है तो घर वालों को बताएं/फोन करके पूछें और सावधान रहें
- किसी अनजान के लिए दरवाजा न खोलें

स्टाफ/शिक्षकों के लिए जरुरी संदेश

कम से कम हर 3 से 6 माह में यह **जानकारी दोहराते रहें**

ये बातें भी याद रखें

जरूर याद रखो

किसी भी मुसीबत में, जब कोई और मदद न मिल सके

हम सब मिलकर अपने बचपन, हमारे स्कूल और राज्य को सुरक्षित बनायेंगे

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FROM THE DESK OF THE DIRECTOR

Dear Teacher and Friends,

Workbooks for the subjects of Science, English and Mathematics have been prepared for the students of class 9 and 10 by RSCERT, Udaipur and Rajasthan School Education Council, Jaipur. These workbooks are designed keeping in mind the core competencies and learning outcomes.

- This workbook does not believe in memorization but in learning by understanding.
- The purpose of this workbook is not just to fill the worksheets, it is for the student to learn through self-practice.
- We should not think of making it a part of the curriculum and completing it blindly. While working on this workbook, let us pay special attention to those children whose learning level is low.
- Every effort has been made to prepare the worksheets in increasing order of proficiency. We have to keep this sequence in mind while giving practice work in the class room, but the teacher is free to make the child work on any worksheet as per their needs.
- This is a workbook. Before working on this, it is necessary to complete the teaching-learning process on the related teaching material. While working on the workbook, we have to help the students, support them and provide them full opportunities to work.
- While working on some worksheets, we have to go beyond the curriculum and develop the imagination of children.
- Your important suggestions are respectfully invited to make this workbook more rich and error-free.

  It is hoped that this workbook will be helpful in consolidating the knowledge that children have learned.

For Teachers...

This workbook is prepared by the Rajasthan State Council of Educational Research and Training, Udaipur. It has been prepared for remedial teaching of class 10. It contains 44 worksheets, 2 model papers, assessment sheets and 2 model question papers for board exam preparation. One worksheet to solve per day. The worksheet also shows the subject matter along with learning points, memorization points and references to current text books.

Adequate questions have been given in the worksheet for practice, still the teacher can make the required questions for the students as per their need and get them solved. The worksheet provides an opportunity to read and understand in simple and easy to understand language with the inclusion of various interesting activities, games, puzzles etc. as enjoyable learning material. Some assessment sheets have been given in between. Encourage students to bring the solved assessment papers from home and have the teacher check them.

There is freedom in solving the questions in the worksheet. Sometimes the correct solution can be obtained from multiple methods. Students are expected to practice using worksheets until they understand.

In the worksheets, students have been given opportunities to understand at their own pace. Teachers can provide guidance if necessary.

We hope this workbook will prove useful for you and your students.

Your positive suggestions are always invited.

Teaching Learning Process- Learning Outcomes	Learning Outcomes
Students may be provided opportunities individually or in groups and encouraged to- • Expand in detail the previously studied methods of finding the least common multiple (LCM) and highest common factor (HCF) of large numbers. • Discuss various aspects of polynomials like their degrees, types (linear, quadratic), zeroes etc., their graphical representations and relationships between their zeroes. • Playing a game that involves factoring a polynomial and creating a new polynomial using one of the factors. For example, a group, say $x^3 - 2x^2 - x - 2$, factors and another polynomial is formed using one of its factors. Which is further factorized by the second group, continuing the process. • Use quadratic equations to solve real life problems through various aspects like quadratic formula etc. • Discuss different aspects of linear equations by engaging students in the following activities. • One group can ask the other group to formulate linear equations in two variables with coefficients in a particular number system i.e. natural numbers/numbers which are not integers etc. • To represent a linear equation graphically in terms of 1D or 2D and try to explain the difference in their nature. • Encourage students to observe and differentiate identities and equations. • Observe and analyze patterns in your daily life situations to check whether they contain arithmetic progression and if so, find rules for the sum of their first terms and second terms. These	**Student-** • Develops results such as Euclid's division algorithm, fundamental theorem of arithmetic from previously studied properties of numbers and the relationships between them and applies them to solving problems in daily life contexts. • Develops the relationship between algebraic and geometric methods of finding the zeroes of a polynomial. • Finds solutions to pairs of linear equations in two variables, using various algebraic methods. • Displays the methods of finding the roots of a quadratic equation and the method of determining the nature of its roots. • Develops strategies for applying the concept of Arithmetic progression in daily life situations. • Creates methods to differentiate between congruent figures and similar figures. • Establishes properties for the similarity of two triangles using

situations can happen in our savings/pocket expenses and games like snakes and ladders etc. • Analyze and compare various geometric shapes, charts, models made from paper folding process and explain their similarity and congruence. • Discuss in groups various situations like- ▪ Construction of maps etc. in which the concepts of trigonometry are used. ▪ Work on a project related to heights and distances that involves developing methods for measuring the angle of elevation of the top of a building and measuring one's own distance from that building. ▪ Develop methods to find the values of various trigonometric ratios, for a given value of a trigonometric ratio. ▪ Observe such shapes in the environment which are a combination of the shapes studied so far, like cone, cylinder, cube, cuboid, sphere, hemisphere etc. They can work in groups and provide formulas for different sides of these combined shapes. ▪ Determine the area of various materials, objects, designs around you. For example, designs on handkerchiefs, floor tiles designs, geometry boxes etc. ▪ Discuss and analyze situations related to surface areas and volumes of different objects, such as (a) Given two boxes of a particular shape with different dimensions, if one box can be transformed into exactly the same shape as the other box What characteristic will change? (b) By what percentage will each dimension of a box be changed, so that it becomes similar to the other boxes? ▪ Discuss and analyze the probability of	various previously established geometric criteria and results, such as basic proportionality theorem, etc. • Expresses relations for geometric shapes in terms of a Cartesian plane, such as finding the distance between two given points, finding the coordinates of a point lying between given points, etc. • Determines all trigonometric ratios with a given acute angle and uses them to solve problems related to daily life, such as finding heights or distances from various structures. • Deriving proofs of theorems related to tangent to a circle. • Constructs a triangle similar to a given triangle according to a given scale factor. • Justifies a pair of tangent lines from an external point to a circle and the process used in it. • Examines the steps in geometric constructions and gives reasons for each step. • Finds surface area and volume by imagining surrounding objects as combinations of different solid shapes, such as cylinder and cone, cylinder and semicircle, combination of

occurrence of various events through simple activities, such as tossing a coin, throwing two die together, picking up a card from a deck of 52 cards, etc. ■ Generalize the formulas for mean, median and mode studied in previous classes by providing conditions for these central tendencies. ■ Collect data from your surroundings and calculate central tendencies from these. ■ Draw a tangent from a point outside a circle and draw a tangent from a point that lies inside the circle. This will encourage them to find different methods to verify the properties of tangent lines.	different cubes, etc. • Calculates the mean, median and mode of various sets for data related to daily life contexts. • Determines the probability of an event. • Applies concepts in solving daily life problems.

Suggested Educational Processes in an Inclusive System

Children with special needs should be accompanied with other children in the class and other suitable activities can be designed keeping in mind the above learning objectives. The teacher should keep in mind the special problem of the child and plan alternative strategies for the teaching-learning process.

A healthy inclusive environment in the classroom provides equal opportunities to all students, whether with or without learning difficulties. The measures that need to be adopted are as follows –

- Developing process skills through group activities and using ICT for stimulation, repeated practice and evaluation.
- To assess the learning process through various methods, taking cognizance of the student's answers.
- Observing the child's engagement in multiple choice activities through different methods and levels of engagement.

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Note : Question papers given in this workbook are tentative for the guidance of students, it should be marked and valid according to BSER Model test paper 2024.

Pri Test Paper

Q. 1 Find the value of $\sqrt{156.25}$.

(a) 12.25 (b) 11.5 (c) 12.5 (d) 13.5 ( )

Q. 2 Which of the following is an irrational number -

(a) $\frac{22}{7}$ (b) π (c) $\frac{1}{2}$ (d) A and B both are correct ( )

Q. 3 The number of zeroes of the polynomial $x^3 - 2x^2 + x$ will be -

(a) 3 (b) 2 (c) 0 (d) 1 ( )

Q. 4 If two equations are $x + y = 4, x - y = 2,$ then the value of x will be -

(a) 1 (b) 3 (c) 1 and 3 (d) 4 ( )

Q. 5 Which of the following statements is for quadratic equation ?

(a) $ax^2 + bx + c = 0$ $a, b, c, \in R, a = 0$

(b) $ax^2 + bx + c = 0$ $a, b, c, \in R, a \neq 0$

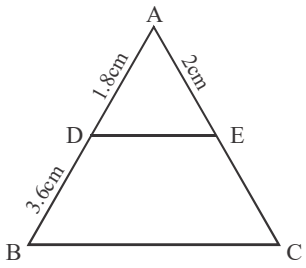
(c) $ax^2 + bx + c$ $a, b, c, \in R, a = 0$

(d) $ax^2 + bx + c$ $a, b, c, \in R, a \neq 0$ ( )

Q. 6 The formula to find the n^{th} term from the last term in an arithmetic progression is -

(a) a + (n-1) d (b) l + (n-1) d (c) $\frac{n}{2}$ (a-d) (d) None of the above ( )

Q. 7

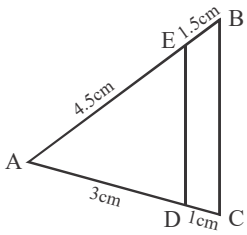


In the given figure DE || BC and AD = 1.8cm, BD = 3.6cm, AE = 2cm, so find the value of EC -

(a) 4cm (b) 3cm

(c) 5.4cm (d) 4.5cm ( )

Q. 8



In the given figure. Which sides are parallel -

(a) AB || AC (b) BC || CD

(c) BC || ED (d) None of the above ( )

Q. 9 How many tangent lines can be drawn from a point on a circle ?

(a) 1 (b) Two (c) 0 (d) Infinite ( )

Q. 10 What will be the length of the tangent drawn to a circle from a point located at a distance of 5 cm from the centre of a circle of radius 3 cm ?

(a) 6 (b) 4 (c) 8 (d) 2 ( )

Q. 11 What will be the distance of the point (x, y) from the origin ?

(a) $\sqrt{x+y}$ (b) $x+y$ (c) x^2+y^2 (d) $\sqrt{x^2+y^2}$ ( )

Q. 12 The distance of X-axis from point (2, 3) is -

(a) 2 (b) -3 (c) 3 (d) 5 ( )

Q. 13 The point which is equidistant from the points (2,-5) and (-2, 9) is -

(a) (-7, 0) (b) (7, 0) (c) None of these (d) a and b are correct ( )

Q. 14 The value of $2\tan^2 30^o$ is -

(a) $\frac{2}{\sqrt{3}}$ (b) $\frac{1}{2\sqrt{3}}$ (c) $\frac{2}{3}$ (d) 6 ( )

Q. 15 If the height of a tower is equal to its shadow, then the angle of elevation will be -

(a) 30^0 (b) 45^0 (c) 60^0 (d) 90^0 ( )

Q. 16 The probability that Vinita's birthday will be on Monday in a non-leap year will be -

(a) $\frac{1}{1}$ (b) $\frac{3}{7}$ (c) $\frac{6}{7}$ (d) $\frac{2}{7}$ ( )

Q. 17 The formula for the length of the arc corresponding to the sector with angle θ is -

(a) $\frac{\theta \times 2\pi r}{360^0}$ (b) $\frac{\pi r^2 \theta}{360^0}$ (c) $\frac{2\pi r^2}{360^0}$ (d) $\frac{\pi r \theta}{360^0}$ ( )

Q. 18 The area of the sector is –

(a) $\frac{\pi r^2 \theta}{720} \times 2$ (b) $\frac{1}{2} lr$ (c) $\frac{\pi r^2 \theta}{360^o}$ (d) All of the above ( )

Q. 19 The mean of 2, 3, 4, 5, 6 will be -

(a) 2 (b) 3 (c) 4 (d) 5 ( )

Q. 20 The value of that observation which has the highest frequency is called -

(a) Mean (b) Median

(c) Mode (d) None of the above ( )

Worksheet – 1

REAL NUMBERS

Points to Remember :

1. Basic theorem of Arithmetic- Every Composite Number can be expressed as the product of Prime Numbers.
2. $\sqrt{2}, \sqrt{3}, \sqrt{5}$ etc. are Irrational Numbers.
3. If a and b are two positive Integers then HCF (a, b) x LCM (a, b) = a x b

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Q. 1 Which of the following numbers is a prime number ?

(a) 29 (b) 25 (c) 16 (d) 15 ( )

Q. 2 Which of the following is not an irrational number ?

(a) $\sqrt{10}$ (b) $\sqrt{24}$ (c) $\sqrt{35}$ (d) $\sqrt{25}$ ( )

Q. 3 $\sqrt{3}$ and $\sqrt{5}$ are -

(a) Integer numbers (b) Irrational numbers

(c) Rational numbers (d) None of these ( )

Q. 4 The real number is-

(a) Only rational numbers (b) Only irrational numbers

(c) Both rational and irrational (d) None of these ( )

Q. 5 5.2372 is -

(a) Integer number (b) Rational number

(c) Imaginary number (d) None of these ( )

Q. 6 Find the HCF & LCM of 5, 15 and 20.

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Q. 7 What will be the product of the smallest prime and smallest composite number ?

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Q. 8 How many rational numbers can be there between two rational numbers ?

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Q. 9 Find HCF of $6x^4y$ and $12xy$.

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Q. 10 If p and q are two prime numbers, then what will be their HCF ?

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Q. 11 Write the prime factors of 216.

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Q. 12 How many odd numbers are there between 0 and 50 ?

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Worksheet – 2

REAL NUMBERS

Q. 1 The HCF of 6 and 20 using Prime Factorization Method is -

(a) 2 (b) 6 (c) 20 (d) 60 ( )

Q. 2 π is a -

(a) Rational number (b) Irrational number (c) Whole number (d) None of these ( )

Q. 3 Which of the following is not an irrational number -

(a) $\sqrt{\frac{64}{81}}$ (b) $2\sqrt{3}$ (c) $\sqrt{\frac{21}{35}}$ (d) $\sqrt{3}\sqrt{2}$ ( )

Q. 4 5 - √2 is a -

(a) Rational number (b) Integer number (c) Irrational number (d) None of these ( )

Q. 5 Write the prime factors of 1260 in the form of exponents.

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Q. 6 Find the LCM of the numbers 55 and 88.

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Q. 7 Find the HCF of the numbers 4052 and 12576.

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Q. 8 Write the relation between the LCM and HCF of two numbers.

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Q. 9 Find the LCM of numbers 24 and 72.

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Q. 10 If $X = 2^3 \times 3^2$ and $Y = 2^2 \times 3^2$, then find the LCM and HCF of X and Y.

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Worksheet – 3

REAL NUMBERS

Q. 1 Which of the following numbers is different -

(a) $\sqrt{\frac{3}{2}}$ (b) $\sqrt{\frac{16}{4}}$ (c) $\sqrt{\frac{2}{5}}$ (d) $\sqrt{\frac{21}{35}}$ ( )

Q. 2 If LCM of two numbers a and 18 is 36 and HCF is 2, then the value of a will be -

(a) 2 (b) 3 (c) 4 (d) 1 ( )

Q. 3 $\left(3-\sqrt{3}\right)$ is -

(a) Rational number (b) Irrational number

(c) An integer number (d) None of these ( )

Q. 4 $\sqrt{10} \times \sqrt{15}$ is equal to -

(a) $5\sqrt{6}$ (b) $6\sqrt{5}$ (c) $\sqrt{30}$ (d) $\sqrt{25}$ ( )

Q. 5 $2\sqrt{3}$ is -

(a) An integer (b) Rational (c) Irrational (d) A whole number ( )

Q. 6 The total number of factors of a prime number are -

(a) 0 (b) 1 (c) 2 (d) 3 ( )

Q. 7 Find the LCM of 96 and 404 by Prime Factorization Method.

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Q. 8 Prove that $\sqrt{2}$ is an Irrational Number.

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Q. 9 Given that HCF (306,657) is 9.

Find the LCM (306, 657).

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Q. 10 Find the HCF of 72 and 120 by Prime Factorization Method and then find their LCM.

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Q. 11 Prove that $3 + 2\sqrt{5}$ is an Irrational Number.

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Q. 12 Find the HCF and LCM of the numbers 510 and 92 and check that the product of the two numbers = HCF X LCM.

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Worksheet – 4

POLYNOMIALS

Points to Remember :

1. The highest degree of 'x' in a polynomial P(x) is called the degree of the polynomial.
2. Polynomials having degree 1 are called linear polynomials.
3. Polynomials having degree 2 are called quadratic polynomials.
4. Polynomials having degree 3 are called cubic polynomials.
5. The shape of the graph of a quadratic polynomial $ax^2 + bx + c$ is like a parabola.

Q. 1 What will be the zeroes of the polynomial p(x) = 2x+ 1 is -

(a) 1 (b) $-\frac{1}{2}$ (c) $\frac{1}{2}$ (d) 2 ( )

Q. 2 The zeroes of the polynomial x^2 - 3 will be -

(a) (3, 3) (b) $\left(-\sqrt{3},\sqrt{3}\right)$ (c) $\left(-\sqrt{3},-\sqrt{3}\right)$ (d) $(-3,-3)$ ( )

Q. 3 If a, b are the zeroes of the polynomial $p(x) = x^2 - 2x + 15$, then the value of ab will be -

(a) -15 (b) 15 (c) 5 (d) 2 ( )

Q. 4 If p, q are the zeroes of the polynomial $x^2 - 2x + 1$, then the value of $\frac{1}{p} + \frac{1}{q}$ will be -

(a) 2 (b) 2 (c) 0 (d) 1 ( )

Q. 5 What will be the number of zeroes of a 'nth' degree polynomial -

(a) 1 (b) 0 (c) n (d) 2 ( )

Q. 6 Find the quadratic polynomial whose zeroes are 5 and 8.

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Q. 7 Write an example of a quadratic polynomial.

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Q. 8 What type of shape is obtained from the graph of a quadratic polynomial $ax^2 + bx + c$.

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Q. 9 Find a quadratic polynomial whose sum and product of zeroes are 7 and 5 respectively.

.....

Q. 10 Find a quadratic polynomial whose zeroes are $\frac{1}{4}$ and $-\frac{1}{4}$.

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Worksheet – 5

POLYNOMIALS

Points to Remember :

1. A quadratic polynomial $P(x) = ax^2 + bx + c$ can have at most two zeroes.
2. If α and β are the zeroes of a quadratic polynomial $P(x) = ax^2 + bx + c$ then $\alpha + \beta = -b/a$, $\alpha\beta = c/a$

Q. 1 If one of the zeroes of the polynomial $2x^2 + x + k$ is 3, then the value of k will be -

(a) 12 (b) 21 (c) 24 (d) -21 ( )

Q. 2 The zeroes of the quadratic polynomial $3x^2 + 15x + 12$ will be -

(a) Both positive (b) Both negative

(c) One positive, one negative (d) Both same but opposite signs ( )

Q. 3. The zeroes of the polynomial $P(x) = ax^2 + bx + c$ will be -

(a) 1 (b) 3 (c) 2 (d) None of these ( )

Q. 4 The shape of a graph is parabolic. Which polynomial will it represent ?

(a) Exponential polynomial (b) Quadratic polynomial

(c) Cubic polynomial (d) None of these ( )

Q. 5 Expression $(x - 3)$ will be a factor of the polynomial $p(x) = x^3 + x^2 - 17x + 15$ if -

(a) $p(3) = 0$ (b) $p(-3) = 0$ (c) $p(-3) = -3$ (d) $p(-3) = 3$ ( )

Q. 6 Find the zeroes of the quadratic polynomial $x^2 - 6x + 5$.

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Q. 7 If the product of the zeroes of the polynomial $ax^2 - 6x - 6$ is 6, then find the value of a.

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Q. 8 If the zeroes $\bar{\alpha}$ and β of the quadratic polynomial $f(x) = x^2 - 5x + k$ are such that $\bar{\alpha} - \beta = 1$ then find the value of k.

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Q. 9 If the factor of the polynomial $f(x) = x^4 - x^3 - 4x^2 + kx + 10$ is $x - 1$, then find the value of k.

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Q. 10 Find the sum of the zeroes of the polynomial $x^2 + 7x + 10$.

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Worksheet – 6

POLYNOMIALS

Points to Remember :

1. If α, β are the zeroes of the quadratic polynomial $P(x) = ax^2 + bx + c$, $a \neq 0$ then $ax^2 + bx + c = Kx^2 - K(\alpha + \beta)x + K(\alpha\beta)$
2. If the zeroes of a cubic polynomial $P(x) = ax^3 + bx^2 + cx + d$ are α, β, γ then $\alpha + \beta + \gamma = -b/a$, $\alpha\beta + \beta\gamma + \gamma\alpha = c/a$, $\alpha\beta\gamma = -d/a$
3. If two zeroes of a quadratic polynomial are given, then the quadratic polynomial is written in the following way- $x^2 -$ (Sum of zeroes) $x +$ (Product of zeroes)

Q. 1 If the zeroes of the quadratic polynomial $ax^2 + bx + c$, $c \neq 0$ are the same then -

(a) c and b will have the same signs (b) c and a will have the same signs

(c) c and b will have different signs (d) c and a will have different signs ( )

Q. 2 If the zeroes of the polynomial $2x^2 + ax + b = 0$ are reciprocals of each other, then the value of b is-

(a) - 1 (b) - 2 (c) 2 (d) 1 ( )

Q. 3 The zeroes of a polynomial $P(x)$ are the coordinates of those points of x where -

(a) The graph of $y = p(x)$ intersects the x axis.

(b) The graph of $x = p(y)$ intersects the y axis

(c) The graph of $y = p(y)$ intersects the x axis.

(d) The graph of $x = p(x)$ intersects the y axis ( )

Q. 4 A quadratic polynomial whose zeroes are 3 and 4 will be –

(a) $x^2 - 7x + 12$ (b) $x^2 + 7x + 12$

(c) $x^2 - 7x - 12$ (d) $x^2 + 7x - 12$ ( )

Q. 5 The product of zeroes of the polynomial $x^2 - 6x$ will be -

(a) 0 (b) 1 (c) 3 (d) 6 ( )

Q. 6 Find the quadratic polynomial, if the sum and product of its zeroes are respectively -

(i) $\frac{7}{3}, \frac{5}{3}$ .....

(ii) 0 and $\sqrt{5}$ .....

Q. 7 If the sum of the zeroes of the polynomial $Kx^2 + 2x + 3$ is equal to their product, then find the value of K.

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Q. 8 If the zeroes of the polynomial $6x^2 - 3 - 7x$ is $\frac{3}{2}, -\frac{1}{3}$, then check the correctness of the relation between zeroes and coefficients.

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Q. 9 If the sum and product of the zeroes of a polynomial are q, $\frac{1}{q}$ respectively, then find the polynomial.

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Worksheet –7

LINEAR EQUATIONS IN TWO VARIABLES

Q. 1 The method to solve a system of linear equations in two variables is –

(a) Substitution method (b) Elimination method

(c) Cross multiplication method (d) All of the above ( )

Q. 2 A two-digit number with unit digit x and tens digit y -

(a) $10x + y$ (b) $10y + x$ (c) Both (d) None of these ( )

Q. 3 The solutions of the equation $2x + y = 5$ are -

(a) 2, 1 (b) 1, 2 (c) 1, 0 (d) 0, 0 ( )

Q. 4 The solutions of the equation $x + y = 6$ will be -

(a) One (b) Two (c) Infinite (d) Not even one ( )

Q. 5 In the equation $x + 2y = 9$, if $x = 5$, then what will be the value of y.

(a) 1 (b) 2 (c) 4 (d) -2 ( )

Q. 6 In the equation $4x + 2y = K$, if $x = 2, y = 1$, then the value of K will be -

(a) 6 (b) 10 (c) 7 (d) 8 ( )

Q. 7 While solving a pair of linear equations in two variables, the value of one variable is expressed in terms of the other variable. This method is called -

(a) Graph method (b) Elimination method

(c) Substitution method (d) Multiplication method ( )

Q. 8 Find the value of a, b, c in equation $2x + 3y = 4$ for the standard equation $ax + by = c$?

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Q. 9 The cost of 9 pencils and 8 pens is Rs 54. Write this as an algebraic equation.

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Q. 10 Solve the system of equations $x – y + 1 = 0$ and $3x + 2y – 12 = 0$.

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Q. 11 Write the standard form of a pair of linear equations in two variables.

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Worksheet –8

LINEAR EQUATIONS IN TWO VARIABLES

Q. 1 The difference between three times one number and double the other number is 9, write it in algebraic form -

(a) $3x + 2y = 9$ (b) $3x - 2y = 9$

(c) $2x - 3y = 9$ (d) $2x + 3y = 9$ ( )

Q. 2 The cost of 7 apples and 4 oranges is Rs 45. Write this in algebraic form -

(a) $7x + 4y = 45$ (b) $7x - 4y = 45$

(c) $7x + 3y = 35$ (d) $4x + 7y = 45$ ( )

Q. 3 Does the point (2, 3) lie on the line $3x - 2y = 5$?

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Q. 4 The sum of the ages of a father and his son is 40 years. If the father's age is three times the son's age, then find their age.

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Q. 5 Find two solutions of equation $2x + 5y = 17$.

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Q. 6 Write the solution for the pair of linear equations $\sqrt{2}x + \sqrt{3}y = 0$ and $\sqrt{3}x - \sqrt{2}y = 0$.

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Q. 7 Solve $2x + 3y = 8$ and $8x - 3y = 2$ by Substitution Method.

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Q. 8 Solve $3x + 4y = 10$ and $2x - 2y = 2$ by Elimination Method.

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Q. 9 Solve $8x + 5y = 9$ and $3x + 2y = 2$ by Substitution Method.

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Worksheet –9

QUADRATIC EQUATIONS

Points to Remember :

1. $ax^2 + bx + c, a \neq 0$ is called the standard form of the quadratic equation.
2. The roots of the quadratic equation $ax^2 + bx + c, a \neq 0$ and the zeroes of the quadratic polynomial $ax^2 + bx + c$ are the same.
3. Roots of the quadratic equation $ax^2 + bx + c, a \neq 0$. It can be determined by the formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
4. Here $b^2 - 4ac$ itself determine whether the root is real or not, $D = b^2 - 4ac$ is called the derivative of the equation.
5. A quadratic polynomial can have at most two zeroes. Therefore, any quadratic equation can have at most two roots.
6. The quadratic equation will have roots of $ax^2 + bx + c, a \neq 0$.
   (i) There will be two different real roots if $b^2 - 4ac > 0$
   (ii) There will be two equal real roots if $b^2 - 4ac = 0$
   (iii) There will be no real roots if $b^2 - 4ac < 0$

Q. 1 The roots of the equation $ax^2 + bx + c = 0, a \neq 0$ will be real and unequal if -

(a) $b^2 < 4ac$ (b) $b^2 > 4ac$ (c) $b^2 = 4ac$ (d) All of the above ( )

Q. 2 The roots of $x^2 - 4 = 0$ are -

(a) 4 (b) ± 2 (c) 3 (d) -4 ( )

Q. 3 The degree of a linear equation in one variable is always -

(a) 0 (b) 1 (c) 2 (d) None of these ( )

Q 4. The roots of the quadratic equation $2x^2 - x - 6 = 0$ are -

(a) $-2, \frac{3}{2}$ (b) $2, \frac{-3}{2}$ (c) $-2, \frac{-3}{2}$ (d) $2, \frac{3}{2}$ ( )

Q. 5 If the quadratic equation $x^2 - kx + 4 = 0$ has the same roots, then the value of k will be -

(a) 2 (b) 1 (c) 4 (d) 3 ( )

Q. 6 The product of the roots of the equation $(a-b)x^2 + (b-c)x + (c-a) = 0$ will be -

(a) $\frac{c-a}{b-a}$ (b) $\frac{b-c}{a-b}$ (c) $\frac{c-a}{a-b}$ (d) $\frac{b-c}{b-a}$ ( )

Q. 7 If the roots of quadratic equation $2x^2 + 3x - 4 = 0$ are 1 and β, then find the value of 1 + β.

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Q. 8 What will be the nature of the roots of the quadratic equation $x^2 + x - 1 = 0$?

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Q. 9 When does the equation $ax^2 + bx + c = 0, a \neq 0$ have the same roots ?

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Q. 10 What will be the degree of the equation $x^2 + 5x - 6 = 0$?

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Worksheet –10

QUADRATIC EQUATIONS

Q. 1 The sum of the roots of the equation $x^2 + 2x - 3 = 0$ is -

(a) -2 (b) 2 (c) $\frac{1}{2}$ (d) $-\frac{1}{2}$ ( )

Q. 2 The product of the roots of the equation $2x^2 + x - 6 = 0$ is -

(a) -3 (b) 2 (c) -7 (d) 0 ( )

Q. 3 If $\frac{1}{2}$ is the root of quadratic equation $x^2 + kx - \frac{5}{4} = 0$, then the value of k is -

(a) 2 (b) -2 (c) $\frac{1}{4}$ (d) $\frac{1}{2}$ ( )

Q. 4 For which value of k, the quadratic equation $2x^2 - kx + k = 0$ has the same roots as -

(a) Only 0 (b) Only 4 (c) Only 8 (d) Only 0, 8 ( )

Q. 5 Which of the following is not a quadratic equation -

(a) $(x + 1)(x-2) = 0$ (b) $2x^2 - 7x = 0$

(c) $x + \frac{3}{x} = x^2$ (d) $x^2 - 9 = 0$ ( )

Q.6 If $ax^2 + bx + c = 0$ has the same roots then what will be the value of c -

(a) $-\frac{b}{2a}$ (b) $\frac{b}{2a}$

(c) $\frac{-b^2}{4a}$ (d) $\frac{b^2}{4a}$ ( )

Q. 7 The roots of the equation $x^2 - 2x - 35 = 0$ will be -

(a) -5, 7 (b) 7, -5 (c) -7, -5 (d) 7, 5 ( )

Q. 8 The sum of the roots of equation $2x^2 - 3x + 6 = 0$ is -

(a) 3 (b) $\frac{3}{2}$ (c) -3 (d) $\frac{2}{3}$ ( )

Q. 9 If the roots of quadratic equation $x^2 - 2x + k = 0$ are same, then the value of k will be -

(a) 0 (b) 2 (c) -1 (d) 1 ( )

Worksheet –11

QUADRATIC EQUATIONS

Q. 1 If one solution of the equation $x^2 + 3ax + k = 0$ is $x = -a$, then the value of k will be -

(a) $2a^2$ (b) 0 (c) 2 (d) -2a ( )

Q. 2 What is the sum of the roots of the quadratic equation $-3x^2 + 4x + 5 = 0$ -

(a) $\frac{5}{3}$ (b) $\frac{3}{4}$ (c) $\frac{4}{3}$ (d) $\frac{3}{5}$ ( )

Q. 3 If the roots of the quadratic equation $(b-c)x^2 + (c-a)x + (a-b) = 0$ are the same, then the value of $a + c$ will be -

(a) b (b) -b (c) 2b (d) -2b ( )

Q. 4 Which of the following is the zero of $4 - \frac{1}{2}x^2$ -

(a) 4 (b) 7 (c) $2\sqrt{2}$ (d) 2 ( )

Q. 5 The product of the roots of polynomial $4x^2 - 4x + 1$ will be -

(a) -1 (b) 1 (c) $\frac{1}{4}$ (d) 0 ( )

Q. 6 The nature of the roots of the quadratic equation $4x^2 - 12x - 9 = 0$ is -

(a) Real and identical (b) Real and different

(c) Imaginary and similar (d) Imaginary and different ( )

Q. 7 The product of two consecutive positive integers is 72. If the smaller number is x, then write the equation -

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Q. 8 What is the equation of the quadratic equation whose roots are 3, -3 ?

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Q. 9 If a two-digit number is four times the sum of its digits and three times the product of its digits, then find the number?

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Worksheet –12

ARITHMETIC PROGRESSION

Points to Remember :

1. An arithmetic progression is a list of numbers in which the difference between any two consecutive numbers always remains the same and by adding a certain number to each number, the next number is obtained.
2. The difference between two consecutive terms of an arithmetic progression is called common difference.
3. If the first term of the Arithmetic Sequence is a and the common difference is d, then the n^{th} term of the sequence will be $T_n = a + (n-1)d$

Q. 1 The common difference of the arithmetic progression 4, 10, 16, 22, 28, ... will be -

(a) 4 (b) 6 (c) 2 (d) 8 ( )

Q. 2 An arithmetic progression is -

(a) 2, 4, 8, 16……. (b) - 10, - 6, - 2, 2 …….

(c) 3,5, 4, 2, ……. (d) √2, √6, √9, √12, ……. ( )

Q. 3 The common difference of A.P. 6, 9, 12, 15,…… will be -

(a) 9 (b) 3 (c) 5 (d) 6 ( )

Q. 4 The fourth term of arithmetic progression 7, 12, 17, ……. will be -

(a) 24 (b) 19 (c) 22 (d) 9 ( )

Q. 5 The first term of the arithmetic progression 5, 7, 9, 11, …… will be -

(a) 2 (b) 3 (c) 4 (d) 5 ( )

Q. 6 Write the first four terms of the arithmetic progression when -

$a = 4$, $d = 2$

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Q. 7 Find the first term ‘a’ and common difference ‘d’ for the arithmetic progression -7, -9, -11, -13.

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Q. 8 Find the 10^{th} term of the arithmetic progression 2, 7, 12, ……

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Q. 9 If $a_n = 3 + 4n$ then write the first four terms of the arithmetic progression.

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Q. 10 Write the formula to find the n^{th} term of an arithmetic progression.

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Q. 11 Find the 10^{th} term of A.P.: 54, 51, 48, 45, …….

……

Q. 12 Which term of the arithmetic progression 21, 18, 15, …… is zero ?

……

Q. 13 Find the 30^{th} term of the arithmetic progression 10, 7, 4 .....

……

Q. 14 Which term of the arithmetic progression 3, 15, 27, 39, …… is 639 ?

……

Q. 15 What will be the number of terms in arithmetic progression 3, 5, 7, 9, ... , 19 ?

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Worksheet –13

ARITHMETIC PROGRESSION

Points to Remember :

1. The sum of n^{th} terms of an arithmetic progression can be determined by $S_n = \frac{n}{2}[2a + (n-1)d]$.
2. If the last term of the arithmetic progression is given as T_n, then $S_n = \frac{n}{2}[a + T_n]$.
3. The three terms of an arithmetic progression are $a-d, a, a+d$.
4. The four terms of the arithmetic progression are $a-3d, a-d, a+d, a+3d$.
5. The five terms of the arithmetic progression are $a-2d, a-d, a, a+d, a+2d$.

Q. 1 When the first term of an arithmetic progression is 2 and the common difference is 3, then the three terms of the arithmetic progression will be -

(a) 2, 6, 9 (b) 2, 5, 8 (c) 2, 6, 10 (d) 2, 5, 9 ( )

Q. 2 If the n^{th} term of an arithmetic progression is 3n+ 5, then its common difference will be -

(a) 1 (b) 2 (c) 3 (d) 5 ( )

Q. 3 If the first term of the arithmetic progression is 2 and the common difference is 3, then the n^{th} term is -

(a) $2n-1$ (b) $2n+1$ (c) $3n-1$ (d) $3n+1$ ( )

Q. 4 The seventh term of arithmetic progression 5, 7, 9, 11 ..... will be -

(a) 20 (b) 25 (c) 17 (d) 35 ( )

Q. 5 If the first term of the arithmetic progression is 'a' and the common difference is 'd', then the sum of the first n^{th} terms is -

(a) $a + (n-1)d$ (b) $a + nd$ (c) $\frac{n}{2}[(2a+(n-1)d]$ (d) $\frac{n}{2}[2a+nd]$ ( )

Q. 6 What is the 10^{th} term of the arithmetic progression -40, -15, 10, 35,..... .

.....

Q. 7 Write the first term and common difference of the arithmetic progression 3, 1, -1, -3.....

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Q. 8 In AP, a = 11 and d = - 3, then write the first four terms.

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Q. 9 Find the number of terms in the arithmetic progression 3, 6, 9, ... , 39.

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Q. 10 How many two digit numbers are divisible by 7 ?

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Q. 11 Which term of A.P. 21, 18, 15..... is 81 ?

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Q. 12 Which term of A.P. 21, 42, 63, 84, ... is 210 ?

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Q. 13 Find the sum of 20 terms of arithmetic progression 1, 4, 7, 10, ...

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Q. 14 Find the sum of -

$34 + 32 + 30 + \ldots\ldots\ldots\ldots + 10$

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Q. 15 Find the sum of the first 100 natural numbers.

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Worksheet – 14

ARITHMETIC PROGRESSION

Q. 1 The next term of the series – 6, -3, 0, 3, ……

(a) 6 (b) -6 (c) 9 (d) 2 ( )

Q. 2 The common difference of arithmetic series. -1, -5/6, -2/3, ……. is -

(a) -1/6 (b) 1/6 (c) -5/6 (d) -1 ( )

Q. 3 If the first term of the arithmetic progression is 6 and the common difference is 3, then A.P will be -

(a) 6, 9, 12, 15, ……. (b) -6, -9, -12, -15, …….

(c) 3, 6, 9, ……. (d) -4, -6, -9, ……. ( )

Q. 4 The first and last term of an arithmetic progression are 2 and 8 respectively. If the sum of the n^{th} terms is 90 then the value of 'n' will be -

(a) 13 (b) 14 (c) 15 (d) 18 ( )

Q. 5 What is the 11^{th} term of the arithmetic progression -3, - ½ , 2 …….

(a) 22 (b) 30 (c) 25 (d) 32 ( )

Q. 6 If the 7^{th} term and 13^{th} term of the arithmetic progression are 34 and 64 respectively, then its 18^{th} term will be -

(a) 89 (b) 88 (c) 87 (d) 90 ( )

Q. 7 Write the 5^{th} term from the last term of arithmetic series 3, 5, 7, 9, ……. 201.

……

Q. 8 The first term and last term of the arithmetic progression are 1 and 11 respectively. If the sum of its terms is 36, find the number of terms.

……

Q. 9 Write the common difference and next four terms of the arithmetic progression 3,-2,-7,-12,……

……

Q. 10 Find the total number of terms in arithmetic series 3, 8, 13, 18, ……., 78.

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Q. 11 Find the sum of the first five multiples of 3.

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Q. 12 How many two digit numbers are divisible by 3 ?

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Q. 13 If $a_n = 9 - 5n$ is the n^{th} term of an arithmetic progression, then write the common difference.

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Q. 14 Find the sum of the first 1000 positive integers.

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Q. 15 Find the sum of odd numbers between 0 and 50.

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Worksheet –15

TRIANGLE

Points to Remember :

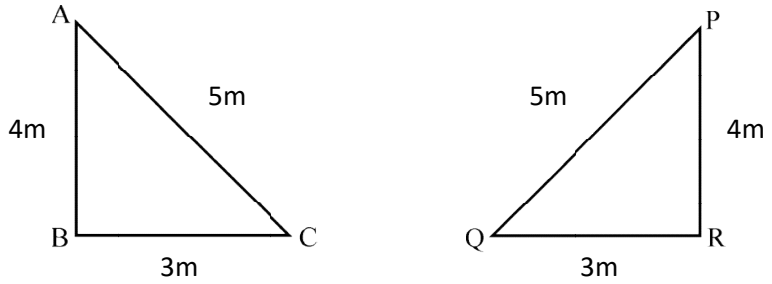
1. Similar shapes are that have the same shape, but their sizes may vary.
2. Two polygons are called similar if their corresponding angles are equal and their corresponding sides are proportional.
3. All circles, squares, equilateral triangles are similar.

Q. 1 Congruent figures are -

(a) similar in shapes and sizes (b) similar in shape

(c) similar in size (d) none of these ( )

Q. 2 ΔABC and ΔPQR will be -



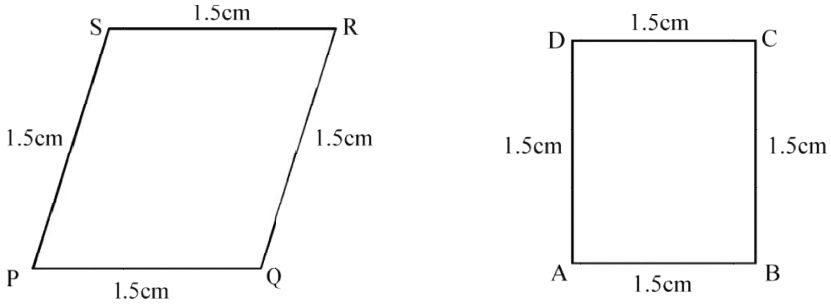
(a) Equilateral (b) Similar (c) Equilateral and Similar (d) none of these ( )

Q. 3 Two Polynomials will be similar if -

(a) corresponding angles are equal (b) corresponding sides are proportional

(c) both a and b (d) corresponding angles are unequal. ( )

Q. 4 If the sides of rhombus PQRS and square $ABCD$ are equal as shown in the figure, then will they be similar ?



(a) yes (b) no (c) can't say (d) PQRS = ABCD ( )

Q. 5 Which of the following statements are correct ?

(a) All congruent figures are similar.

(b) Not all congruent figures are similar.

(c) All similar figures are congruent.

(d) It is not necessary for all similar figures to be congruent. ( )

Q. 6 Write which type of triangles will always be similar?

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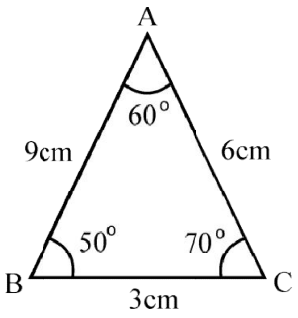
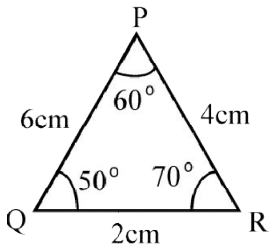
Q. 7 Are ΔABC and ΔPQR similar? If yes then why ?





(a) ..... (b) .....

Q. 8 Write the conditions of similarity of triangles.

(a) .....

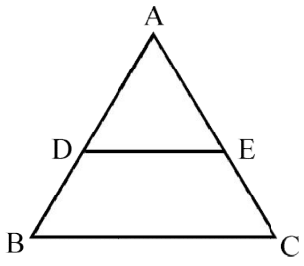
(b) .....

Q. 9 If in the given figure ΔABC, $DE \parallel BC$ then (using basic proportionality theorem) which sides will be proportional ?

(a) $\frac{AD}{DB}$ = ...

(b) $\frac{AB}{DB}$ = ...

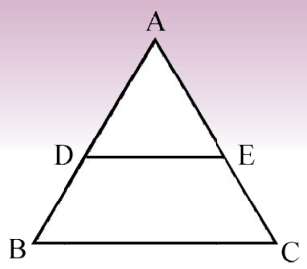
(c) $\frac{AB}{AD}$ = ...



Q. 10 In the given figure of question number 9, $DE \parallel BC$ and AD=20cm, DE = 5CM, AB= 12CM then find the value of BC.

(a) 5cm (b) 6cm (c) 6.5cm (d) 7.5cm ( )

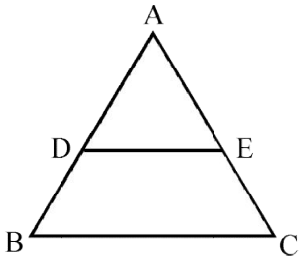
Q. 11 In the given figure, DE|| BC and AC = 20cm, EC = 5cm, DE = 12cm then the value of BC is -



(a) 15cm (b) 16cm

(c) 18cm (d) 24cm ( )

Q. 12 In the given figure, DE||BC, AD = 2.7cm and $\frac{AE}{EC} = \frac{3}{2}$.



Find the length of DB.

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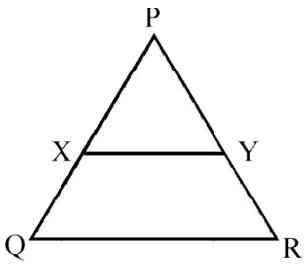
Q. 13 In the given figure, XY||QR, PR = 6.3cm and $\frac{PQ}{XQ} = \frac{7}{3}$.



Find the length of YR.

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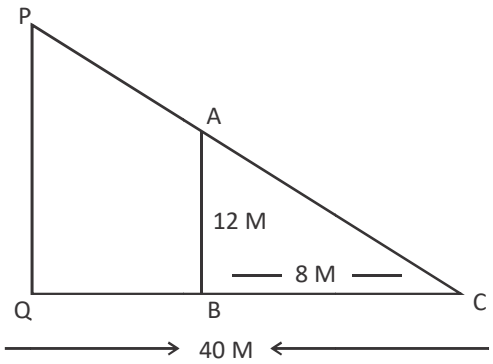
Q. 14 In the given figure, the shadow of 12 meter rod AB is 8 meters and the shadow of tower PQ is 40 meters, then find the height of tower PQ.



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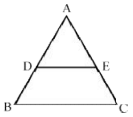
Worksheet –16

TRIANGLE

Points to Remember :

1 In two similar angled triangles, the ratio of their corresponding sides always remains the same.

2. In Δ ABC and ΔDEF, if $\angle A = \angle D$, $\angle B = \angle E$, $\angle C = \angle F$ and $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$ then Δ ABC ~ΔDEF

3. 

When DE || BC in Δ ABC then $\frac{AD}{DB} = \frac{AE}{EC}$ (basic proportional theorem)

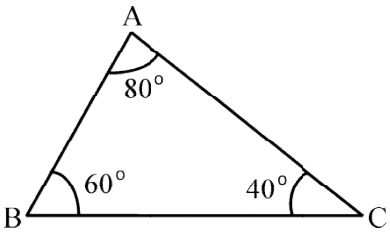
Q. 1 In a triangle, all three angles of the triangle are respectively equal, hence the symbolic form of their similarity will be -

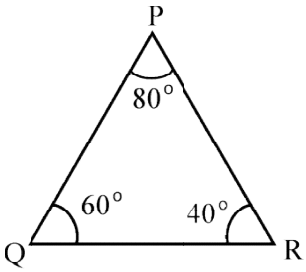
(a) $\Delta ABC \sim \Delta PQR$

(b) $\Delta BCA \sim \Delta PQR$

(c) $\Delta ABC \sim \Delta QRP$

(d) All are right





( )

Q. 2 Which of the following is not a criteria of similarity (for triangles) -

(a) Angle-angle-angle (b) Side-angle-side

(c) Side-side-side (d) Angle-side-side ( )

Q. 3 Which statement will be true for side-angle-side -

(a) Any two angles and one side

(b) Any two angles and the side containing them

(c) Two adjacent angles and side in front of them

(d) None of these ( )

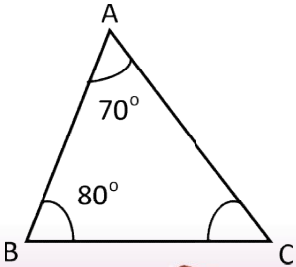
Q. 4 In $\Delta ABC \sim \Delta DEF$ (according to the figure), which options are correct ?

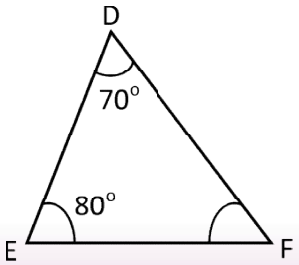
(a) By AAA criteria

(b) By Side-Angle-Side criteria

(c) By A-S-A criteria

(d) By Side - Side - Side criteria





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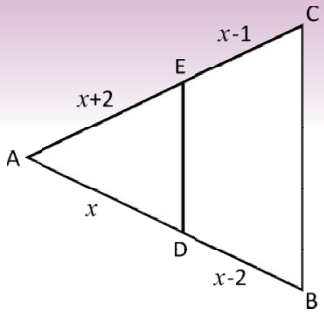
Q. 5



In the givenfigure DE II BC, AD= x, DB = x–2, AE = x+2 and EC = x–1, then the value of x is -

(a) 4 (b) 3

(c) 2 (d) 1 ( )

Q. 6 If ΔABC and ΔPQR are similar, then which statement is true -

(a) $\angle B = \angle R$ (b) $\angle C = \angle Q$

(c) $\angle A = \angle R$ (d) $\angle A = \angle P$ ( )

Q. 7 In ΔPQR and ΔABC, $\angle A = \angle Q, \angle R = \angle B$ then write the symmetry in symbolic form.

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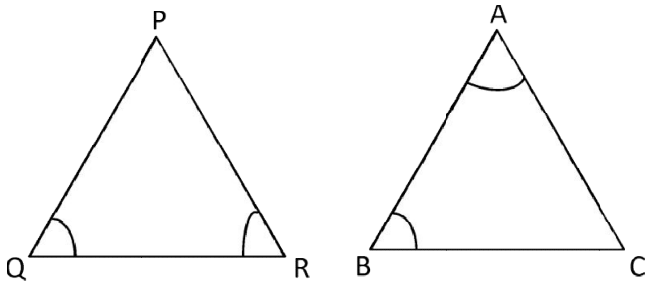

Q. 8 The length of the shadow on the ground by a vertical pillar of height 6m is 4m. While at the same time, the length of the shadow of another tower is 28m, find the height of the tower.

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Q. 9 In the given figure $\frac{OA}{OC} = \frac{OD}{OB}$, then prove that $\angle A = \angle C$.

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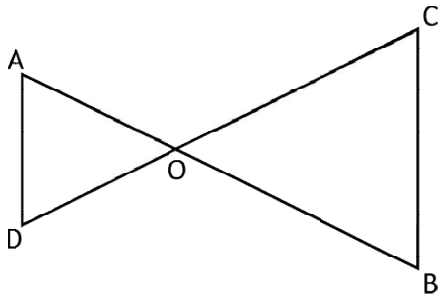
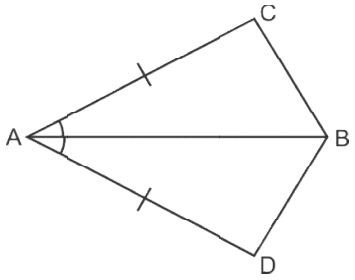


Worksheet –17

TRIANGLE

Q. 1 In quadrilateral ABCD, AC = AD and AB bisects angle A, then the sides BC and BD will be -



(a) Equal (b) Unequal

(c) BC greater than BD (d) BD greater than BC ( )

Q. 2 The value of each angle in an equilateral triangle will be -

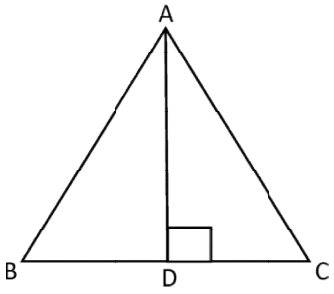
(a) 60° (b) 30° (c) 45° (d) 90° ( )

Q. 3 Each side of an equilateral triangle will be -

(a) Equal (b) Two sides equal

(c) Unequal (d) None of the above ( )

Q. 4 In triangle ABC, the bisector AD of angle A is perpendicular to side BC. Which of the following options is correct ?



(a) $AB = AC$ (b) $AD = AC$

(c) $BD = AB$ (d) $AD = BC$ ( )

Q. 5 Which statement is incorrect from the following statements -

(a) The sum of three angles of a triangle is 180°.

(b) In a right triangle one angle is 90°.

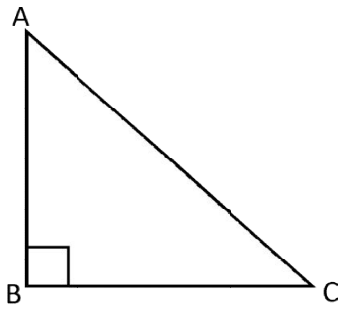
(c) A triangle has three vertices.

(d) Each angle in a triangle is less than 60° ( )

Worksheet –18

TRIANGLE

Q. 1 If $\angle B = 90°$ in triangle ABC (from Pythagoras theorem), then which of the following will be correct -



(a) $AB^2 = AC^2 + BC^2$

(b) $AC^2 = AB^2 + BC^2$

(c) $BC^2 = AC^2 + AB^2$

(d) All of the above ( )

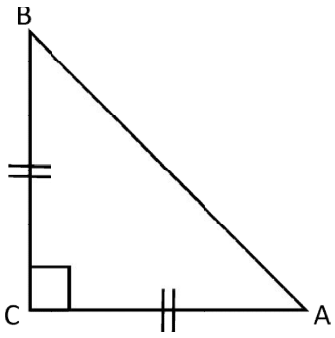
Q. 2 If $PQ^2 + QR^2 = PR^2$ in a triangle PQR, then which angle will be a right angle -

(a) $\angle P$ (b) $\angle Q$ (c) $\angle R$ (d) None of the above ( )

Q. 3 A ladder rests on a wall in such a way that its lower end is at a distance of 2.5 m from the wall and its upper end is rested at a distance of 6 m from the ground. The length of the ladder is -

(a) 6.5m (b) 8.5m (c) 4.5m (d) 4m ( )

Q. 4 In the given figure, ΔABC is an isosceles right triangle whose $\angle C = 90$, hence -



(a) $AB^2 = 2AC^2$

(b) $BC^2 = 2AB^2$

(c) $AC^2 = 2\ AB^2$

(d) $AB^2 = 4AC^2$ ( )

Q. 5 If in ΔABC, AB = 6 cm, BC = 8 cm and AC = 10 cm then the value of ∠B will be -

(a) 60° (b) 90° (c) 45° (d) 30° ( )

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Q. 6 If in ΔPQR, $PQ = 6\sqrt{3}$ cm, $PR = 12$ cm and $QR = 6$ cm, then find the value of $\angle Q$.

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Worksheet –19

COORDINATE GEOMETRY

Points to Remember :

1. The distance between two points $P(x_1, y_1)$ and $Q(x_2, y_2)$ is $PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$.
2. The distance between the origin $(0, 0)$ of point $P(x, y)$ is $OP = \sqrt{x^2 + y^2}$.
3. Coordinates of the midpoint of the line segment PQ connecting two points $P(x_1, y_1)$ and $Q(x_2, y_2)$ will be $(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$.
4. The coordinates of the point which internally divides the line segment PQ joining two points $P(x_1, y_1)$ and $Q(x_2, y_2)$ in the ratio $m_1 : m_2$ will be $(\frac{m_1x_2 + m_2x_1}{m_1 + m_2}, \frac{m_1y_2 + m_2y_1}{m_1 + m_2})$.

Q. 1 Point (4, -5) will be in which quadrant -

(a) I Quadrant (b) II Quadrant (c) III Quadrant (d) IV Quadrant ( )

Q. 2 The abscissa of the point (2, 3) is -

(a) 2 (b) 3 (c) Both 2 and 3 (d) Neither 2 or 3 ( )

Q. 3 The point (0, 5) is located on -

(a) x – axis (b) y – axis (c) II Quadrant (d) III Quadrant ( )

Q. 4 The distance of point (x,y) from the origin O is -

(a) x^2+y^2 (b) $\sqrt{x^2 + y^2}$ (c) $x+y$ (d) $x–y$ ( )

Q. 5 The distance between the origin (0,0) and A(3, 4) is -

(a) 4 units (b) 3 units (c) 5 units (d) 7 units ( )

Q. 6 Write the formula to find the distance between points A (x_1, y_1) and B (x_2, y_2).

AB = ...

Q. 7 Find the distance between the points P(3, 1) and Q(8,6).

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Q. 8 Write the distance of point P(3, 4) from x axis.

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Q. 9 Write the distance of point (-3,-4) from Y axis.

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Q. 10 Find the point on the X axis which is equidistant from the points A(6, 5) and B(-4,5).

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Q. 11 Do the points A(3, 2), B(-2, -3) and C(2, 3) form a triangle, if yes, then why ?

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Q. 12 Find the distance between the points A(-a, a) and Q(-a, -a).

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Q. 13 Find a relation between X and Y, such that the point (X, Y) is equidistant from the points (7, 1) and (3, 5).

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Q. 14 Find the distance between points (a cosθ + b sinθ, 0) and (0, a sinθ - b sinθ).

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Q. 15 Find the coordinates of the points that trisect the line segment joining the points P(-3, 4) and Q(4, 5).

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Worksheet –20

COORDINATE GEOMETRY

Q. 1 If $A(x_1, y_1)$ and $B(x_2, y_2)$ are points, then the coordinates of the midpoint of AB are -

(a) $\left(\frac{x_1+y_1}{2}, \frac{x_2+y_2}{2}\right)$ (b) $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

(c) $\left(\frac{x_1+y_2}{2}, \frac{x_2+y_1}{2}\right)$ (d) None of the above ( )

Q. 2 If points are A(4, 0) and B(0, 4), then the midpoint of AB will be -

(a) (0, 2) (b) (2, 0) (c) (2, 2) (d) (-2, -2) ( )

Q. 3 Points A (–2, –1), B (a, 0), C (4, b) and D (1, 2) are the vertices of a parallelogram, then the value of 'a' will be -

(a) 4 (b) 1 (c) 3 (d) 2 ( )

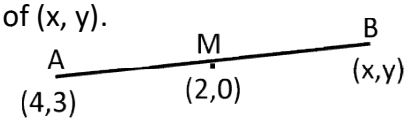
Q. 4 Give the coordinates of the point which divides the line segment joining the points (4, –3) and (8, 5) internally in the ratio 3 : 1.

(a) (7, -3) (b) (7, 3) (c) (-7, 3) (d) (-7, -3) ( )

Q. 5 If the distance between the points A(9, P) and B(6, 0) is 5 units, then the value of 'P' is -

(a) only 4 (b) only -4 (c) ±4 (d) 0 ( )

Q. 6 In the given figure, M is the midpoint of AB then find the value of (x, y).



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Q. 7 If the line segment joining the points $A(x_1, y_1)$ and $B(x_2, y_2)$ intersects the point P in k:1, then write the coordinates of P.

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Q. 8 In what ratio does the point (-1, 6) divide the line segment joining the points (-3, 10) and (6, -8).

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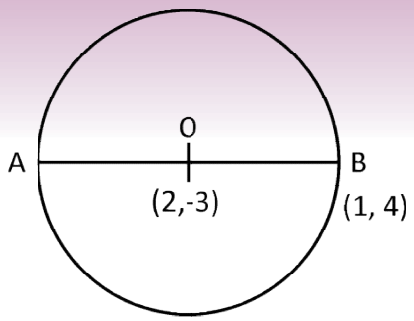
Q. 9



In the given figure, AB is the diameter of the circle and O is the centre. Find the coordinates of point A.

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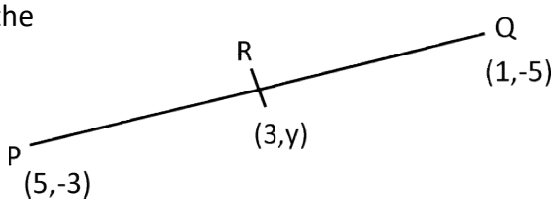
Q. 10 In the given figure, if R is the midpoint of the line segment PQ, then find the value of y.



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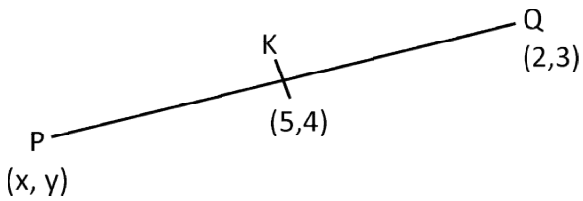
Q. 11



If K is the midpoint of line segment PQ then find the value of P(x, y)

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Q. 12 If the midpoint of two points $A\,(-2, 5)$ and $B\,(-5, Y)$ is $(-\frac{7}{2}, 3)$, then find the distance between points A and B.

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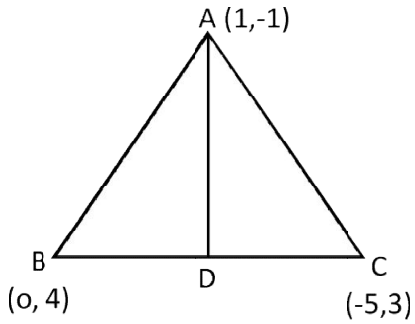
Q. 13



In the given figure ΔABC, if A(1, -1), B(0, 4) and C(-5, 3), then find the length of the median AD.

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Q. 14 Find the ratio in which the point (-3, P) divides the points (-5, -4) and (-2, 3) internally. Also find the value of P.

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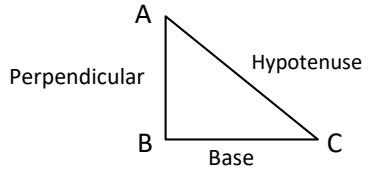
Worksheet –21

INTRODUCTION TO TRIGONOMETRY

Points to Remember :

1. In a right triangle, there is one right angle and other two are acute angles (less than 90^0).

2. 

The pythagoras theorem describes the relation between the sides of a right triangle.

$(\text{Hypotenuse})^2 = (\text{base})^2 + (\text{perpendicular})^2$

3. Trignometric ratios: The ratio of the sides of a triangle relative to the acute angles of a right triangle is called the trigonometric ratios of the angles.

Sin θ	Cos θ	Tan θ
$\frac{\text{Perpendicular}}{\text{Hypotenuse}}$	$\frac{\text{Base}}{\text{Hypotenuse}}$	$\frac{\text{Perpendicular}}{\text{Base}}$
Coses θ	Sec θ	Cot θ

Q. 1 In any right triangle, the ratio of tan θ to the sides will be -

(a) $\frac{\text{Perpendicular}}{\text{Hypotenuse}}$ (b) $\frac{\text{Base}}{\text{Hypotenuse}}$ (c) $\frac{\text{Perpendicular}}{\text{Base}}$ (d) $\frac{\text{Base}}{\text{Perpendicular}}$ ( )

Q. 2 In ΔABC, $\angle$B is right angle and $\sin A = \frac{4}{5}$, then the value of base is -

(a) 4 (b) 3 (c) 5 (d) 2 ( )

Q. 3 In ΔABC, $\angle B$ is right angle and $\cos A = \frac{3}{5}$, then the value of $\sin A$ is -

(a) $\frac{3}{4}$ (b) $\frac{4}{5}$ (c) $\frac{5}{4}$ (d) $\frac{5}{3}$ ( )

Q. 4 In ΔABC, $\cos A = \frac{12}{13}$, then the value of $\cot A$ is -

(a) $\frac{12}{5}$ (b) $\frac{5}{12}$ (c) $\frac{5}{13}$ (d) $\frac{13}{5}$ ( )

Q. 5 In PQR, $\angle Q = 90^o$ and $\tan P = 1$, then the value of $\cot P$ is -

(a) 1 (b) $\sqrt{2}$ (c) $\frac{1}{2}$ (d) None ( )

Q. 6 In ΔPQR, $\angle Q = 90^o$ and tan P = 1, then find value of sin P.

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Q. 7 In ΔPQR, $\angle Q = 90^{o}$ and tan P = 1, then find value of sin R.

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Q. 8 If 3 tan A = 4 , then find the value of $\frac{1-\tan^2 A}{1+\tan^2 A}$.

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Q. 9 For any angle, $\sin\theta = \frac{4}{3}$ is possible or not. Give reasons.

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Q. 10 In ΔABC AB = 24cm, BC = 7cm and $\angle B = 90^{o}$, then find the value of sin A and sin C.

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Q. 11 If $\sin\theta = \frac{1}{2}$, then find the value of $\frac{1-2\,Sin^2\theta}{sin\theta}$

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Q. 12 If $\text{cosec } A = \frac{17}{8}$, then find the value of tan A.

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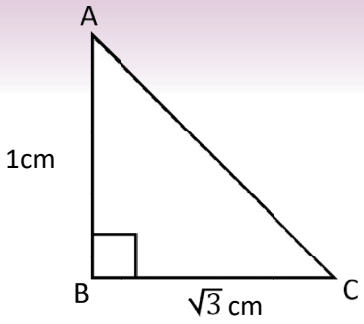
Q. 13 In ΔABC, $AB = 1cm, BC = \sqrt{3}$ cm and $\angle B = 90^{\circ}$, then find the value of $\sin A \operatorname{cosec} C + \cos A \sin C$



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Trigonometry ratio	0^0	30^0	45^0	60^0	90^0
$\sin\theta$	0	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{\sqrt{3}}{2}$	1
$\cos\theta$	1	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	0
$\tan\theta$	0	$\frac{1}{\sqrt{3}}$	1	$\sqrt{3}$	∞
$\cot\theta$	∞	$\sqrt{3}$	1	$\frac{1}{\sqrt{3}}$	0
$\sec\theta$	1	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	2	∞
$\operatorname{cosec}\theta$	∞	2	$\sqrt{2}$	$\frac{2}{\sqrt{3}}$	1

Worksheet –22

INTRODUCTION TO TRIGONOMETRY

Q. 1 Value of $\sin 90^\circ$ is -

(a) 0 (b) $\frac{1}{2}$ (c) $\sqrt{\frac{3}{2}}$ (d) 1 ( )

Q. 2 Value of $\cos 0^\circ + \sin 0^\circ$ is -

(a) 0 (b) $\frac{1}{2}$ (c) $\sqrt{2}$ (d) 1 ( )

Q. 3 Value of $\cot 0^\circ$ is -

(a) 1 (b) $\sqrt{3}$ (c) Not defined (d) 0 ( )

Q. 4 Value of $\sin 60^\circ \cos 30^\circ + \sin 30^\circ \cos 60^\circ$ is -

(a) 1 (b) 0 (c) $\sqrt{2}$ (d) $\frac{1}{\sqrt{2}}$ ( )

Q. 5 Value of $\frac{1- tan^2 45}{1+ tan^2 45}$ is -

(a) $\tan 90^0$ (b) $\sin 90^0$ (c) $\sin 45^0$ (d) $\cos 90^0$ ( )

Q. 6 If $\tan (a + b) = \sqrt{3}$ and $\tan (a - b) = \frac{1}{\sqrt{3}}$, $0^\circ < a + b \leq 90^\circ$, $a > b$, then find the value of a and b.

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Q. 7 Find the value of $\frac{\cos 45^o}{\sec 30^o + \operatorname{cosec} 30^o}$.

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Q. 8 Find the value of $\frac{1-sin^2 30^0}{1+sin^2 30^0}$.

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Q. 9 Find the value of $\cos 45^{\circ} \operatorname{cosec} 30^{\circ}$.

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Q. 10 Find the value of $\frac{2\tan 30^{o}}{1-\tan^{2}30^{o}}$.

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Q. 11 If tan A = $\frac{3}{4}$, then find the value of secA(1–sinA) (secA + tanA).

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Worksheet –23

INTRODUCTION TO TRIGONOMETRY

Points to Remember :

1. Trigonometry Identities

$\sin^2\theta + \cos^2\theta = 1$, $1 + \tan^2\theta = \text{Sec}^2\theta$, $1 + \cot^2\theta = \text{cosec}^2\theta$

Q. 1 $1+\tan^2 A$ is equal to -

(a) $\cot^2 A$ (b) $\sec^2 A$ (c) $\text{cosec}^2 A$ (d) $\cos^2 A$ ( )

Q. 2 $\frac{1+\tan^2 A}{1+\text{Cot}^2 A}$ is equal to -

(a) $\sec^2 A$ (b) -1 (c) $\cot^2 A$ (d) $\tan^2 A$ ( )

Q. 3 Value of $\cos^2 60^\circ + \sin^2 60^\circ$ is -

(a) 1 (b) 0 (c) 50 (d) $\text{Cos}^2 A$ ( )

Q. 4 $\tan A$ is equal to -

(a) $\sin A \times \sec A$ (b) $\text{cosec } A \times \sec A$

(c) $\sin A \times \cos A$ (d) $\cot A$ ( )

Q. 5 $9\sec^2 A - 9\tan^2 A$ is equal to -

(a) 1 (b) 9 (c) 8 (d) -1 ( )

Q. 6 $(\sec A + \tan A)(1-\sin A)$ is equal to -

(a) $\sec A$ (b) $\sin A$ (c) $\text{cosec } A$ (d) $\cos A$ ( )

Q. 7 Write $\cot A$ in terms of $\text{cosec } A$ -

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Q. 8 If $15\cot A = 8$ then find the value of $\sin A$ and $\sec A$.

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Q. 9 Write $\tan A$ in terms of $\sec A$.

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Q. 10 Write the value of $\frac{1}{\sqrt{Cosec^2\theta - 1}}$

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Q. 11 Write sec A in terms of cot A.

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Q. 12 Prove that $\frac{1+\cot^2 A}{1+\tan^2 A} = \cot^2 A$

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Q. 13 Prove that $\sqrt{\frac{1+\cos A}{1-\cos A}} = \text{cosec A} + \cot A$

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Q. 14 Prove that $\frac{\sin A - 2\sin^3 A}{2\cos^3 A - \cos A} = \tan A$

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Q. 15 Prove that $\frac{1+\sec A}{\sec A} = \frac{\sin^2 A}{1-\cos A}$

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Worksheet – 24

SOME APPLICATIONS OF TRIGONOMETRY

Q. 1 When the sum of two angles is 90^0, then they are called -

(a) Complementary angle (b) Supplementary triangle

(c) Angle of vertex (d) Adjacent angle ( )

Q. 2 Angle of elevation is formed -

(a) Between the line of sight and the horizontal line below the horizontal level.

(b) Between the line of sight and the horizontal line above the horizontal level.

(c) In both the cases

(d) None of these ( )

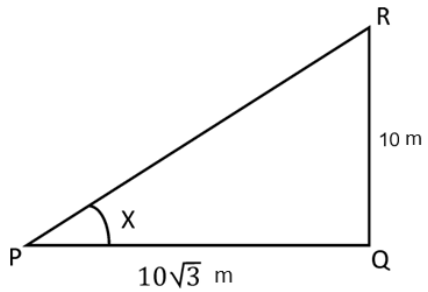
Q. 3 The ratio of the height of a straight tower and its shadow is $1:\sqrt{3}$. At this time the angle of elevation of the sun will be-

(a) 30^o (b) 60^o (c) 45^o (d) 90^o ( )

Q. 4 If the shadow of the tower is equal to its length, then the angle of elevation of the sun will be -

(a) 30^o (b) 60^o (c) 45^o (d) 90^o ( )

Q. 5



In the given figure, PQ = $10\sqrt{3}$m, QR = 10m
Find the value of angle x.

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Q. 6 By increasing the angle of elevation of the sun, what would be the changes in the length of the shadow of a tower ? Write.

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Q. 7 The angle of depression of a boat from a 20 meter high river bridge is 30^0. How far the boat will have to travel to reach the bridge ?

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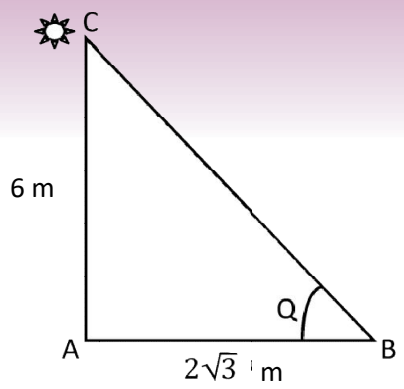
Q. 8 If the shadow of a 6 m high tower is $2\sqrt{3}$m, then find the angle of elevation of the sun.



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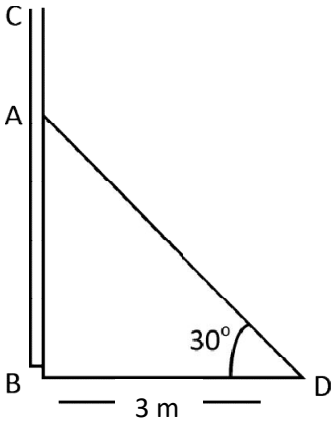
Q. 9



As shown in the figure, BC is a tree which breaks from a stem A during a storm and touches the place D on the ground, the broken part makes an angle of 30^0 on the plane. If AB =$\sqrt{3}$m then find the total height of the tree.

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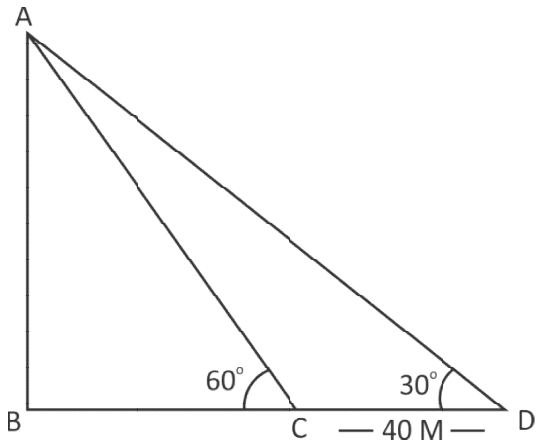
Worksheet –25

SOME APPLICATIONS OF TRIGONOMETRY

Q. 1 The shadow of a tower standing on a flat ground (as shown in the figure) becomes 40 meters longer when the angle of elevation of the sun decreases from 60^0 to 30^0. Find the height of the tower.



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Q. 2 The angle of elevation of the top of a building from the foot of a tower is 30^0 and the angle of elevation of the top of a tower from the foot of a building is 60^0. If the height of the tower is 48 meters, then find the height of the building.

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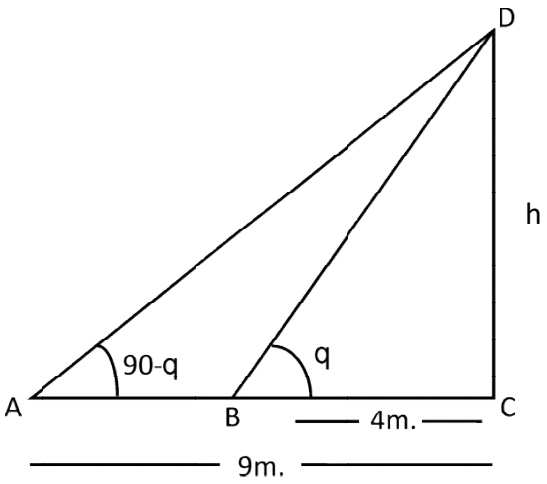
Q. 3 In the given figure, DC is a building. The angle of elevation of the top of a building from two points situated at a distance of 9 meter and 4 meter from its base are complementery to each other. Find the height of the tower (h).



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Q. 4 A kite is flying at a height of 60 meter from the ground. The string attached to the kite is temporarily tied to a point. The inclination of the string with the ground is 60^0. Assuming there is no slack in the string, find the length of the rope.

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Q. 5 A tower is standing vertically on the earth. From a point on the ground which is 15 meter away from the foot of the tower, the angle of elevation of the top of the tower is 60^0. Find the height of the tower.

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Q. 6 An observer 1.5 meter tall is at a distance of 28.5 meters from a lighthouse. The angle of elevation of the top of the lighthouse is 45^0. Find the height of the lighthouse.

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Worksheet –26

CIRCLE

Q. 1 How many point does a tangent touches the circle ?

(a) 1 (b) 2 (c) 3 (d) 4 ( )

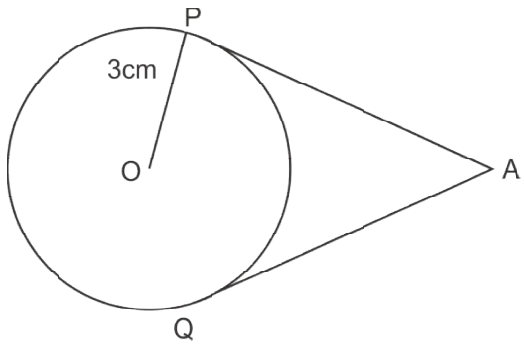
Q. 2 Relation between diameter (d) and radius (r) of a circle is -

(a) $r = 2d$ (b) $d = 2r$ (c) $d = \frac{r}{2}$ (d) $d = r$ ( )

Q. 3 How many tangent can be drawn to a circle from an external point ?

(a) only 1 (b) only 2 (c) only 3 (d) only 4 ( )

Q. 4



In the given picture, if AP = 4 cm, then the length of AQ will be -

(a) 3cm (b) 4cm

(c) 7cm (d) 1cm ( )

Q. 5 At how many points does a secant line intersects a circle ?

(a) 2 (b) 1 (c) 3 (d) 4 ( )

Q. 6 If the circumference of a circle is 44 cm, then find the radius.

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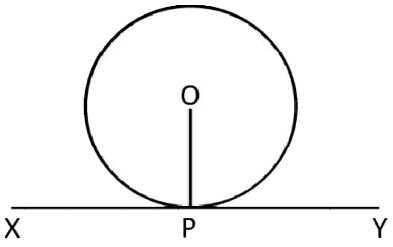
Q. 7



In the given figure, write the relation between OP and XY.

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Q. 8 In the given figure, what type of quadrilateral OAPB will be ?

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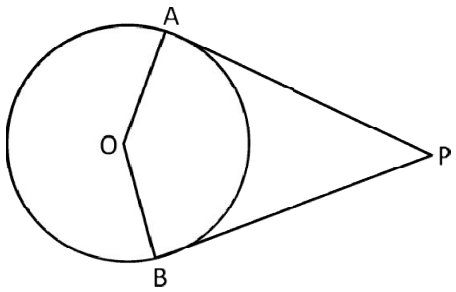

Q. 9 How many parallel tangent in maximum can be there on a circle ?

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Q. 10 Write the definition of Concentric circles ?

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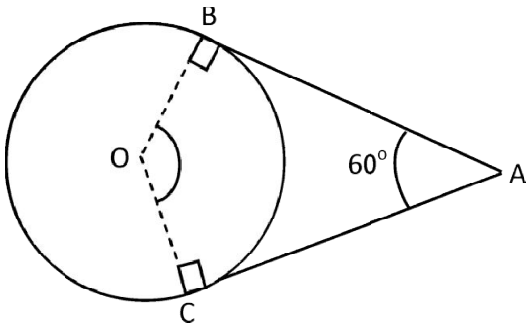
Q. 11



In the given figure, if AB and AC are two tangent lines and $\angle BAC = 60^{\circ}$, find the value of $\angle BOC$.

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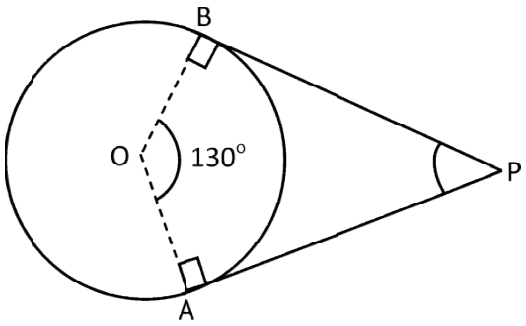
Q. 12



In the given figure, PA and PB are two tangent lines, their point of contact subtends an angle of 130° at the centre. Find the value $\angle BPA$.

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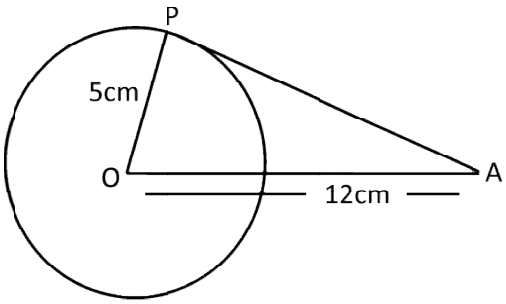
Q. 13



In the given figure, find the length of AP.

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Q. 14 Prove that the tangent lines drawn from an external point are equal in length.

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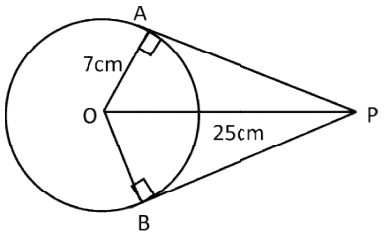
Worksheet –27

CIRCLE

Q. 1 The length of a tangent line from a point P to a circle is 15 cm and distance of P from the centre of the circle is 17 cm, then the diameter of circle will be -

(a) 64cm (b) $\sqrt{64}$cm (c) $2\sqrt{64}$cm (d) 18cm ( )

Q. 2 In the given figure, the length of a tangent PA will be -



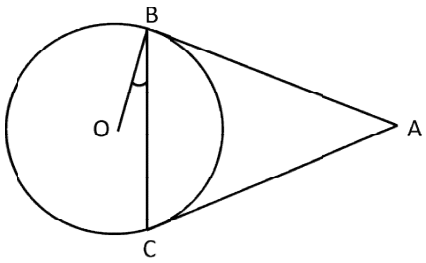
(a) 12cm (b) 24cm

(c) 32cm (d) 5 cm ( )

Q. 3 The tangent drawn at the ends of the diameter of a circle are ..... to each other.

(a) perpendicular (b) parallel (c) intersect (d) secant ( )

Q. 4 In the given figure, from external point A, two tangents AB and AC are drawn on the circle with center O, then -



(a) $\angle BAC = 2\angle OBC$

(b) $\angle BAC = 2\angle BCA$

(c) $2\angle BAC = \angle OBC$

(d) $\angle BAC = \angle OBC$ ( )

Q. 5 How many tangents can be drawn on the same circle from a point inside the circle ?

(a) 2 (b) 1 (c) None of these (d) 8 ( )

Q. 6 If the tangents to a circle from a point P and center O are inclined at an angle of 80^0 to each other, then find the value of $\angle POA$.

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Q. 7 Write the name of quadrilateral drawn around a circle.

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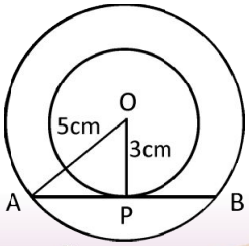
Q. 8



In the given figure, there are two concentric circles with OA=5 cm and OP=3cm, then find the length of AB.

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Q. 9 How many tangents can be drawn on the circumference of a circle ?

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Q. 10 Prove that the perpendicular drawn from the point of contact to the tangent passes from the centre of the circle.

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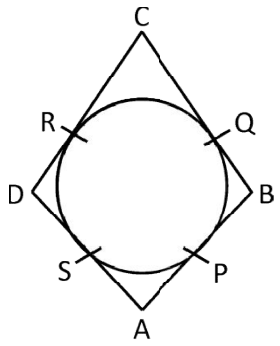
Q. 11



In the given figure, a quadrilateral ABCD has been drawn around a circle. If AB = 5 cm, CD = 8 cm and AD = 3 cm, then find the length of BC.

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Q. 12 Prove that the angle formed between tangents drawn from the same point is supplementary to the angle formed at the centre.

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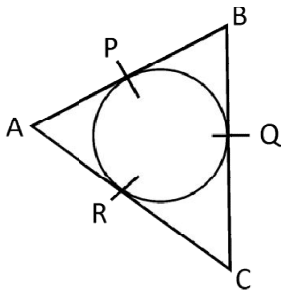
Q. 13 In the given figure, If AP = 5cm, QC = 6cm, BP = 4cm, then find the perimeter of ΔABC.



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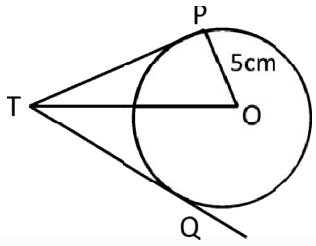
Q. 14 In the given figure, if PQ = 8cm, PO = 5cm, then find the length of TP.



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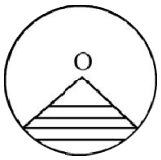
Worksheet –28

AREA RELATED TO CIRCLE

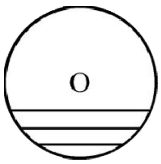
Points to Remember :

1. Distance covered by travelling once around a circle is called the circumference of a circle.
2. Circumference of a circle $= 2\pi r$, where r is radius of a circle.
3. Area of a circle $= \pi r^2$ where r is radius of a circle.
4. Area of the sector of angle $\theta = \frac{\pi r^2 \theta}{360^o}$
5. Length of an arc of a sector of angle $\theta = \frac{\pi r \theta}{180^o}$
6. Area of the major sector of angle $\theta = \frac{\pi r^2 (360^o - \theta)}{360^o}$

Q. 1 

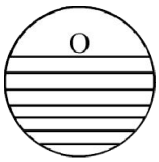
The shaded part of the circle is called -

(a) Circumference (b) Sector (c) Minor Sector (d) Major Sector ( )

Q. 2 

The shaded part of the circle is called -

(a) Circumference (B) Sector (c) Minor Sector (d) Major Sector ( )

Q. 3 

The shaded part of the circle is called -

(a) Circumference (b) Sector (c) Minor Sector (d) Major Sector ( )

Q. 4 The value of Circumference ÷ Diameter is -

(a) 0 (b) 1 (c) 2 (d) π ( )

Q. 5 The value of each quadrant of a circle is -

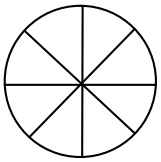
(a) 30° (b) 45° (c) 60° (d) 90° ( )

Q. 6 The sum of the angles formed at the centre of the circle is -

(a) 1 Right angle (b) 2 Right angle (c) 3 Right angle (d) 4 Right angle ( )

Q. 7 If the area and circumference of a circle are numerically equal, then the radius of a circle is -

(a) 2 unit (b) π unit (c) 4 unit (d) 7 unit ( )

Q. 8  In the given diagram, 4 diameters of a circle divides it into 8 equal sectors.

Value of the angle of each sector will be -

(a) 15° (b) 30° (c) 45° (d) 60° ( )

Q. 9 The area of the sector of a circle of radius R and angle a° is -

(a) $\frac{a}{180^\circ} \times 2\pi r$ (b) $\frac{a}{360^\circ} \times 2\pi R$ (c) $\frac{a}{720^\circ} \times 2\pi R^2$ (d) $\frac{a}{180^\circ} \times 2\pi R^2$ ( )

Q. 10 Write both the commonly used values of π.

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Q. 11 If the radius of a circle is r, then find its area.

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Q. 12 If the radius of a circle is 21cm, then find its area.

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Q. 13 The length of the corresponding arc of a sector of a circle of angle θ is -

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Q. 14 Write the relation between the area of a segment, the area of its corresponding sector and area of corresponding triangle.

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Q. 15 An arc of a circle of radius 7 cm makes an angle of 30^0 at the centre. Find the area of major sector.

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Q. 16 The chord of a circle of radius 12 cm subtends an angle of 60° at the centre. Find the area of corresponding minor and major sectors.

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Worksheet –29

AREA RELATED TO CIRCLE

Q. 1 Find the area of the sector of a circle of radius 12 cm whose angle is 30°.

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Q. 2 The value of angle subtended by the minute hand of a clock in one minute is -

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Q. 3 The length of a minute hand of a clock is 21 cm. Find the area of a sector made by minute hand in 10 minutes.

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Q. 4 An arc of a circle of radius 14 cm subtends an angle of 60° at the centre.

Find the length of the arc.

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Q. 5 The area of a semicircle is -

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Q. 6 A chord of a circle of radius 7cm subtends an angle of 90^0 at the center. Find the area of corresponding minor segment.

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Q. 7 If the circumference and the area of a circle are numerically equal, then find the radius of a circle.

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Q. 8 A chord of a circle of radius 12cm subtends an angle of 60^0 at the center. Find the area of corresponding minor segment.

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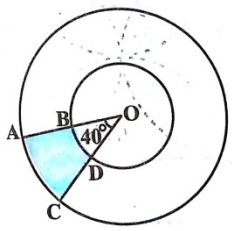
Q. 9 If the radii of 2 concentric circles with centre O is 14 cm and 21 cm respectively and $\angle$ AOC is 40°, then find the area of the shaded region of the given figure.



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Q. 10 From each corner of a square of side 4 cm, a quadrant of a circle of radius 1 cm is cut and also a circle of diameter 2 cm is cut from the center. Find the area of the remaining portion of the square.

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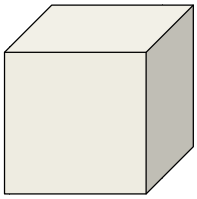
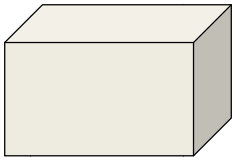
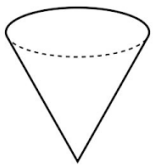
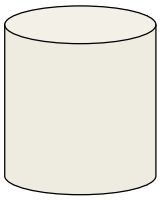
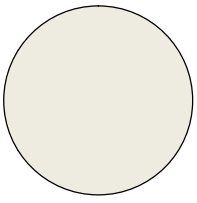
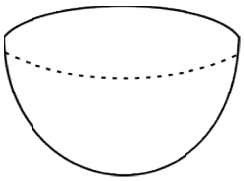
Worksheet –30

SURFACE AREAS AND VOLUME

Q. 1 Identify and name each of the following solid geometrical shapes and write the formula to find the area and volume of each.

Diagram of solid figure	Name of solid figure	Formula to find the area	Formula to find the volume
			
			
			
			
			
			

Also learn these formulas thoroughly.

Worksheet –31

SURFACE AREAS AND VOLUME

Q. 1 Tanker, capsules of medicine and long gulabjamun are combinations of which geometrical shapes ?

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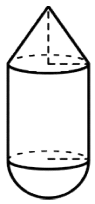
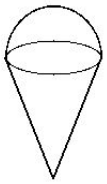
Q. 2 Write the names of various geometric shapes being combined in the following figure.

(a)



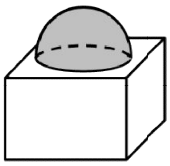
(1) ..... (2) ..... (3) .....

(b)



(1) ..... (2) .....

(c)



(1) ..... (2) .....

Q. 3 Formula of volume of sphere of radius r will be -

(a) $4\pi r^2$ (b) $\frac{4}{3}\pi r^3$ (c) $\frac{2}{3}\pi r^3$ (d) $2\pi r^2$ ( )

Q. 4 The number of circular parts in the frustum of a cone is -

(a) 1 (b) 2 (c) 3 (d) 4 ( )

Q. 5 Which of the following object is not in the shape of a frustum of a cone-

(a) Turkish Hat (b) Bucket (c) Glass (d) Icecream cone ( )

Q. 6 A hemisphere is placed on a cubical block of side 7cm. The maximum diameter of the hemisphere will be -

(a) 7cm (b) 14cm (c) 21cm (d) 28cm ( )

Q. 7 The radius of a cone is 6 cm and height is 8 cm.The slant height of a cone will be –

(a) 6cm (b) 8cm (c) 10cm (d) 14cm ( )

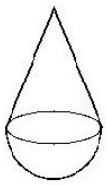
Q. 8 The surface area of a sphere is 324 π cm^2, then its volume will be -

(a) 972 π cm^3 (b) 960 π cm^3 (c) 729 π cm^3 (d) 346 π cm^3 ( )

Q. 9 The radius of a cylinder is 7 cm and height is 30 cm. Its volume will be -

(a) 600 cm^3 (b) 1320 cm^3 (c) 2310 cm^3 (d) 4620 cm^3 ( )

Q. 10 The total surface area of a toy shown in the figure will be- (use proper symbol **+ or -** in the blank space)

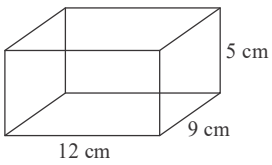


(i) Curved surface area of hemisphere …….. Curved surface area of a cone

Q. 11 The total surface area of a toy shown in the figure will be- (use proper symbol **+ or -** in the blank space)

(i) Curved surface area of a hemisphere …… Curved surface area of a cylinder ……. Curved surface area of another hemisphere.

Q. 12 Find the volume and total surface area of the figure shown in the picture -



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Worksheet –32

SURFACE AREAS AND VOLUME

Q. 1 If the slant height of a cone is 9 meter and the radius of its base is 12 meter, then find the curved surface area of the cone.

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Q. 2 The total surface area of a cube is 486 cm^2, then find the side of the cube.

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Q. 3 A solid is in the shape of a cone standing on a hemisphere whose radius is 1 cm and the height of cone is equal to its radius. Express the volume of the solid in the terms of π.

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Q. 4 The height of a cylinder is 11cm and its curved surface area is 968 cm^2. Find the radius of the base of the cylinder.

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Q. 5 Find the total surface area and volume of a sphere of radius 14 cm.

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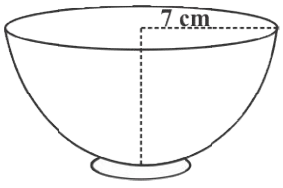
Q. 6 Find the total surface area and volume of a hemisphere of radius 7 cm.



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Q. 7 The length, breadth and height of a wall is 5 meter, 30 cm and 3 meter respectively. How many bricks of measurement 20 cm x 10 cm x 7.5 cm are required to make a wall ?

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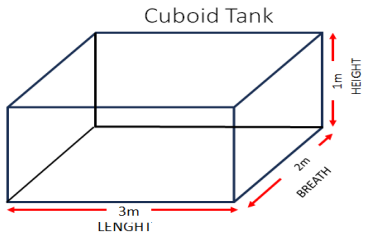
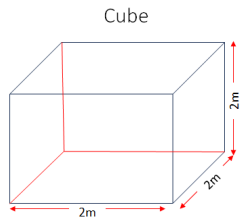
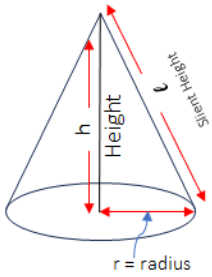
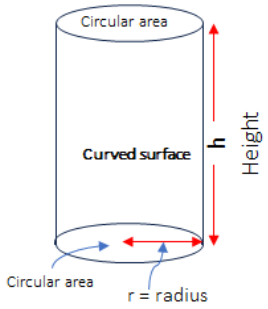
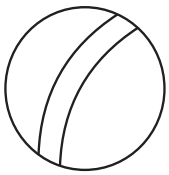
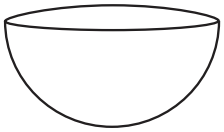
POINTS TO REMEMBER

Picture of solid figure	Name of solid figure	Formula to calculate area	Formula to calculate volume
	Cuboid	2[l x b + b x h + l x h]	l x b x h
	Cube	6 x [side]^2	[side]^3
	Cone	Curved surface area of cone = $\pi r l$ Total surface area of cone = $\pi r\,(r + l)$ Relation between slant height (l) radius (r) and height (h) is $l^2 = r^2 + h^2$	$\frac{\pi r^2 h}{3}$
	Cylinder	Curved surface area = $2\pi rh$ Total surface area = $2\pi r\,(r + h)$	$\pi r^2 h$
	Sphere	Total surface area = $4\pi r^2$	$\frac{4}{3}\pi r^3$
	Hemisphere	Curved surface area = $2\pi r^2$ Total surface area = $3\pi r^2$	$\frac{2}{3}\pi r^3$

POINTS TO REMEMBER

1. Mean (average) of all observation = $\frac{\text{Sum of values of all observations}}{\text{Total number of all observations}}$

2. Class symbol of class interval = $\frac{\text{Upper limit + Lower limit}}{2}$

3. An observation whose frequency is maximum is called Mode.

4. Median is a measure of central tendency which is the middle value in the data.

5. Formula for finding Mean by direct method $\bar{x} = \frac{\sum fx}{\sum f}$

6. Formula for finding Mean by assured method $\bar{x} = a + \frac{\sum fd}{\sum f}$ where $d = x\text{-}a$

7. Formula for finding Mean by deviation method $\bar{x} = a + \frac{\sum fu}{\sum f} \times h$ where $u = \frac{x-a}{h}$

8. Formula for finding Mode by grouped data -

   Mode = $l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$

   - Lower limit of the modal class = l
   - Size of the class interval = h
   - Frequency of the modal class = f_1
   - Frequency of the class preceding the modal class = f_0
   - Frequency of the succeeding the modal class = f_2

9. Formula for finding Median by grouped data -

   Median = $l + \left(\frac{\frac{n}{2} - cf}{f}\right) \times h,$

   - Lower limit of the median class = l
   - No of observation = n
   - Cumulative frequency of class preceding the median class = cf
   - Frequency of median class = f
   - Class size = h

10. Relation between Mean, Median and Mode.

    3 Median = Mode + 2 Mean

Worksheet –33

STATISTICS

Q. 1 The measures of central tendency are -

(a) Mean (b) Median (c) Mode (d) All the above ( )

Q. 2 The lower limit of the class in class interval 40-45 is -

(a) 15 (b) 40 (c) 45 (d) 85 ( )

Q. 3 The upper limit of the class in class interval 60-70 is -

(a) 10 (b) 60 (c) 70 (d) 130 ( )

Q. 4 The class symbol of class interval 10-25 is-

(a) 10 (b) 15 (c) 17.5 (d) 25 ( )

Q. 5 The class range of class interval 70-85 is -

(a) 15 (b) 70 (c) 85 (d) 155 ( )

Q. 6 The mean (average) of 2, 3, 4, 5, 6 will be -

(a) 2 (b) 3 (c) 4 (d) 5 ( )

Q. 7 In the frequency distribution, cumulative frequency of a class is the ..... of preceding frequencies of that class.

(a) sum (b) difference (c) multiple (d) divisible ( )

Q. 8 While classifying the data, the number 40 will be taken in which of the following intervals -

(a) 25-40 (b) 40-45 (c) Both (d) None of these ( )

Q. 9 In statistics, greek letter used for addition is -

(a) γ (b) β (c) δ (d) Σ ( )

Q. 10 The value of that observation whose frequency is the highest is called -

(a) Mean (b) Median (c) Mode (d) All the above ( )

Q. 11 The range of following data 3, 5, 4, 3, 9, 7, 12 will be -

(a) 3 (b) 12 (c) 9 (d) 10 ( )

Q. 12 The mean of first 7 natural numbers will be -

(a) 4 (b) 5 (c) 3 (d) 7 ( )

Q. 13 Find the median of following data 25, 31, 23, 26, 34, 22, 28, 35, 32, 20.

.....

Q. 14 If arithmetic mean of $x+6, x+2, x+5, x+7$ is 10, then find the value of x.

.....

Q. 15 Define the median class.

.....

.....

Q. 16 Find the median of the distribution given below -

x	20	25	28	29	33	38	42	43
Frequency	6	20	24	28	15	4	2	1

.....

.....

Worksheet –34

STATISTICS

Q. 1 Tell the symbols used in the formula to find mode

Mode = $l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$

- Lower limit of the modal class = ...
- Size of the class interval = ...
- Frequency of the modal class = ...
- Frequency of the class preceding the modal class = ...
- Frequency of the class succeeding modal class = ...

Q. 2 Identify the symbols used in the formula to find Median -

Median = $l + \left(\frac{\frac{n}{2} - cf}{f}\right) \times h$

- Lower limit of the Median class= .....
- No of observation = ...
- Cumulative frequency of class preceding the Median class = ...
- Frequency of Median class = ...
- Class interval = ...

Q. 3 Write the formula to find the Mean by Assured Method.

.....

Q. 4 The number of wickets taken by the bowler in 15 cricket matches is as follows -

2, 0, 3, 1, 4, 3, 2, 5, 0, 6, 3, 1, 3, 4, 3

The Mode of this data will be -

.....

.....

.....

Worksheet – 35

STATISTICS

Q. 1 Find the Mean of following data by Assured Mean Method -

Class Interval	10—25	25—40	40—55	55—70	70—85	85—100
Frequency	2	3	7	6	6	6

Solution -

Worksheet – 36

STATISTICS

Q. 1 The Median of data given below is 50, then find the value of x and y -

Class Interval	0—20	20—40	40—60	60—80	80—100	Total
Frequency	17	x	32	y	19	120

Solution -

Worksheet –37

STATISTICS

Q. 1 The following table shows the literacy rate (in percentage) of 50 cities. Find the Mean literacy rate -

Literacy rate in percentage	35–45	45–55	55–65	65–75	75–85	85–95
Number of cities	3	4	12	14	10	7

Solution -

Worksheet –38

STATISTICS

Q. 1 The following data gives the observed ages of 200 people living in a locality -

Age	0—20	20—40	40—60	60—80	80—100
Frequency	21	35	71	55	18

Find the Mode of given data.

Solution -

Worksheet –39

STATISTICS

Q. 1 The distribution of data given below shows the weight of 40 students in a class -

Weight (in kg)	40—45	45—50	50—55	55—60	60—65	65—70	70—75
Students (in number)	3	5	10	8	7	4	3

Find the Mean weight of the students.

Solution -

Worksheet –40

STATISTICS

Q. 1 The following distribution shows the daily income of 100 workers in a factory -

Daily income (in Rupees)	100—120	120—140	140—160	160—180	180—200
Workers (in Numbers)	24	28	16	12	20

Find the Mean and Mode of the above distribution.

Solution –

POINTS TO REMEMBER

1. The events of an experiment which has only one result is called Initial events.
2. The sum of the probabilities of the initial events of an experiment is always 1.
3. For any event E, $P(E) + P(\bar{E}) = 1$ where $\bar{E}$ stands for 'not E'. E and $\bar{E}$ are called complumentary events.
4. Probability of an event E, writen as $P(E)$ is defined as -

$$P(E) = \frac{\text{Number of favorable outcomes of the experiment}}{\text{Total number of possible outcomes of the experiment}}$$

5. The probability of an impossible event is 0.
6. The probability of a sure event is 1.
7. The probability of the event E is a number $P(E)$ such that $0 \le P(E) \le 1$
8. By tossing a coin once, the total resulting position is Heads or Tails.
9. The total possible outcomes of throwing one die will be 1,2,3,4,5,6.

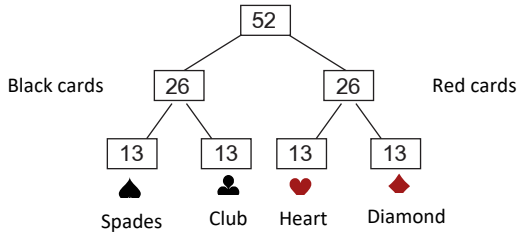
Head Tail

10. The total possible outcomes of throwing two die will be 36.

(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)	(2, 6)
(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)
(4, 1)	(4, 2)	(4, 3)	(4, 4)	(4, 5)	(4, 6)
(5, 1)	(5, 2)	(5, 3)	(5, 4)	(5, 5)	(5, 6)
(6, 1)	(6, 2)	(6, 3)	(6, 4)	(6, 5)	(6, 6)

11. Total cards in a Deck -

Total cards



In 13 cards of each group there is ace, 2,3,4,5,6,7,8,9,10 jack, queen and king.

Total number of card = 52	Ace = 4
Spades = 13	Face Card = 12
Heart =13	Black Color = 13 + 13 = 26
Diamonds =13	Red Color = 13 + 13 = 26
Clubs =13	♥ Heart ♦ Diamond ♣ Club ♠ Spead

Worksheet –41

PROBABILITY

Activity-1: Take a coin (Rs.1,2,5,10) whatever is available with you. Draw pictures of both the surfaces of the coin in the circle given below. For this, place the coin on the back of the paper and rub it with the back lead of the pencil. Write which part of these will be called head and which part will be called tail.

Activity-2: When a coin is tossed to start any game (like kabaddi, kho-kho, cricket etc.) and checked for heads/tails. This type of experiment is called Random Experiment. In this, there are two equal probable outcomes (one head and one tail). Here, the part of Sarnath Pillar (lion picture) is called Head and the part with numbers is called Tail. Now you tell.

1. Number of heads on a coin - .....

2. Number of tails on a coin - .....

3. What are the possible outcomes of tossing a coin ?

Head Tail

.....

While throwing a coin, only two results are obtained- head or tail i.e. equal-equal. If you want Heads then -

$$P(E) = \frac{\text{Number of favorable outcomes of the experiment}}{\text{Total number of possible outcomes of the experiment}} = \frac{1}{2}$$

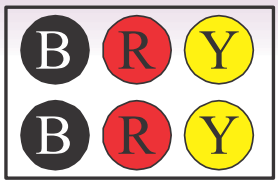
1. If you want to get tail, then what will be the total number of results -

.....

2. What will be the number of outcomes constituting the event -.....

3. Probability of getting tail - .....

Activity-3: The box given in the picture contains two red, two blue and two yellow balls. Look carefully and try to answer the following questions -



1. What is the number of red coloured balls in the bag ?

   .....

2. Is the number of balls of all the three colors equal And how many balls are there in total ?

   .....

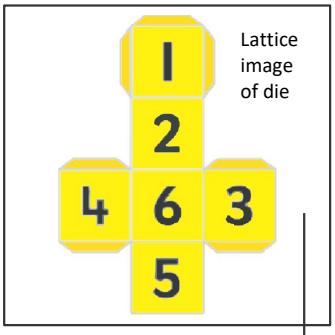
3. What will be the number of equally liked outcomes in probability of drawing a ball of any colour?

   .....

   The probability in both the activities is equal, hence they are called equally liked events.

4. A Die has been made by giving a lattice image of a die in the box. Die which is used to play games like snakes, ladder, ludo etc. It has six faces. A number is written on each side.

   Some die are also dotted.



Answer the following questions -

(i) What will be the number of results of getting digit 2 ?

.....

(ii) What will be the total number of outcomes on the die ?

.....

(iii) What will be the probability of getting digit 2 ?

.....

(iv) Similarly, what will be the probability of getting digit 3 ?

.....

(v) What is the probability of getting digit 1 ?

.....

(vi) What will be the probability of getting digit 4 ?

.....

(vii) What will be the probability of getting digit 6 ?

.....

1. Let us get more information on die -

(i) What are the numbers on the die ?

.....

(ii) What are even numbers ?

.....

(iii) What are the odd numbers ?

.....

(iv) What are the prime numbers ?

.....

2. If getting even numbers, odd numbers, prime numbers by throwing a die is an event, then here the number of outcomes of getting even number (event) is 3.

If the total number of outcomes of the experiment is 6, what is the probability ?

(i) What will be the probability of getting an odd number ?

.....

(ii) What will be the probability of getting a prime number ?

.....

(iii) What will be the total number of outcomes on the die ?

.....

(iv) What will be the probability of getting a number greater than 2 ?

.....

3. There are 4 blue and 3 red balls in a bag. A ball is taken out from the bag without looking at it.

(i) What is the total number of outcomes (total balls) of the event ?

.....

(ii) What is the total number of red balls ?

.....

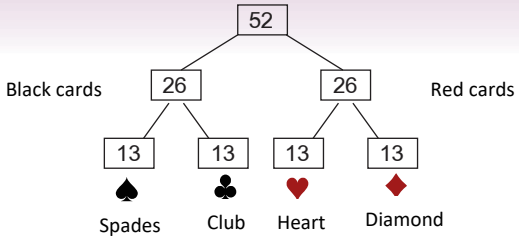
(iii) What will be the probability of getting a red ball ?

.....

(iv) What will be the probability of getting a yellow ball ?

.....

Activity 4: Answer the following questions with the help of pictures given -



The 13 cards in each group are Ace, 2, 3, 4, 5, 6, 7, 8, 9, 10, jack, queen and king.

Total number of card = 52	Ace = 4
Spades = 13	Face Card = 12
Heart =13	Black Color = 13 + 13 = 26
Diamonds =13	Red Color = 13 + 13 = 26
Clubs =13	♥ Heart ♦ Diamond ♣ Club ♠ Spead

1. If a deck of cards is shuffled thoroughly and a card is taken out at random, then tell if that card is an ace?

   (i) What will be the total number of outcomes of the event? = ...

   (ii) What will be the number of outcomes constituting the event?= .....

   (iii) What will be the probability of getting an ace? = ...

2. A card is drawn at random from the deck of cards. If that card is a red card then -

   (i) Total number of outcomes of the event = ...

   (ii) Number of outcomes constituting the event = ...

   (iii) Probability of getting a red card = ...

3. The deck of cards is shuffled and a card is drawn at random. If that card is a face card then -

   (i) Number of outcomes constituting the event = ...

   (ii) Total number of outcomes of the event = ...

   (iii) Probability of having face card = ...

Worksheet –42

PROBABILITY

Q. 1 The probability of an impossible event is –

(a) 0 (b) 1 (c) Between 0 and 1 (d) Greater than 1 ( )

Q. 2 The probability of a certain event is -

(a) 0 (b) 1 (c) Between 0 and 1 (d) Greater than 1 ( )

Q. 3 The sum of probabilities of all possible events of any experiment is -

(a) 0 (b) 1 (c) Between 0 and 1 (d) Greater than 1 ( )

Q. 4 Which of the following numbers cannot be the probability of an event ?

(a) 1/3 (b) 20% (c) 0.5 (d) -1.5 ( )

Q. 5 The total possible outcomes of tossing a coin will be -

(a) 0 (b) 1 (c) 2 (d) 3 ( )

Q. 6 The total possible outcomes of throwing a die will be -

(a) 2 (b) 4 (c) 6 (d) 8 ( )

Q. 7 The total number of picture cards (facecard) in a deck of cards is -

(a) 10 (b) 12 (c) 14 (d) 16 ( )

Q. 8 The total number of red coloured picture cards (face card) in a deck of cards is -

(a) 6 (b) 8 (c) 10 (d) 12 ( )

Q. 9 The total number of black cards in a deck of cards is -

(a) 3 (b) 6 (c) 26 (d) 52 ( )

Q. 10 The probability of getting heads when a coin is tossed once will be -

(a) 0 (b) 0.25 (c) 0.5 (d) 1 ( )

Q. 11 The probability of getting a number greater than 6 when a die is thrown once is -

(a) 0 (b) 1/4 (c) 1/2 (d) 1 ( )

Q.12 The total possible outcomes of throwing two die together or throwing one die twice will be -

(a) 6 (b) 12 (c) 26 (d) 36 ( )

Worksheet –43

PROBABILITY

Q. 1 The value of Probability of event E + Probability of event "not E" is -

.....

Q. 2 What is that event called which cannot happen? Give an example also.

.....

Q. 3 What is that event which is certain to happen ? Give an example also.

.....

Q. 4 If Probability of event P(E) = 0.27, then the probability of "not E" will be -

.....

Q. 5 A card is drawn at random from a well shuffled deck of cards. Calculate the probability that this card -

Will be a queen — .....

Will be a face card — .....

Will not be an ace — .....

Will be black in colour — .....

Will be red coloured face card — .....

Will be the king of black colour — .....

Will be the heart leaf — .....

Q. 6 In a cricket match, the probability of a team winning the match is 0.58. What is the probability of the other team winning the match?

.....

Q. 7 Anurag and Saloni are brother and sister. What is the probability that both have their birthday on same day ?

.....

Q. 8 Rajni's pen box contains 5 blue, 3 black and 2 red pens. If a pen is taken out at random from this box, what is the probability that the pen is -

Blue — .....

Red — .....

Green — .....

Q. 9 Write all the possible outcomes when two coins are tossed simultaneously.

.....

Worksheet –44

PROBABILITY

Q. 1 Two coins are tossed simultaneously. What is the probability that both the coins will get heads (H) or tails (T) ?

.....

Q. 2 A die is thrown once. Find the probability of getting a number divisible by 2.

.....

Q. 3 All the face cards and all the aces of the deck of cards are turned over and shuffled thoroughly. Then a card is taken out at random from it. What is the probability that this card -

Is an ace – .....

Is a jack – .....

Q. 4 Slips of paper with numbers from 1 to 100 written on them, are folded and inserted in a box. One slip is drawn at random from this box. Find the probability that the number written on the drawn slip will be -

Number of 100 – .....

One digit number – .....

Number divisible by 10 – .....

A prime number – .....

Q. 5 Mohan has 100 coins of Rs 1, 150 coins of Rs 2 and 50 coins of Rs 5 in his piggy bank. If the outcome of a coin falling when the piggy bank is shaken and turned upside down is uniform, then what is the probability that the fallen coin -

Is of 5 rupees – .....

Is not of 1 rupee – .....

Q.6 A die is thrown twice. What is the probability that -

Equal digits will be obtained in both the die – .....

The sum of the digits of both the die will be 7 –.....

A score less than 6 will be obtained on a die –.....

The sum of digits obtained on both the die will be more than 12 – .....

MODEL PAPER-1 (2024)

Class-10 (Subject-Mathematics)

Time: 3.15 minutes **MM - 80**

Q. 1 Choose the correct answer for the following objective questions - [12 x 1 = 12]

(i) The greatest common multiple of 24 and 30 is -

(a) 3 (b) 6 (c) 24 (d) 30 ( )

(ii) The number of zeroes of the polynomial $P(x) = x^2 - 2x - 8$ is -

(a) 0 (b) 1 (c) 2 (d) -2 ( )

(iii) In the equation $x + 2y = 0$, if $x = 4$ then the value of y -

(a) 1 (b) 2 (c) 4 (d) -2 ( )

(iv) The roots of $x^2 - 4 = 0$ are -

(a) 4 (b) ± 2 (c) 3 (d) -4 ( )

(v) In arithmatic series 7, 12, 17..... the fourth term will be -

(a) 24 (b) 19 (c) 22 (d) 9 ( )

(vi) Point (4, -5) lies in -

(a) I Quadrant (b) II Quadrant (c) III Quadrant (d) IV Quadrant ( )

(vii) Value of $cot\ 0^o$ is -

(a) 0 (b) $\frac{1}{2}$ (c) $1\sqrt{2}$ (d) 1 ( )

(viii) The sum of the angles of each quadrant of a circle is -

(a) 1 Right angle (b) 2 Right angle (c) 3 Right angle (d) 4 Right angle ( )

(ix) The area of the sector of a circle of radius R and angle a^0 is -

(a) $\frac{a^o}{180}$x $2\pi R^2$ (b) $\frac{a^o}{360}$x $2\pi R$ (c) $\frac{a^o}{720}$x $2\pi R^2$ (d) $\frac{a^o}{720}$x $2\pi R^3$ ( )

(x) If the surface area of a sphere is 324 square cm, then its volume will be -

(a) 972 π cubic cm (b) 960 π cubic cm

(c) 729 π cubic cm (d) 3462 π cubic cm (

(xi) The average of 2, 3, 4, 5, 6 will be -

(a) 2 (b) 3 (c) 4 (d) 5 ( )

(xii) The total possible outcomes of throwing a die will be -

(a) 2 (b) 4 (c) 6 (d) 8 ( )

Q. 2 Fill in the blanks - **[6 x 1 = 6]**

(i) Number which is neither prime nor composite will be ..... .

(ii) Common difference of arithmetic progression 6, 9, 12, 15 will be .....

(iii) The corresponding sides of a similar triangle are .....

(iv) Value of $\sqrt{1 - Cos^2\,\theta}$ will be .....

(v) Cumulative frequency is used to find .....

(vi) Probability of the event occurring + Probability of the event not occurring = ...

Q. 3 Very short answer question - **[12 x 1 = 12]**

(i) Find a quadratic polynomial whose zeroes are $\frac{1}{4}$ and $-\frac{1}{4}$

(ii) The cost of 7 apples and 4 oranges is Rs 45. Write this in algebraic form.

(iii) When does the equation $ax^2 + bx + c = 0,\ a \neq 0$ have the same roots ?

(iv) Find the 20th term of the arithmetic progression 4, 7, 10, 13, ...

(v) What will be the distance of the point (-3, -4) from the y-axis.

(vi) If cosec A = $\frac{17}{8}$, then find the value of tan A.

(vii) $1 + \tan^2\theta$ = ...

(viii) What is the length of the arc corresponding to the sector of angle θ in a circle ?

(ix) Write the statement for Basic Proportional Theorem.

(x) If the surface area of a sphere is 324 π square cm, find its volume.

(xi) Write the Median of the following data –

25, 31, 23, 26, 34, 22, 28, 35, 32, 30

(xii) The total number of possible outcomes when a coin is tossed once is …….

Section – B (2 marks each)

Q. 4 Find LCM and HCF of the numbers 6, 72 and 120 by Prime Factorization Method.

Q. 5 Find the zeroes of quadratic polynomial $x^2 + 7x + 10$ and check the authenticity of the relation between the zeroes and the coefficients.

Q. 6 Find all possible solutions of the following pairs of linear equations -

(i) $2x + 3y = 8$ (ii) $4x + 6y = 7$

Q. 7 Find the roots of the quadratic equation $6x^2 - x - 2 = 0$.

Q. 8 Prove that if in two triangles, their corresponding angles are equal, then their corresponding sides are in the same ratio (proportional), hence these triangles are similar.

Q. 9 Find the relation between x and y such that the point (x,y) is equidistant from the points (7, 1) and (3, 5).

Q. 10 A tower stands vertically on the ground. From a point on the earth, which is 15 m away from the foot of the tower, the angle of elevation of the top of the tower is 60^0. Find the height of the tower.

Q. 11 From a point which is 56m away from the center of a circle, the length of the tangent line to the circle is 40m. Find the radius of the circle.

Q. 12 Find the area of a sector of a circle of radius 40 meter, whose angle is 30^0.

Q. 13 A hemisphere is placed on a cubical block of side 70 m. What can be the maximum diameter of the hemisphere ?

Q. 14 An iron pillar is made of a cylinder of height 220 m and base diameter 240 m on which another cylinder of height 60 cm and radius 8 cm is superimposed? Find the volume of this column.

Q. 15 The following table shows the literacy rate (in percentage) of 50 cities. Find the Mean literacy rate.

Literacy rate in %	0—10	10—20	20—30	30—40	40—50
Number of cities	3	4	12	14	10

Q. 16 A die is thrown once. Find the probability of obtaining the following:

(i) A prime number (ii) Any number lying between 2 and 6

Section C (3 Marks Each)

Q. 17 If the sum of the first 14 terms of an A.P is 1050 and its first term is 10, then find the 20^{th} term.

Q. 18 Find the coordinates of the points of trisection of the line segment joining the points A(2, -2) and B(-7, 4).

Q. 19 From a point on the ground, the angles of elevation of the bottom and top of a communication tower fixed on the top of a 20 m height building are 45^0 and 60^0 respectively. Find the height of the tower.

Q. 20 Find the Mode of the following frequency distribution -

Class group	0—10	10—20	20—30	30—40	40—50
Frequency	12	20	30	25	13

Section-D (4 Marks Each)

Q. 21 Prove that the length of tangents drawn to a circle from an external point is equal.

Or

Prove that the tangent line at any point on a circle is perpendicular to the radius passing through the point of contact.

Q.22 Prove that -

(i) $(1 - \sin A)(\sec A - \tan A) = 1$ (ii) $\frac{cot\ A - cos\ A}{cot\ A + cos\ A} = \frac{cosec\ A - 1}{cosec\ A + 1}$

Using the identity $\sec^2 \theta = 1 + \tan^2 \theta$, prove that -

(i) $\frac{Sin\ \theta - cos\ \theta + 1}{Sin\ \theta - cos\ \theta - 1} = \frac{1}{sec\theta - tan\ \theta}$

Q.23 The following table shows the daily expenditure on food among 25 families of a locality -

Daily expenditure (in Rs)	100—150	150—200	200—250	250—300	300—350
Numbers of families	4	5	12	2	2

Find the average (Mean) expenditure on food using the appropriate method.

Or

The distribution given below shows the weight of 30 students in a class. Find the Mean weight of the students.

Weight (kg)	40—45	45—50	50—55	55—60	60—65	65—70	70—75
Number of students	2	3	8	6	6	3	2

MODEL PAPER-2 (2024)

Class-10 (Subject-Mathematics)

Time: 3.15 minutes **MM - 80**

Q. 1 Choose the correct answer for the following objective questions - [12 x 1 = 12]

(i) Which of the following is not an irrational number -

(a) $\sqrt{10}$ (b) $\sqrt{24}$ (c) $\sqrt{35}$ (d) $\sqrt{25}$ ( )

(ii) Zeroes of polynomial $x^2 - 3$ will be -

(a) $(3,\ 3)$ (c) $(-\sqrt{3}, \sqrt{3})$ (c) $(-\sqrt{3}, -3)$ (d) $(-3,\ -3)$ ( )

(iii) How many solutions will be there in equation X + Y = 6 ?

(a) One (b) Two (c) Infinite (d) None of these ( )

(iv) The degree of a linear equation in one variable is always –

(a) 0 (b) 1 (c) 2 (d) none of these ( )

(v) What will be the common difference of arithmetic progression 6, 9, 12, 15, ... ?

(a) 9 (b) 3 (c) 5 (c) 6 ( )

(vi) The abscissa of the point (2, 3) is -

(a) 2 (b) 3 (c) Both 2 and 3 (d) Neither ( )

(vii) Value of $\sin 90^o$ is -

(a) 0 (b) $\frac{1}{2}$ (c) $\sqrt{\frac{3}{2}}$ (d) 1 ( )

(viii) The value of circumference ÷ diameter is -

(a) 0 (b) 1 (c) 2 (d) π ( )

(ix) The value of the angle of each quadrant of a circle is -

(a) 30^0 (b) 45^0 (c) 60^0 (d) 90^0 ( )

(x) The radius of a cone is 6 cm and height is 8 cm. The slant height of the cone will be -

(a) 6 cm (b) 3 cm (c) 10 cm (d) 14 cm ( )

(xi) What will be the Median of 4, 3, 2, 6, 5 ?

(a) 2 (b) 3 (c) 4 (d) 5 ( )

(xii) Probability of a certain event is -

(a) 0 (b) 1 (c) Between 0 and 1 (d) Greater than 1 ( )

Q. 2 Fill in the blanks - **[6 x 1 = 6]**

(i) There can be..... rational number between two rational numbers.

(ii) The first term of arithmetic progression 5, 7, 9, 11 will be .....

(iii) All ..... triangles are similar. (isosceles/equilateral)

(iv) The value of $\frac{sin\ 45^o}{cos\ 45^o}$ is .....

(v) The observation whose frequency is maximum is called..... of those observations.

(vi) The probability of getting a number greater than 6 when a die is thrown once is.....

Q. 3 Very short answer type questions - **[12 x 1 = 12]**

(i) Write the quadratic polynomial whose zeroes are 5 and 8.

(ii) The cost of 9 pencils and 8 pens is Rs 54. Write it in algebraic equation.

(iii) What will be the nature of the roots of the quadratic equation $x^2 + x - 1 = 0$

(iv) Write the 10^{th} term of the arithmetic progression 2, 7, 12, ...

(v) If the points are A(4, 0) and B(0, 4), then write the midpoint of AB

(vi) If $\sin\theta = \frac{1}{2}$ then write the value of $\frac{1-2\ sin^2\theta}{sin\ \theta}$

(vii) Write the value of $\frac{2\tan 30^o}{1-tan^2 30^o}$

(viii) An arc of a circle of radius 7 cm subtends an angle of 60^0 at the center. Find the length of the arc.

(ix) Write the rules of similarity of triangles.

(x) The radius of a cylinder is 7 cm and height is 30 cm. Find its volume.

(xi) If the Mean of 40, x, 42, 20 is 26, then find the value of x.

(xii) If P(E) = 0.15 then what will be the probability of '$\bar{E}$' ?

Section B (2 Marks Each)

Q. 4 Find the LCM of 96 and 404 by Prime Factorization Method.

Q. 5 Find a quadratic polynomial whose sum and product of zeroes are –3 and 2 respectively.

Q. 6 Among two supplementary angles, the larger angle is 18^0 more than the smaller angle. Find the angles.

Q. 7 Find two numbers whose sum is 27 and product is 182.

Q. 8 Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides at different points, then these two sides are divided in the same ratio.

Q. 9 Find the coordinates of the points trisecting the line segment joining the points A(2, -2) and B(-7, 4).

Q. 10 An observer of height 1.5m height is at a distance of 28.5 m from a lighthouse. The angle of elevation of the top of the lighthouse from his eyes is 40^0. Find the height of the lighthouse.

Q. 11 The radii of two concentric circles are 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

Q. 12 A chord of a circle of radius 15 cm subtends an angle of 60^0 at the centre. Find the area of the corresponding minor segment. (Use $\pi = 3.14$ and $\sqrt{3}=1.73$).

Q. 13 A solid is formed by joining the adjacent faces of two cubes, each of volume 64 cubic meters. Find the surface area of the cuboid obtained.

Q. 14 A solid is in the shape of a cone standing on a hemisphere whose radii are 1 cm and the height of the cone is equal to their radii. Find the volume of this solid in terms of π.

Q. 15 Find the daily Mean wage of the factory workers from the following distribution of daily wages of 50 workers of a factory.

Daily wages (in rupees)	500—520	520—540	540—560	560—580	580—600
Number of workers	12	14	8	6	10

Q. 16 Rakesh has 5 blue, 3 black and 2 red pens in his pen box. If a pen is drawn at random from this box, what is the probability that the pen -

(i) Will be blue (ii) Will be not green

Section-C (3 Marks Each)

Q. 17 Find the sum of the first 51 terms of the arithmetic progression, whose second and third terms are 14 and 18 respectively.

Q. 18 If the point A(6, 1), B(8, 2), C(9, 4) and D(P, 3) are the vertices of a parallelogram in the same order, then find the value of P.

Q. 19 The angle of elevation of the top of a building from the foot of a tower is 30^0 and the angle of elevation of the top of the tower from the foot of the building is 60^0. If the tower is 50m high, then find the height of the building.

Q. 20 The following distribution shows the daily pocket money of children in a locality. The average pocket money is Rs 18. Find the missing frequency.

Daily Pocket Allowance (in Rs)	11–13	13–15	15–17	17–19	19–21	21–23	23–25
Number of children	7	6	9	13	f	5	4

Section-D (4 Marks Each)

Q. 21 Prove that a parallelogram circumscribing a circle is a Rhombus.

Or

Prove that in two concentric circles, the chord of the larger circle which touches the smaller circle is bisected at the point of contact.

Q. 22 Prove that $\sec A(1 - \sin A)(\sec A + \tan A) = 1$

or

Prove that $\frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta} = \tan\theta$

Q. 23 If the Median of the distribution given below is 28.5, then find the values of x and y.

Class interval	0–10	10–20	20–30	30–40	40–50	50–60	Total
Frequency	5	x	20	15	y	5	60

or

Find the Mode of the following frequency distribution -

Class interval	0–8	8–16	16–24	24–32	32–40
Frequency	10	15	25	22	12

Post Test Paper

Class-10 (Subject-Mathematics)

Time: 3.15 minutes **MM - 80**

Q. 1 Choose the correct answer for the following objective questions - [12 x 1 = 12]

(i) HCF of two numbers is 6 and LCM is 20. If one number is 30, then the other number will be ?

(a) 20 (b) 40 (c) 24 (d) 15 ( )

(ii) The statement true for quadratic polynomial $an^2 + bn + c$ will be -

(a) any zero polynomial (b) has two equal zeroes

(c) there is one zero (d) there are maximum two zeroes ( )

(iii) The distance between the origin and the point (x, y) is -

(a) $x + y$ (b) $\sqrt{x + y}$ (c) $\sqrt{x^2 + y^2}$ (d) None of these ( )

(iv) Which statement is true in the following linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ -

(a) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ intersecting (b) $\frac{a_1}{a_2} \neq \frac{b_1}{b_2} = \frac{c_1}{c_2}$ coincides with

(c) $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$ is parallel (d) All of the above ( )

(v) The terms of an arithmetic progression are $a_1, a_2, a_3 \ldots\ldots\ldots a_n$. If the first term is a_1, then the value of the common difference d will be -

(a) $a_1 - a_2$ (b) $a_2 - a_3$ (c) $a_2 - a_1$ (d) $a_4 - a_1$ ( )

(vi) The value of $\sqrt{sec^2 40^o - tan^2 40^o}$ will be -

(a) 1 (b) -1 (c) 2 (d) 0 ( )

(vii) How many degrees of an angle does the tangent line of a circle makes with the radius passing through the point of contact?

(a) 50^0 (b) 180^0 (c) 90^0 (d) 100^0 ( )

(viii) The angle of depression of a given object is the angle formed by the line of sight and the horizontal line -

(a) above (b) below

(c) Both a and b are correct (d) None of these ( )

(ix) If the length of an arc of a sector is 22 cm and radius is 21 cm, then what will be the area of the sector?

(a) 231 (b) 462 (c) 213 (d) None of these ( )

(x) What will be the total volume of 21 metal balls each of 1 cm diameter ?

(a) 11 cm^3 (b) $\frac{4}{3}$ cm^3 (c) 88 cm^3 (d) $\frac{88}{3}$ cm^3 ( )

(xi) The following are the number of wickets taken by a bowler in 10 cricket matches: 2, 6, 4, 5, 0, 2, 1, 3, 2, 3. Calculate the Mode.

(a) 3 (b) 4 (c) 6 (d) 2 ( )

(xii) If the probability of celebrating Jagriti's birthday is 0.08, then what will be the probability of not celebrating ?

(a) 0.992 (b) 0.92 (c) 1 (d) 0 ( )

Q. 2 Choose the correct answer from the options given in the bracket - [6 x 1 = 6]

(i) Pratibha takes 18 minutes while Pooja takes 12 minutes to go around a circular field. They both start walking from the same place and at the same time and walk in the same direction. After how much time do they return to the starting point? ..... (36 minutes/6 minutes)

(ii) Two polygons having the same number of sides are similar –

(equal/proportional)

(i) Their corresponding angles should be.....

(ii) Their corresponding sides should be.....

(iii) If $\tan A = \frac{3}{4}$ then the value of sin A is ..... $\left[\frac{3}{5} / \frac{4}{5}\right]$

(iv) Whether the numbers $\sqrt{2}$, $\sqrt{8}$, $\sqrt{18}$, $\sqrt{32}$ are A.P. or not (Yes/No)

(v) The Median of the distribution 2, 3, 2, 4, 2, 3, 2, 5 is .....

(vi) The height of a slide is 1.5 m, which makes an angle of 60^0 with the ground, find the length of the slide.

Q. 3 Very short answer type questions - [12 x 1 = 12]

(i) Find a quadratic polynomial whose zeroes are 4 and 1.

(ii) There are 10 boys and 7 girls in class X. Express this algebraically.

(iii) In the first row of a flower bed, there are 23 rose plants, in the second bed there are 21 plants, in the third bed there are 19 rose plants and so on, in the last row there are 5 rose plants. How many total rows are there in this bed ?

(iv) In ΔABC, $\angle B$ is right angle in which AB = 29 cm, BC= 21 cm, then the value of AC will be ?

(v) Find the value of $\cot^2 45^\circ - \operatorname{cosec}^2 45^\circ$.

(vi) If $\tan P = \frac{5}{12}$ and $\angle Q = 90^\circ$, then find the value of $\tan P - \cot R$.

(vii) A tower is standing vertically on the earth. From a point on the earth which is situated 15 meter away from the foot point of the tower, the angle of depression of the top is 60^0, then find the height of the tower.

(viii) The tangent line PQ at a point P to a circle of radius 5 cm meets a line passing through the center O at the point such that OQ = 12 cm. Then find the length of PQ.

(ix) The length of a shadow of a tree is $\sqrt{3}$ times of its height. Find the angle of elevation.

(x) An arc of a circle of radius 7 cm subtends an angle of 30^0 at the centre. Find the length of the arc.

(xi) What will be the probability of getting the number 8 when the die is thrown once?

(xii) Write the value of $\sin^2 \theta + \cos^2 \theta$

Section-B (2 marks each)

Q. 4 Prove that $\sqrt{5}$ is an irrational number.

Q. 5 Find the zeroes of the quadratic polynomial $4u^2 + 8u$.

Q. 6 Find the distance between the points (a, b) and (-a, -b).

Q. 7 If the angles of depression of the opposite banks of a 3 meter high bridge of a river are 30^0 and 45^0 respectively, then find the width of the river.

Q. 8 Manvi received a spinning top as a birthday gift which is not painted or she wants to color it with her wax colours. The top is cone shaped with a semi-circle superimposed on it. The total height of the top is 5 cm and its diameter is 3.5 cm. Find the area to be painted by her.

Q. 9 Find the Median of the following data –

Marks	20	29	28	33	42	38	73	25
Number of students	6	28	24	15	2	4	1	20

Q. 10 Find a point on the Y-axis which lies equidistant between the points A(6, 5) and B(-4, 3).

Q. 11 The height of a right angled triangle is 7 cm less than its base. If the hypotenuse is 13 cm, then find the other two sides.

Q. 12 Find the ratio in which the points A(1, -5) and B(-4, 5) joining the line segment is divided by the x-axis. Find the coordinates of this divided point.

Q. 13 Find the Mean of the following distribution using the Standard Deviation Method -

No. of wickets	20—60	60—100	100—150	150—250	250—350	350—450
No. of bowlers	7	5	16	12	2	3

Q. 14 Two players Babulal and Hukmesh play a match of tennis. It is known that the probability of Babulal winning the match is 0.62, then what is the probability of Hukmesh winning ?

Q. 15 Find the 20^{th} term from the last term in A.P 3, 8, 13 ..... 253.

Q. 16 Find the sum of odd numbers between 0 and 50.

Section C (3 marks each)

Q. 17 Prove that if two sides parallel to one side of a triangle intersect at different points, then it divides the other two sides in the same ratio.

Q. 18 A circular brooch is made of silver wire whose diameter is 3.5 cm. The wire is used to make 5 diameters of the circle which divides it into 10 equal sectors, then find -

(i) Total length of tied silver wire.

(ii) Area of each sector of Brooch.

Q. 19 The following distribution shows the daily pocket money of children of a locality. The Mean pocket money is Rs. 18. If so, find the missing frequency.

Daily pocket money	11—13	13—15	15—17	17—19	19—21	21—23	23—25
No. of children	7	6	9	13	f	5	4

Q. 20 A Kamal Daan (Pen stand) is made of wood in the shape of a cuboid in which four conical bundles are made to hold the pens. The dimensions of the cuboid are 15 cm x 10 cm x 3.5 cm. The diameter of each bundle is 1 cm, the depth is 14 cm. Find the volume of the wood in the entire Kamal Daan.

Section D (4 marks each)

Q. 21 Prove that -

$$\sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = \sec\theta - \tan\theta$$

Or $\frac{\sin\theta+\tan\theta}{\sin\theta+\cos\theta-1} = \sec\theta + \tan\theta$

Q. 22 Prove that tangents drawn from an external point to a circle are of equal length.

Or

Two tangents TP and TQ have been drawn from an external point T to a circle with center O. Prove that $\angle PTQ = 2\angle OPQ$

Q. 23 Find the Mode of the following frequency distribution -

Class interval	10—25	25—40	40—55	55—70	70—85	85—100
Frequency	2	3	7	6	6	6

or

If the Median of the following distribution is 28.5, then find the value of x and y -

Class interval	0—10	10—20	20—30	30—40	40—50	50—60	Total
Frequency	5	x	20	15	y	5	60

MODEL PAPER-3 (2024)

Class-10 (Subject – Mathematics)

Time: 3.15 minutes MM - 80

Q. 1 Choose the correct answer for the following objective questions - [12 x 1 = 12]

(i) HCF of 15 and 21 will be -

(a) 2 (b) 3 (c) 4 (d) 5 ( )

(ii) The degree of polynomial $3x^4 + 2x^3 - x + 3$ is -

(a) 1 (b) 2 (c) 3 (d) 4 ( )

(iii) In the equation $2x - y = 5$ if $x = 3$ then the value of y will be -

(a) 0 (b) 3 (c) 5 (d) 1 ( )

(iv) The quadratic equation from the following is -

(a) $x^2 - \frac{1}{x^2} = 9$ (b) $x + \frac{1}{x} = x^2$

(c) $x^2 - 2x + 1$ (d) $x^2 + 5x + 4 = 0$ ( )

(v) If the n^{th} term in the arithmetic progression is 7-4n, then the common difference will be-

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

(vi) The distance of any point from *y* axis is -

(a) Ordinate (b) Abscissa (c) Constant (d) None of these ( )

(vii) The value of $\sin^2\theta + \cos^2\theta$ -

(a) 0 (b) 1 (c) $\frac{1}{2}$ (d) ∞ ( )

(viii) If the area of a circle is 154 cm^2, then what will be its radius ?

(a) 14 cm (b) 5 cm (c) 7 cm (d) 44 cm ( )

(ix) What will be the diameter of a circle of maximum radius that can be drawn in a square of side 5 cm ?

(a) 5 cm (b) 10 cm (c) 2.5 cm (d) 2 cm ( )

(x) The formula to find the length of the diagonal of a cube is -

(a) l^2 (b) $l\sqrt{3}$ (c) l^3 (d) $3\,l$ ( )

(xi) What will be the Median of 1, 10, 12, 4, 8, 3, 11 ?

(a) 1 (b) 7 (c) 11 (d) 8 ( )

(xii) What will be the probability of getting an even number when a die is thrown ?

(a) $\frac{1}{3}$ (b) $\frac{2}{3}$ (c) $\frac{1}{4}$ (d) $\frac{1}{2}$ ( )

Q. 2 Fill in blanks - [6 x 1 = 6]

(i) If the LCM= 48 and HCF= 4 is of any number P and 16, then the number P will be.....

(ii) In A.P. -11, -8, -5, ... 5^{th} term will be ?

(iii) Two figures are congruent if their dimensions and ..... are the same.

(iv) The value of $\cos 0^o$ is .....

(v) If the Arithmetic Mean of 5, 7, x, 9 is 9, then the value of x will be = ...

(vi) The probability of getting 6 on tossing a die will be .....

Q. 3 Very short answer type questions - **[12 x 1 = 12]**

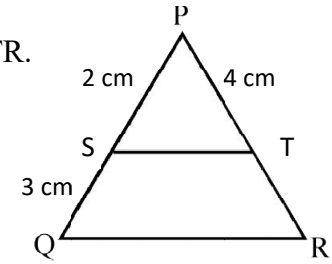
(i) Which polynomial is called a polynomial of degree 2?

(ii) If $x + y = 14$ and $x - y = 4$ then find the value of x.

(iii) Find the solution of the equation $x^2 - \frac{x}{4} = 0$.

(iv) Write the 7^{th} term in the arithmetic progression 21, 18, 15, 12, ...

(v) In ΔPQR, if the $PS = 2$ cm, $SQ = 3$ cm, $PT = 4$ cm, then find TR.



(vi) Find the distance between the points (0, 0) and (6, 8)

(vii) What will be the value of $\sqrt{cosec^2\theta - 1}$?

(viii) What will be the value of $sec\frac{\pi}{3}$?

(ix) Find the area of a quadrant of a circle whose circumference is 22 cm.

(x) Find the Mean of 4, 5, 6, 8, 2 -

(xi) If a player scored 25, 40, 45, 50, 100, 40, 75, 40, 50, 86 runs respectively in 10 innings, then calculate the Mode of the runs.

(xii) Write the formula to find the total surface area of a cylinder.

Section-B (2 Marks Each)

Q. 4 Prove that $3\sqrt{2}$ is an irrational number.

Q. 5 Find a quadratic polynomial whose sum and product of zeroes are $\frac{-1}{4}$ and $\frac{1}{4}$ respectively.

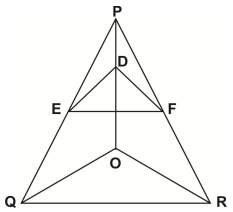
Q. 6 The cost of 2 pencils and 3 erasers is Rs 9. And the cost of 4 pencils and 5 erasers is Rs 17, then find the cost of each pencil and eraser.

Q. 7 Find two consecutive positive integers whose sum of their squares is 365.

Q. 8 In the given figure if

$DE \parallel OQ$ and $DF \parallel OR$ then

Prove that $EF \parallel QR$



Q. 9 If $Q(0, 1)$ is equidistant from the points $P(5, -3)$ and $R(x, 6)$, then find the value of x. Find the distances QR and PR.

Q. 10 A tree breaks due to a storm and the broken part bends in such a way that the top of the tree starts touching the ground and makes an angle of 30° with it. The distance to the foot of the tree, where the top of the tree touches the ground is 8m. Find the height of the tree.

Q. 11 Prove that the perpendicular drawn from the point of contact to the tangent line passes through the center of the circle.

Q. 12 A chord of a circle of radius 12 cm subtends an angle of 120° at the centre. Find the area of the corresponding circle segment. (Use π = 3.14 and $\sqrt{3}$ = 1.73).

Q. 13 Find the length of the side of a cube of volume 216 cubic cm?

Q. 14 The radius of a sphere is 8 cm, how many balls of radius 8 mm can be made from it ?

Q. 15 Find the Median of the following distribution -

X	5	6	7	8
C. f.	2	5	8	10

Q.16 In a group of 144 ball pens, 12 ball pens are bad and the rest are good. You would like to buy only that pen which is good, but you would not like to buy a bad pen? What is the probability that the shopkeeper takes out one pen at random from these pens and gives it to you?

(a) You will buy a good pen. (b) You will not buy a good pen.

Section-C (3 Marks Each)

Q. 17 A manufacturer of T.V sets produces 600 T.V sets in the 3rd year and 700 T.V sets in the 7th year. Assuming that production increases uniformly by a certain number of times each year, find –

(i) Production in the first year

(ii) Total production in the first 7 years

(iii) Production in 10^{th} year

Q. 18 In what ratio does the point (-1, 6) divide the line segment joining the points (-3, 10) and (6, -8).

Q. 19 The angles of depression of two ships when seen from the top of a lighthouse 75 m high above sea level are 30° and 45°. If there is only one lighthouse and one ship is immediately behind the other, then find the distance between the two ships.

Q. 20 Find the Arithmetic Mean of the following data with the help of Assumed Mean Method -

Class	0—10	10—20	20—30	30—40	40—50
Frequency	3	13	18	12	4

Section-D (4 Marks Each)

Q. 21 If $\theta = 60^{o}$, then prove that -

(i) $\sin^3\theta = 3\sin\theta - 4\sin^3\theta$

(ii) $\tan 2\theta = \frac{2\tan\theta}{1-\tan^2\theta}$

or

Prove that -

$(\sin A + \text{cosec } A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$

Q. 22 Prove that the tangents drawn at the ends of a chord of a circle make equal angles with the chord.

Or

Prove that the lengths of two tangent lines drawn from an external point to a circle are equal.

Q. 23 The following distribution shows the daily pocket money of children of a locality. Mean value of pocket expenditure Rs. 18. Find the missing frequency.

Daily pocket money	11—13	13—15	15—17	17—19	19—21	21—23	23—25
No of children	7	6	9	13	f	5	4

OR

The following table shows the age of patients admitted to a hospital in a particular year.

In age groups	5—15	15—25	25—35	35—45	45—55	55—65
Number of patients	6	11	21	23	14	5

Find the Mode and Mean of the above data.

ANSWER SHEET

Q. 1

(i) B

(ii) D

(iii) D

(iv) C

(v) B

(vi) B

(vii) B

(viii) C

(ix) A

(x) B

(xi) D

(xii) D

Q. 2

(i) 12

(ii) 1

(iii) Figure

(iv) 1

(v) 15

(vi) $\frac{1}{6}$

Q. 3

(i) Quadratic

(ii) 9

(iii) $x = \frac{1}{4}$

(iv) 3

(v) 6 cm

(vi) 10

(vii) Cot A

(viii) 2

(ix) $\frac{77}{8}$cm

(x) 5

(xi) 40

(xii) $2\pi r (r + h)$

MODEL PAPER-4 (2024)

Class-10 (Subject - Mathematics)

Time: 3.15 minutes MM - 80

Q. 1 Choose the correct answer for the following objective questions - [12 x 1 = 12]

(i) The LCM of 12 and 15 will be -

(a) 12 (b) 15 (c) 30 (d) 60 ( )

(ii) The maximum zeroes of a degree 1 polynomial will be -

(a) 0 (b) 1 (c) 2 (d) 3 ( )

(iii) In equation $3x - y = 6$ if $y = 1$, then the value of x will be -

(a) 1 (b) 2 (c) 3 (d) 6 ( )

(iv) If the root of $x^2 - kx - \frac{5}{4} = 0$ is $\frac{1}{2}$ then the value of k will be -

(a) 2 (b) -2 (c) $\frac{1}{4}$ (d) $\frac{1}{2}$ ( )

(v) The sum of the first x terms of a natural number is -

(a) x^2 (b) $x^2 - 1$ (c) $\frac{x(x+1)}{2}$ (d) $x(x-1)$ ( )

(vi) The distance of point (1, 2) from the x axis will be -

(a) 1 (b) 3 (c) 2 (d) 4 ( )

(vii) What will be the value of $\sec^2 60^o$ -

(a) $\frac{1}{4}$ (b) 2 (c) $\frac{\sqrt{3}}{2}$ (d) 4 ( )

(viii) If the radius of a circle is R, then its circumference will be -

(a) $2\pi R$ (b) πR (c) πR^2 (d) $\frac{\pi R}{2}$ ( )

(ix) If the area of the sector of a circle is $\frac{1}{6}$ of the area of the circle, then what will be the angle of the sector ?

(a) 45^0 (b) 120^0 (c) 90^0 (d) 60^0 ( )

(x) If the side of a cube is 35 cm, what will be its perimeter -

(a) 7 cm (b) 9 cm (c) 14 cm (d) 18 cm ( )

(xi) The Mean of the first 7 natural numbers will be -

(a) 4 (b) 5 (c) 3 (d) 7 ( )

(xii) Which of the following is not a probability of an event -

(a) 5% (b) 0.9 (c) 1.1 (d) 0.1 ( )

Q. 2 Fill in the blanks - [6 x 1 = 6]

(i) The smallest prime even number is.....

(ii) The second term of the arithmetic progression in arithmetic progression is 14, ..., 16

(iii) Two circles are always similar but they will be congruent if their..... is equal.

(iv) The value of $\sec 0^{o}$ is .....

(v) The difference between the upper limit and lower limit of a class is called .....

(vi) If the probability of P(E) is 0.85 then the probability of "P($\bar{E}$)" is .....

Q. 3 Very short answer type questions - **[12 x 1 = 12]**

(i) What is the degree of linear polynomial ?

(ii) If the system of equations is $2x + y = 10,\ x - y = 5,$ then find the value of x, y.

(iii) Find the solution of equation $y^2 - \frac{y}{16} = 0$

(iv) Write the 8th term in the arithmetic progression 95, 91, 87, 83 .....

(v) If $\Delta ABC \sim \Delta PQR$ and $\angle P = 68^{o}$ and a $\angle Q = 70^{o}$ then find the value of $\angle C$.

(vi) Write the formula to find the distance between two points.

(vii) If tan $\tan 3x = 1$ then what will be the value of x ?

(viii) What will be the value of 2 $(\sin^2\theta + \cos^2\theta)$?

(ix) If the radius of a circle is 14 cm then find its circumference.

(x) How are the opposite faces a cuboid?

(xi) Show the relation between Mean, Median and Mode through the formula.

(xii) Write the formula to find Mode?

Section B (2 marks each)

Q. 4 Prove that $\sqrt{3}$ is an irrational number ?

Q. 5 Find a quadratic polynomial whose sum and product of zeroes are $\frac{1}{4}$, -1 respectively.

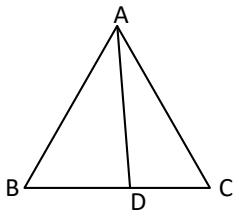
Q. 6 The sum of a two digit number and the number formed by reversing its digits is 66. If the difference between the digits of a number is 2 then find the number.

Q. 7 The area of a rectangular plot is 528 m^2. The length (in metres) of the plot is one more than twice the width. Find the length and breadth of the plot.

Q. 8 A point D is situated on the side BC of a triangle ABC in such a way that

$\angle ADC = \angle BAC,$

then prove that $CA^2 = CB.CD.$



Q. 9 Find a relation between x and y such that the point (x, y) is equidistant from the points (3,6) and (-3,4).

Q. 10 A kite is flying at a height of 60 meters from the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60°. Assuming that there is no slack in the string, find the length of the string.

Q. 11 A circle is drawn inside a triangle ABC in such a way that it touches the sides AB, BC and AC at P,Q and R respectively if AB= 10 cm, AR= 7 cm and CR= 5, then find the length of BC.

Q. 12 If an arc of a circle of radius 210 m subtends an angle of 60° at the centre, then find the length of the arc.

Q. 13 If the height of a cylinder is 7 cm and radius is 8 cm, then find the volume of the cylinder.

Q. 14 What will be the surface area of a sphere of radius 14 cm ?

Q. 15 If the arithmetic mean of $x + 6, x + 2, x + 5$ and $x + 7$ is 10, then find the value of x.

Q. 16 A grey die and a blue die is thrown together. Write the probability of the following possible outcome, When the sum of the numbers of both the die is 8 or 13.

Section – 'C' (3 marks each)

Q. 17 Find the sum of the following -

(i) First 1000 positive integers (ii) First n positive integers

Q. 18 If the points (1, 2) (4, y) (x, 6) and (3, 5) taken in this order are the vertices of a parallelogram, then find the value of x and y.

Q. 19 Two pillars of equal length are installed opposite to each other on both sides of an 80 meter wide road. The angles of elevation of the tops of the pillars from a point on the road between these two pillars are 60° and 30° respectively. Find the height of the pillars and the distance of the point from the pillars.

Q. 20 Find the Mode from the following frequency distribution -

Height (in cm)	52—55	55—58	58—61	61—64
Number of students	10	20	25	10

Section - D (4 marks each)

Q. 21 Using the identity $sec^2\theta = 1 + tan^2\theta$, prove that $\frac{sin\theta - cos\theta + 1}{sin\theta + cos\theta - 1} = \frac{1}{sec\theta - tan\theta}$

OR

Prove that $\left(\frac{1+tan^2A}{1+cot^2A}\right) = \left(\frac{1-tanA}{1-cotA}\right)^2 = tan^2A$

Q. 22 Prove that the tangents drawn from the ends of diameter of a circle are parallel to each other.

Or

Prove that the opposite sides of a quadrilateral circumscribed about a circle subtend supplementary angles at the centre.

Q. 23 The Median of the following data is 525. If the sum of frequencies is 100, then find the value of x and y.

Social class	0—100	100—200	200—300	300—400	400—500	500—600	600—700	700—800	800—900	900—1000
Frequency	2	5	x	12	17	20	y	9	7	4

Or

The following data gives the expected life span (in hours) of 225 electrical appliances.

Life span (in hours)	0—20	20—40	40—60	60—80	80—100	100—120
Frequency	10	35	52	61	38	29

Find the life span Mode of the appliances.

ANSWER SHEET

Q. 1

(i)	d
(ii)	d
(iii)	b
(iv)	b
(v)	c
(vi)	c
(vii)	d
(viii)	a
(ix)	d
(x)	c
(xi)	a
(xii)	c

Q. 2

(i)	2
(ii)	15
(iii)	Radius
(iv)	1
(v)	Range
(vi)	0.15

Q. 3

(i)	1
(ii)	5
(iii)	$\frac{1}{16}$
(iv)	63
(v)	42^{o}
(vi)	$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
(vii)	15
(viii)	2
(ix)	88
(x)	Equal
(xi)	3 median = mode + 2 mean
(xii)	$l + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \text{ x } h$

COMMENTS

बेड टच/ असुरक्षित स्पर्श होने पर क्या करें ?

Shout 'NO' loudly
जोर से 'नो' या 'नहीं' चिल्लाओ

NO

Run away from that person/ place
उस व्यक्ति/स्थान से दूर भाग जाओ

GO

Tell someone trusted
किसी विश्वसनीय को जरूर बताओ

TELL

ये सब करते समय अपनी सुरक्षा का ध्यान रखना चाहिए..

Move Towards Stronger Learning Through Continuous Practice

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