TOP - 10 ANNUAL EXAMINATIO N PAPERS 2024-2025

(Strictly According to CBSE Latest Circulum)

Prepared By :

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PGT Mathematics

MS Pure Mathematics

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Preface

The Central Board of Secondary Education (CBSE) continues to emphasize competency-based education, fostering critical thinking, creativity, and analytical problem-solving skills. With this in mind, we proudly present ***"Top 15 Pre-Board Papers"*,** a meticulously crafted resource designed to support students in mastering the latest examination patterns and syllabus requirements.

This book includes:

- **Competency-Based Questions:** Focus on real-life applications, higher-order thinking skills, and analytical reasoning.
- **Objective and Case Study-Based Questions:** Designed to test comprehension, interpretation, and application of concepts.
- **Subjective Practice Papers:** Carefully aligned with CBSE guidelines for step-by-step problem-solving strategies.
- **Blueprint for Success**: A detailed chapter-wise and section-wise blueprint to help you plan your preparation strategically.
- **Time Management Tips**: Expert advice to help you complete exams within the given time frame, improving speed and accuracy

Each paper has been designed keeping in mind the diverse needs of learners, ensuring comprehensive preparation for upcoming board exams. The inclusion of well-researched questions and thoughtful solutions will empower students to approach their exams confidently.

We extend our gratitude to the faculty and administrative teams of The Nandyal Public School for their continuous support in compiling this resource. We hope this book becomes an essential tool in your academic journey toward success.

Wishing you great learning and success!

How to Use This Book Effectively

Time Management Strategies for Exam Success

1. **Create a Study Timetable:**
    - Allocate specific time slots for each subject based on its difficulty level and your comfort.
    - Include breaks to refresh your mind and maintain focus.
2. **Practice Under Exam Conditions:**
    - Solve one pre-board paper daily in a timed environment to simulate real exam scenarios.
    - Aim to complete the paper within the allotted time frame to improve time management.
3. **Prioritize High-Weightage Chapters:**
    - Focus first on chapters that carry more marks as per the blueprint provided in this book.
    - Balance revision between core concepts and application-based questions.
4. **Effective Use of Reading Time:**
    - Read the entire question paper carefully during the 15-minute reading period.
    - Identify and mentally plan your answers to the easiest questions first.
5. **Stay Calm and Composed:**
    - Practice relaxation techniques to stay focused during exams.
    - Avoid spending too much time on one question—move on and return to it if time allows.

Time Management For CBSE 2025 Pre-Board Exams

It is extremely important to complete each Section of the paper within the prescribed time limits given below. Else, you may run out of time to complete all 38 Qs or review difficult/unattempted Qs.

MATHEMATICS			
Section	**Questions**	**Time to be Spent**	**Total Time** (maximum)
Reading Time (Mandatory): 15 min			
SECTION A (1 mark)	18Q (MCQs)	~1 minute (per Question)	30 minutes (8 minutes extra given*)
	2Q (A/ R)	2 minutes (per Question)	
SECTION B (2 marks)	5Q (VSA)	2 minutes (per Question)	15 minutes (5 minutes extra given*)
SECTION C (3 marks)	6Q (SA)	4 minutes (per Question)	30 minutes (6 minutes extra given*)
SECTION D (5 marks)	4Q (LA)	10 minutes (per Question)	50 minutes (10 minutes extra given*)
SECTION E (4 marks)	3Q (Case-based)	10 minutes (per Question)	35 minutes (5 minutes extra given*)
Revision Time			20 minutes
TOTAL TIME:			**180 minutes**

~ means approximate time (1 minute +/– is okay) * Extra time for competency-based Qs is suggested.

IMPORTANT:

1. The mandatory 15 minutes Reading Time should be used to skim through the paper and decide which Qs to attempt at the end (difficult Qs).
2. Revision time is a must to have (at the end) to achieve three things:
   - Attempt the questions you have left or are not 100% sure about
   - Check if any question (sub-part) is left unattempted
   - Double check, if the correct options are picked in the Objective section

(v)

Wishing You All the Best!

About TNPS Digital Library

At **TNPS Digital Library**, we aim to foster a comprehensive learning environment, offering an extensive range of educational resources to support students, teachers, and parents alike. Our platform is designed to meet the diverse academic needs of students from **Class 1 to Class 12**, providing them with the tools to succeed and excel.

What Our Library Offers:

- **Extensive Collection of Books:**
  We offer millions of books, including textbooks, reference materials, and **e-books** for all subjects. These resources cater to the CBSE syllabus and include everything from foundational texts to advanced reference guides.

- **Pre-Board Papers and Sample Papers:**
  Our collection includes a vast array of **pre-board papers**, **question papers**, and **sample papers** for all classes and subjects. These papers are aligned with the latest CBSE patterns and are perfect for exam preparation.

- **Story Books and Literature Resources:**
  We also provide a rich selection of **story books**, literature resources, and novels that engage students in creative reading while enhancing language and comprehension skills.

- **Projects and Art Integration Resources:**
  Explore a wide range of **projects**, **sample projects**, and **art integration materials** that help students connect academic learning with real-world applications and creative expression.

- **Lesson Plans for Teachers:**
  Teachers can access **well-structured lesson plans** tailored to the curriculum, designed to enhance classroom delivery and foster engaging, student-centered learning environments.

- **Interactive Learning Tools:**
  In addition to books and papers, we offer **interactive tools**, including quizzes, assignments, and educational games to foster competency-based learning and critical thinking.

How to Access the Portal:

- Simply visit at www.tnpsnandyal.com
- Browse categories or use the search function to find materials specific to your academic needs.

24/7 Support:

Our portal offers **round-the-clock access** to resources and **academic support**, including faculty consultations and peer discussions through dedicated forums.

We encourage all students and teachers to explore the digital library fully, as it is designed to be an all-encompassing platform for your educational success. Keep learning, keep growing!

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Series TNPS/02/01 **SET – 1**

ROLL No. **Q.P Code 09/02/01**

Candidates must write the Q.P Code on the title page of the Answer book.

- Please check that this question paper contains 6 printed pages.
- Please check that this question paper contains 38 questions.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please write down the serial number of the question in the answer-book before attempting it.
- 15 minute time has been allotted to read this question paper.
- The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

गणित
MATHEMATICS

निर्धारित समय : 3 घण्टे *अधिकतम अंक : 80*

Time allowed : 3 hours *Maximum Marks : 80*

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper contains **38** questions. **All** questions are **compulsory**.*

(ii) *This question paper is divided into **five** Sections – **A**, **B**, **C**, **D** and **E**.*

(iii) *In **Section A**, Questions no. **1** to **18** are multiple choice questions (MCQs) and questions number **19** and **20** are Assertion-Reason based questions of **1** mark each.*

(iv) *In **Section B**, Questions no. **21** to **25** are very short answer (VSA) type questions, carrying **2** marks each.*

(v) *In **Section C**, Questions no. **26** to **31** are short answer (SA) type questions, carrying **3** marks each.*

(vi) *In **Section D**, Questions no. **32** to **35** are long answer (LA) type questions carrying **5** marks each.*

(vii) *In **Section E**, Questions no. **36** to **38** are case study based questions carrying **4** marks each.*

(viii) *There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 3 questions in Section C, 2 questions in Section D and 2 questions in Section E.*

(ix) *Use of calculators is **not** allowed.*

Section-A

Consists of Multiple Choice Type questions of 1 mark each.

Q. 1. **Which of the following statements is true?**

(A) Every irrational number can be represented as a fraction.

(B) Every irrational number can be represented with the help of decimals.

(C) Every rational number can be represented as a terminating decimal.

(D) Every rational number can be represented as an integer.

Q. 2. $\sqrt{2}$ **is a polynomial of degree**

(A) 2 **(B)** 0 **(C)** 1 **(D)** $\frac{1}{2}$

Q. 3. **If (2, 0) is a solution of the linear equation $2x + 3y = k$, then the value of k is**

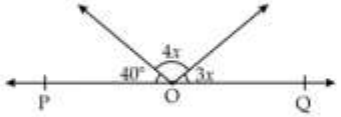
(A) 4 **(B)** 6 **(C)** 5 **(D)** 2

Q. 4. **Abscissa of a point is positive in**

(A) I and II quadrants **(B)** I and IV quadrants **(C)** I quadrant only **(D)** II quadrant only

Q. 5. **In the given figure, POQ is a line. The value of x is**

(A) 20° **(B)** 25° **(C)** 30° **(D)** 35°



Q. 6. **Which of the following is not a criterion for congruence of triangles?**

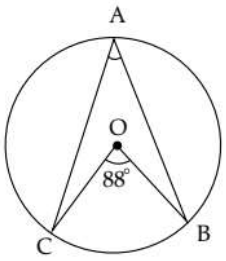
(A) *SAS* **(B)** *ASA* **(C)** *SSA* **(D)** *SSS*

Q. 7. **The quadrilateral formed by joining the midpoints of the sides of a quadrilateral *PQRS*, taken in order, is a rectangle, if**

(A) PQRS is a rectangle **(B)** PQRS is a parallelogram

(C) Diagonals of PQRS are perpendicular **(D)** Diagonals of PQRS are equal

Q. 8. **Given below is the figure of a circle with centre O. The measure of $\angle BOC = 88°$.**



What is the measure of $\angle BAC$?

(A) 44° **(B)** 60° **(C)** 88° **(D)** 176°

Q. 9. **If the area of an equilateral triangle is $16\sqrt{3}$ cm^2, then the perimeter of the triangle is**

(A) 48 cm **(B)** 24 cm **(C)** 12 cm **(D)** 36 cm

Q. 10. **The radius of a sphere is 2*r*, and then its volume will be**

(A) $\frac{4\pi r^3}{3}$ **(B)** $4\pi r^3$ **(C)** $\frac{8\pi r^3}{3}$ **(D)** $\frac{32}{3}\pi r^3$

Q. 11. **In a bar graph, the width of bars**

(A) Are proportional to the corresponding frequencies

(B) Have no significance

(C) Are proportional to the space between two consecutive bars.

(D) Are proportional to the corresponding heights.

Q. 12. **Which of the following is irrational?**

(A) $\frac{\sqrt{4}}{\sqrt{9}}$ **(B)** $\frac{\sqrt{12}}{\sqrt{3}}$ **(C)** $\sqrt{7}$ **(D)** $\sqrt{81}$

Q. 13. **In a right circular cone, the cross section made by a plane parallel to the base is a**

(A) Sphere **(B)** Hemisphere **(C)** Circle **(D)** Semicircle

Q. 14. **A diagonal of a rectangle is inclined to one side of the rectangle at 25°. The acute angle between the diagonals is**

(A) 55° **(B)** 50° **(C)** 40° **(D)** 25°

Q. 15. **The number of dimension, a point has**

(A) 0 **(B)** 1 **(C)** 2 **(D)** 3

Q. 16. **Factorize $12a^2b - 6ab^2$**

(A) $6ab(2a - b)$ **(B)** $2ab(6a - 3b)$ **(C)** $3ab(4a - 2b)$ **(D)** $6a(2ab - b)$

Q. 17. **The linear equation $2x - 5y = 7$ has**

(A) a unique solution **(B)** two solutions

(C) infinitely many solutions **(D)** no solution

Q. 18. **In RHS rule 'H' stands for**

(A) Height **(B)** Hypotenuse **(C)** Heron's Formula **(D)** Highest

Directions : In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

(A) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

Q. 19. **Assertion (A):** According to Euclid's 1st Axiom-"Things which are equal to the same thing are also equal to one another."

Reason (R): If $AB = PQ$ and $PQ = XY$, then $AB = XY$.

Q. 20. **Assertion (A):** If angles '*a*' and '*b*' form a linear pair of angles and $a = 40°$ then $b = 150°$.

Reason (R): Sum of linear pair of angles is always 180°.

Section-B

Consists of 5 questions of 2 marks each.

Q. 21. Below is the marks of 35 students in mathematics test (out of 10). Average these marks in tabular form using tally mark.

5, 8, 7, 6, 10, 8, 2, 4, 6, 3, 7, 5, 8, 5, 1, 7, 4, 6, 3, 5, 2, 8, 4, 2, 6, 4, 2, 8, 9, 5, 4, 7, 5, 5, 8

Q. 22. If $y = 2$ and $y = 0$ are the zeroes of the polynomial $f(y) = 2y^3 - 5y^2 + ay + b$, find the value of a and b.

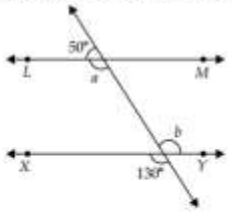
Q. 23. Find the value of the polynomial

$p(x) = x^3 - 3x^2 - 2x + 6$ at $x = \sqrt{2}$

Q. 24. If $(3x - 15°)$ and $(x + 5°)$ are complementary angles, find the angles.

OR

In the given figure, find the angles a and b and then show that $LM \parallel XY$.



Q. 25. The radius and slant height of a cone are in the ratio 4 : 7. If its curved surface area is 792 cm^2, find its radius.

OR

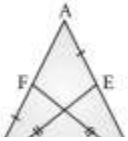
How much ice-cream can be put into a cone with base radius 3.5 cm and height 12 cm ?

Section-C

Consists of 6 questions of 3 marks each.

Q. 26. If $f(x) = 5x^2 - 4x + 5$, find $f(1) + f(-1) + f(0)$.

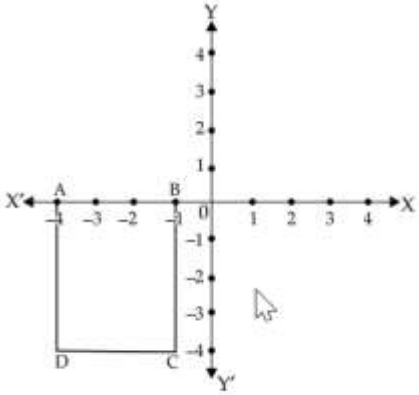
Q. 27. In the given figure, $AB = AC$ and BE and CF are bisectors of $\angle B$ and $\angle C$ respectively. Prove that $\Delta EBC \cong \Delta FCB$.



Q. 28. Write the equation $4x = 6(1 - y) + 3x$ in the form $ax + by = c$ and also find the co-ordinate of the points where its graph cuts the two axes ?

OR

$ABCD$ is a rectangle. Write the equation of its sides. Also, find its area.



Q. 29. If $x = \frac{1}{3-2\sqrt{2}}$ and $y = \frac{1}{3+2\sqrt{2}}$, then find the value of $x + y + xy$. A I

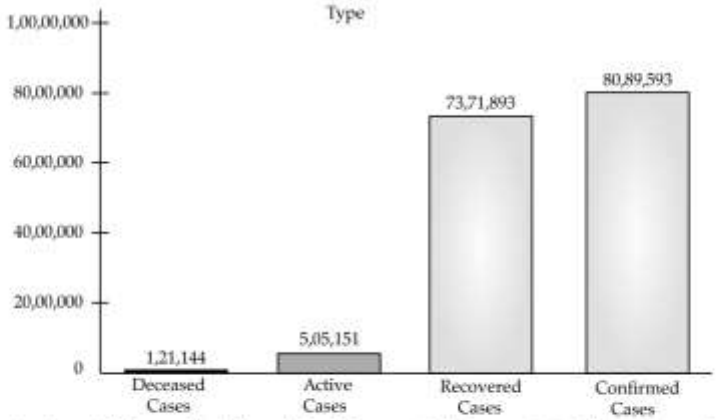
OR

If $x = 2 + \sqrt{3}$, then find the value of $x^2 + \frac{1}{x^2}$. A I

Q. 30. How many litres of milk can a hemispherical bowl of diameter 10.5 cm hold ? (Use $\pi = 3.14$)

Q. 31. Corona-virus disease (COVID-19) is an infectious disease. It is caused by a newly discovered corona-virus. Most people who fall sick with COVID-19 experience mild to moderate symptoms and recover without special treatment.

Number of the coronavirus (COVID-19) cases across India as of October 30, 2020.



Corona-virus is mainly transmitted through droplets generated when an infected person coughs, sneezes or exhales. Look at the bar graph and answer the following:

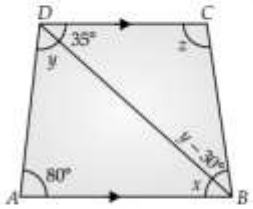
(i) What is horizontal line representing ?

(ii) How many confirmed cases were more than recovered cases?

Section-D

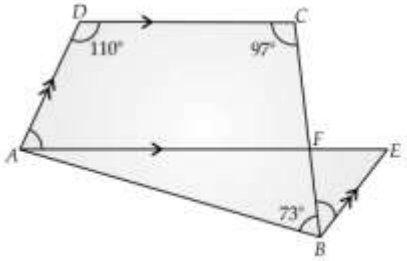
Consists of 4 questions of 5 marks each.

Q. 32. In the given figure, $AB \parallel DC$, $\angle BDC = 35°$ and $\angle BAD = 80°$. Find y, z.



OR

In the below figure $ABCD$ is a quadrilateral in which $\angle ABC = 73°$, $\angle C = 97°$ and $\angle D = 110°$. If $AE \parallel DC$ and $BE \parallel AD$ and AE intersects BC at F, find the measure of $\angle EBF$.



Q. 33. Give two rational numbers whose

(i) difference is a rational number, **(ii)** sum is a rational number,

(iii) product is a rational number, **(iv)** division is a rational number.

Justify also.

Q. 34. From a point in the interior of an equilateral triangle, perpendiculars are drawn on the three sides. The length of the perpendiculars are 14 cm, 10 cm and 6 cm. Find the area of the triangle. A I

OR

The diameter of the moon is approximately one-fourth the diameter of earth. What fraction of volume of earth to the volume of moon ?

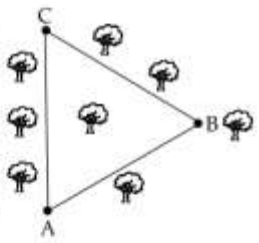
Q. 35. The auto rickshaw fare in a city is charged ₹ 10 for first kilometre and ₹ 4 per kilometre for subsequent distance covered. Write the linear equation to express the above statement and find 3 solutions to the equation.

Section-E

Cased Based Subjective Questions.

Read the following passage and answer the following questions:

Q. 36. Three light house towers are located at points A, B and C on the section of a national forest to protect animals from hunters by the forest department as shown in figure.



(i) How many straight lines can be drawn from A to C? 1

(ii) Give one more Postulate. 2

OR

Write one more Euclid's axiom? 2

(iii) State the Euclid Axiom which states the required result. 1

Q. 37. Beti Bachao, Beti Padhao (BBBP) is a personal campaign of the Government of India that aims to generate awareness and improve the efficiency of welfare services intended for girls.

In a school, a group of $(x + y)$ teachers, $(x^2 + y^2)$ girls and $(x^3 + y^3)$ boys organised a campaign on Beti Bachao, Beti Padhao.

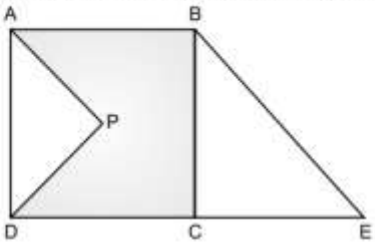
(i) Which mathematical concept is used here? 1

(ii) Write the correct identities to be used here? 2

OR

If in the group, there are 10 teachers and 58 girls, then what is the number of boys? 2

Q. 38. *ABCD* is a village in quadrilateral shaped. The Panchayat has decided to use the triangular area *APD* for girl's education by constructing schools and colleges specially for girls as shown below.



But members of Panchayat have some queries. Answer the following queries :

(i) If $\angle PAD = 30°$ and $\angle PDA = 60°$ then what is the measure of $\angle APD$? 1

(ii) If *ABCD* is a rectangle and *AP* and *DP* are the angular bisector of $\angle BAD$ and $\angle CDA$ respectively, then what are the measure of $\angle PAD$ and $\angle PDA$? 2

OR

If $AP \parallel BE$, then what is sum of $\angle BAP$ and $\angle ABE$? 2

(iii) If $BC = CE = 10$ km then find *BE*. 1

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Series TNPS/02/02 **SET – 2**

ROLL No. **Q.P Code 09/02/02**

Candidates must write the Q.P Code on the title page of the Answer book.

- Please check that this question paper contains 7 printed pages.
- Please check that this question paper contains 38 questions.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please write down the serial number of the question in the answer-book before attempting it.
- 15 minute time has been allotted to read this question paper.
- The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

गणित
MATHEMATICS

निर्धारित समय : 3 घण्टे *अधिकतम अंक : 80*

Time allowed : 3 hours *Maximum Marks : 80*

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper contains **38** questions. **All** questions are **compulsory**.*

(ii) *This question paper is divided into **five** Sections – **A**, **B**, **C**, **D** and **E**.*

(iii) *In **Section A**, Questions no. **1** to **18** are multiple choice questions (MCQs) and questions number **19** and **20** are Assertion-Reason based questions of **1** mark each.*

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(vii) *In **Section E**, Questions no. **36** to **38** are case study based questions carrying **4** marks each.*

(viii) *There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 3 questions in Section C, 2 questions in Section D and 2 questions in Section E.*

(ix) *Use of calculators is **not** allowed.*

Section-A

Consists of Multiple Choice Type questions of 1 mark each.

Q. 1. **Between two rational numbers**

(A) there is no rational number

(B) there is exactly one rational number

(C) there are infinitely many rational numbers

(D) there are only rational numbers and no irrational numbers

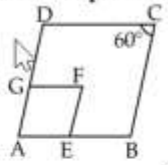
Q. 2. **Which one of the following is a polynomial ?**

(A) $\frac{x^2}{2}-\frac{2}{x^2}$ **(B)** $\sqrt{2x}-1$ **(C)** $x^2+\frac{3x^{\frac{3}{2}}}{\sqrt{x}}$ **(D)** $\frac{x-1}{x+1}$

Q. 3. **Three or more lines intersecting at a same point are said to be**

(A) Parallel lines **(B)** Intersecting lines **(C)** Concurrent lines **(D)** Straight line

Q. 4. **In the following figure, ABCD and AEFG are two parallelograms. If $\angle C = 60°$, then $\angle GFE$ is**



(A) 30° **(B)** 60° **(C)** 90° **(D)** 120°

Q. 5. **If AB = 12 cm, BC = 16 cm and AB is perpendicular to BC, then the radius of the circle passing through the points A, O and C is**

(A) 6 cm **(B)** 8 cm **(C)** 10 cm **(D)** 12 cm

Q. 6. **The sides of a triangle are 56 cm, 60 cm, and 52 cm long. Then the area of the triangle is**

(A) 1322 cm^2 **(B)** 1311 cm^2 **(C)** 1344 cm^2 **(D)** 1392 cm^2

Q. 7. **The total surface area of a cone whose radius is $2r$ and slant height $2l$ is**

(A) $4\pi r\,(l + r)$ **(B)** $\pi r\,(l + 4r)$ **(C)** $\pi r\,(l + r)$ **(D)** $2\pi rl$

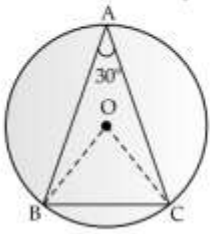
Q. 8. For drawing a frequency polygon of a continuous frequency distribution, we plot the points whose ordinates are the frequencies of the respective classes and abscissae are

(A) upper limits of the classes. (B) lower limits of the classes.
(C) class marks of the classes. (D) upper limits of preceding classes.

Q. 9. A hemispherical bowl has a radius of 7 cm. The volume of water it would contain is

(A) 620 cm^3 (B) 719 cm^3 (C) 725 cm^3 (D) 815 cm^3

Q. 10. In the given figure, O is the centre of a circle and $\angle BAC = 30°$, then $\angle OBC$ is



(A) 60° (B) 45° (C) 40° (D) 70°

Q. 11. Two angles measure $(55° + 3a)$ and $(115° - 2a)$. If each is supplement of the other, then the value of a is

(A) 20° (B) 30° (C) 10° (D) 40°

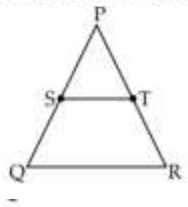
Q. 12. $\sqrt[4]{\sqrt[3]{2^2}}$ equal

(A) $2^{\frac{2}{6}}$ (B) 2^{-6} (C) $2^{\frac{1}{6}}$ (D) 2^6

Q. 13. If $AB = QR$, $BC = PR$ and $CA = PQ$, then

(A) $\Delta ABC \cong \Delta PQR$ (B) $\Delta CBA \cong \Delta PRQ$ (C) $\Delta BAC \cong \Delta RPQ$ (D) $\Delta PQR \cong \Delta BCA$

Q. 14. In the given figure S is the mid-point of PQ and $ST \parallel QR$ then PT is equal to



(A) SQ (B) PS (C) TR (D) QR

Q. 15. A pyramid is a solid figure, the base of which is

(A) only a triangle. (B) only a square. (C) only a rectangle. (D) any polygon.

Q. 16. The point at which two coordinate axes meet is called the ..... .

(A) abscissa (B) ordinate (C) origin (D) quadrant

Q. 17. The factorisation of $4x^2 + 8x + 3$ is

(A) $(x + 1)(x + 3)$ (B) $(2x + 1)(2x + 3)$ (C) $(2x + 2)(2x + 5)$ (D) $(2x - 1)(2x - 3)$

Q. 18. Which of the following is irrational?

(A) 0.14 (B) $0.14\overline{16}$ (C) $0.\overline{1416}$ (D) 0.4014001400014...

Directions : In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

(A) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

Q. 19. **Assertion (A):** If $x - 2$ is a factor of $P(x) = 2x^2 + 3x - k$ then value of $k = 14$.
Reason (R): $(x - a)$ is a factor of polynomial $P(x)$, if $P(a) = 0$.

Q. 20. **Assertion (A):** Sum of the pair of angles is 120° and 60° is supplementary.
Reason (R): Two angles, whose sum is 90° are called supplementary angles.

Section-B

Consists of 5 questions of 2 marks each.

Q. 21. PS is an altitude of an isosceles triangle PQR in which $PQ = PR$. Show that PS bisects $\angle P$.

Q. 22. Simplify : $\left(\frac{81}{16}\right)^{-\frac{3}{4}} \times \left(\frac{25}{9}\right)^{-\frac{3}{2}}$.

Q. 23. Find the value of 'k' if $(x - 1)$ is a factor of $p(x) = 2x^2 + kx + \sqrt{2}$.

Q. 24. $ABCD$ is a cyclic quadrilateral in which $AB \parallel CD$. If $\angle D = 70°$, find all the remaining angles.

OR

$ABCD$ is a cyclic quadrilateral in which AC and BD are its diagonals. If $\angle DBC = 55°$ and $\angle BAC = 45°$, find $\angle BCD$.

Q. 25. Find the radius of a sphere whose surface area is 616 cm^2.

OR

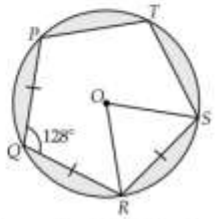
Find the volume of a sphere whose surface area is 154 cm^2.

Section-C

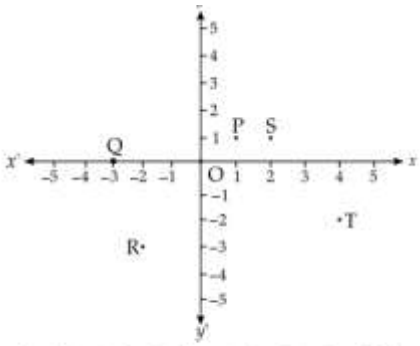
Consists of 6 questions of 3 marks each.

Q. 26. Find the equations of any two lines passing through the point (– 1, 2). How many such lines can be here ?

Q. 27. In the given figure, $PQ = QR = RS$ and $\angle PQR = 128°$. Find $\angle PTQ$, $\angle PTS$ and $\angle ROS$.



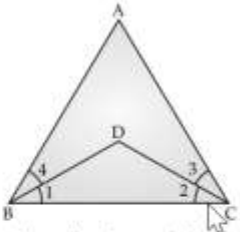
Q. 28. In which quadrant or on which axis does each of the following points lie



Q. 29. In the given figure, if $\angle 1 = \angle 3$, $\angle 2 = \angle 4$ and $\angle 3 = \angle 4$, write the relation between $\angle 1$ and $\angle 2$, using Euclid's axiom.

OR

In the given figure, we have $\angle ABC = \angle ACB$, $\angle 3 = \angle 4$. Show that $\angle 1 = \angle 2$. A I



Q. 30. An umbrella is made by stitching ten triangular pieces of cloth, each measuring 60 cm, 60 cm and 20 cm. Find the area of the cloth required for the umbrella.

Q. 31. If $x^2 + \frac{1}{x^2} = 98$, then find value of $x^3 + \frac{1}{x^3}$.

Section-D

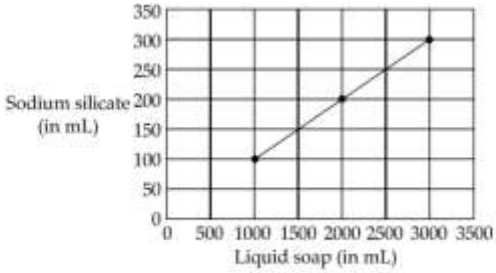
Consists of 4 questions of 5 marks each.

Q. 32. Arrange in descending order $\sqrt[3]{2}, \sqrt[4]{5}, \sqrt[6]{7}$ and $\sqrt[12]{3}$.

OR

Express $0.6 + 0.\overline{7} + 0.4\overline{7}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$. A I

Q. 33. Sodium silicate is one of the constituents in liquid soap. The graph shows the amount of sodium silicate in liquid soap.



(a) How much sodium silicate (mL) is used for making 10 L of soap?

(b) Write an equation to show the relation between quantities of sodium silicate and liquid soap.

Q. 34. A right angled ΔABC with sides 3 cm, 4 cm and 5 cm is revolved about the fixed side of 4 cm. Find the volume of the solid generated. Also, find the total surface area of the solid.

OR

What length of tarpaulin 3 m wide will be required to make conical tent of height 8 m and base radius 6 m ? Assume that the extra length of material that will be required for stitching margins and wastage in cutting is approximately 20 cm (Use $\pi = 3.14$). A I

Q. 35. Draw a histogram to represent the following frequency distribution. A I

Marks	0 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 100
Number of students	7	10	10	20	20	15	8

Section-E

Cased Based Subjective Questions.

Q. 36. A shipment service provider uses three types of containers for shipping materials. The height and width of the three containers are the same. The containers' height is 0.15 m more than their width, and the volume of the smallest container is 652 m³.

Container I Container II Container III

(i) Write a polynomial relating container I's length, breadth and height with its volume. 1

(ii) What is the volume of container III? 2

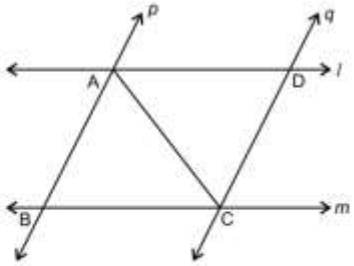
OR

What is the height of each container? 2

(iii) Is the volume of each container same? 1

Q. 37. BSE stands for a disease called Bovine Spongiform Encephalopathy. "Bovine" means that the disease affects cows, "spongiform" refers to the way the brain from a sick cow looks spongy under a microscope, and "encephalopathy" indicates that it is a disease of the brain. This disease is commonly called "mad cow disease."

A farmer has a field ABCD formed by two pair of parallel roads as shown below in which $l \parallel m$ and $p \parallel q$. His four cows suffering from BSE. Thus, he tied them at four corners of the field ABCD.



(i) If $\angle BAC = 30°$, find $\angle CAD$. 1

(ii) If cow at C and cow at D is 2 km apart, then what is the distance between cow at A and cow at B? 2

OR

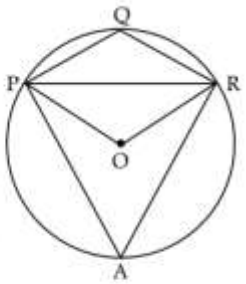
If we join BD such that BD meet AC at O and $\angle BOC = 30°$, then what is the measure of $\angle AOD$? 2

(iii) If $\angle B = 45°$, then $\angle D$ will be? 1

Q. 38. Four Friends Rima, Mohan, Sohan and Sita are sitting on the circumference of a circular park. Their locations are marked by points A, P, Q and R.

Rohit joins them and sits at the centre of the circular park, so he is equidistant from all the other friends. His position is marked as O.

They are sitting in such a way that $\angle PQR = 110°$.



(i) What is measure of reflex $\angle POR$? 1

(ii) What is the measure of $\angle PAR$? 2

OR

Find $\angle OPR$? 2

(iii) Which mathematical concept is used here? 1

THE NANDYAL PUBLIC SCHOOL :: NANDYAL

Series TNPS/02/03 **SET – 3**

ROLL No. **Q.P Code 09/02/03**

Candidates must write the Q.P Code on the title page of the Answer book.

- Please check that this question paper contains 7 printed pages.
- Please check that this question paper contains 38 questions.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please write down the serial number of the question in the answer-book before attempting it.
- 15 minute time has been allotted to read this question paper.
- The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

गणित
MATHEMATICS

निर्धारित समय : 3 घण्टे *अधिकतम अंक : 80*

Time allowed : 3 hours *Maximum Marks : 80*

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper contains **38** questions. **All** questions are **compulsory**.*

(ii) *This question paper is divided into **five** Sections – **A**, **B**, **C**, **D** and **E**.*

(iii) *In **Section A**, Questions no. **1** to **18** are multiple choice questions (MCQs) and questions number **19** and **20** are Assertion-Reason based questions of **1** mark each.*

(iv) *In **Section B**, Questions no. **21** to **25** are very short answer (VSA) type questions, carrying **2** marks each.*

(v) *In **Section C**, Questions no. **26** to **31** are short answer (SA) type questions, carrying **3** marks each.*

(vi) *In **Section D**, Questions no. **32** to **35** are long answer (LA) type questions carrying **5** marks each.*

(vii) *In **Section E**, Questions no. **36** to **38** are case study based questions carrying **4** marks each.*

(viii) *There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 3 questions in Section C, 2 questions in Section D and 2 questions in Section E.*

(ix) *Use of calculators is **not** allowed.*

Section-A

Consists of Multiple Choice Type questions of 1 mark each.

Q. 1. **The decimal expansion of the number $\sqrt{2}$ is**

(A) a finite decimal **(B)** 1.41421

(C) non-terminating recurring **(D)** non-terminating non-recurring

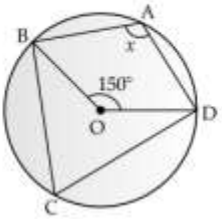
Q. 2. **Which of the following needs a proof?**

(A) Theorem **(B)** Axiom **(C)** Definition **(D)** Postulate

Q. 3. **The diagonals AC and BD of a parallelogram $ABCD$ intersect each other at the point O. If $\angle DAC = 32°$ and $\angle AOB = 70°$, then $\angle DBC$ is equal to**

(A) 24° **(B)** 86° **(C)** 38° **(D)** 32°

Q. 4. **In the given figure, O is the centre of a circle and $\angle BOD = 150°$, then the value of x is**



(A) 105° **(B)** 115° **(C)** 100° **(D)** 110°

Q. 5. **The sides of a triangle are 35 cm, 54 cm and 61 cm, respectively. The length of its longest altitude is**

(A) $16\sqrt{5}$ cm **(B)** $10\sqrt{5}$ cm **(C)** $24\sqrt{5}$ cm **(D)** 28 cm

Q. 6. **The product $\sqrt[3]{2}.\sqrt[4]{2}.\sqrt[12]{32}$ equals**

(A) $\sqrt{2}$ **(B)** 2 **(C)** $\sqrt[12]{2}$ **(D)** $\sqrt[12]{32}$

Q. 7. **Degree of the zero polynomial is**

(A) 0 **(B)** 1 **(C)** any natural number **(D)** not defined

Q. 8. The complementary angle of 65° is.

(A) 65° (B) 25° (C) 75° (D) 35°

Q. 9. In triangles ABC and PQR, $AB = AC$, $\angle C = \angle P$ and $\angle B = \angle Q$. The two triangles are

(A) isosceles but not congruent (B) isosceles and congruent

(C) congruent but not isosceles (D) neither congruent nor isosceles

Q. 10. The volume of a hemisphere is 19404 cm^3. The total surface area of the hemisphere is

(A) 16632 cm^2 (B) 3696 cm^2 (C) 4158 cm^2 (D) 8316 cm^2

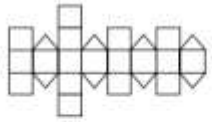
Q. 11. In a histogram, which of the following is proportional to the frequency of the corresponding class?

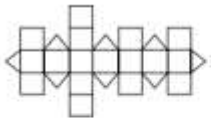
(A) Area of the rectangle (B) Length of the rectangle

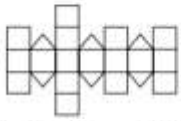
(C) Width of the rectangle (D) Perimeter of the rectangle

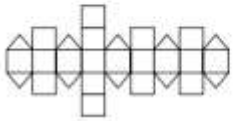
Q. 12. This is the picture of a gas balloon filled with helium gas.

This balloon has 18 faces that are square in shape and 8 equilateral faces that are triangular. Which of the following is the net of the balloon?

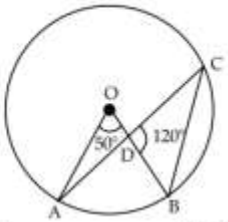
(A) 

(B) 

(C) 

(D) 

Q. 13. In the given figure, O is the centre of a circle, $\angle AOB = 50°$ and $\angle BDC = 120°$, then $\angle OBC$ is



(A) 45° (B) 60° (C) 35° (D) 90°

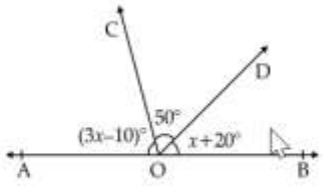
Q. 14. If bisectors of ∠A and ∠B of a quadrilateral ABCD intersect each other at P, of ∠B and ∠C at Q, of ∠C and ∠D at R and of ∠D and ∠A at S, then PQRS is a

(A) rectangle (B) rhombus

(C) parallelogram (D) quadrilateral whose opposite angles are supplementary

Q. 15. In the given figure, AOB is a straight line. If $\angle AOC = (3x - 10)°$, $\angle COD = 50°$ and $\angle BOD = (x + 20)°$ then $\angle AOC$ is.

(A) 40° (B) 60° (C) 80° (D) 50°



Q. 16. **It is known that if $x + y = 10$ then $x + y + z = 10 + z$. The Euclid's axiom that illustrates this statement is**

(A) First Axiom. **(B)** Second Axiom. **(C)** Third Axiom. **(D)** Fourth Axiom.

Q. 17. **Point (0, –7) lies**

(A) on the x–axis **(B)** in the second quadrant

(C) on the y-axis **(D)** in the fourth quadrant

Q. 18. **If (x + 2) is a factor of $g(x) = 3x^2 + x - k$, then value of k will be**

(A) 12 **(B)** 8 **(C)** 10 **(D)** 14

Directions : In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

(A) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

Q. 19. **Assertion (A):** A polynomial may have more than one zero.
Reason (R): Every real number is zero of the zero polynomial.

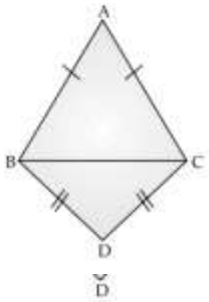
Q. 20. **Assertion (A):** An angle is 14° more than its complementary angle, then angle is 52°.
Reason (R): Two angles are said to be supplementary if their sum is 180°.

Section-B

Consists of 5 questions of 2 marks each.

Q. 21. In the figure, ΔABC and ΔDBC are two isosceles triangles on the same base BC. Prove that $\angle ABD = \angle ACD$.

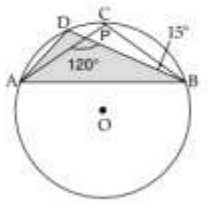
A I



D

Q. 22. In the given figure, O is the centre of the circle and chord AC and BD intersect at P such that $\angle APB = 120°$ and $\angle PBC = 15°$, find the value of $\angle ADB$.

A I



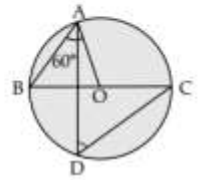
Q. 23. Factorize : $64a^3 - 27b^3 - 144a^2b + 108ab^2$ A I

Q. 24. Find the curved surface area and total surface area of a right circular cone whose slant height is 5 cm and radius is $\frac{7}{2}$ cm .

OR

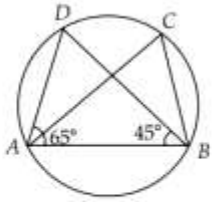
A solid shotput is a metallic sphere of radius 4.9 cm. Find the mass of shotput, if density is 7.8 gm/cm^3.

Q. 25. In the given figure, BC is a diameter of the circle and $\angle BAO = 60°$, then find $\angle ADC$.



OR

In the figure, if $\angle DAB = 65°$, $\angle ABD = 45°$, then find $\angle ACB$.



Section-C

Consists of 6 questions of 3 marks each.

Q. 26. Find the value of a and b if

$$\frac{\sqrt{2}+1}{\sqrt{2}-1} - \frac{\sqrt{2}-1}{\sqrt{2}+1} = a + \sqrt{2}\,b$$ A I

Q. 27. If $f(x) = 3x + 5$, evaluate $f(7) - f(5)$.

Q. 28. Find the percentage increase in the area of a triangle, if its each side is doubled. A I

OR

The sides of a triangular field are 51 m, 37 m and 20 m. Find the number of rose beds that can be prepared in the field if each rose bed occupies a space of 6 sq. m.

Q. 29. Solve the equation $2x + 1 = x - 3$ and represent the solution(s) on

(i) the number line.

(ii) the Cartesian plane. A I

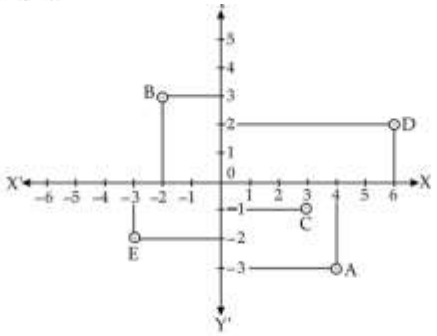
OR

See figure and write the following : A I

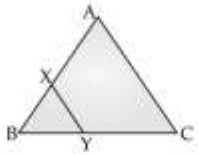
(i) The co-ordinate of B.

(ii) The point identified by the coordinates $(-3, -2)$.

(iii) The abscissa of the point D.



Q. 30. In a triangle ABC, X and Y are the points on AB and BC such that $BX = BY$ and $AB = BC$. Show that $AX = CY$. State the Euclid's Axiom used.



Q. 31. For what value of p; $x = 2$, $y = 3$ is a solution of $(p + 1)x - (2p + 3)y - 1 = 0$ and write the equation. A I

Section-D

Consists of 4 questions of 5 marks each.

Q. 32. The sides of a triangular park are 5 m, 7 m and 8 m respectively. Find the cost of levelling the park at the rate of ₹10 per m^2. (Use $\sqrt{3} = 1.73$)

OR

The water for a industry is stored in a hemispherical tank of internal diameter 14 m. The tank contains 40 kilolitres of water. Water is pumped into the tank to fill it to full capacity. Calculate the volume of water pumped into the tank.

Q. 33. If $a = \frac{\sqrt{5}+\sqrt{2}}{\sqrt{5}-\sqrt{2}}$ and $b = \frac{\sqrt{5}-\sqrt{2}}{\sqrt{5}+\sqrt{2}}$, Find the value of $\frac{a^2+ab+b^2}{a^2-ab+b^2}$. A I

Q. 34. The following table gives the life time of 400 neon lamps :

Life Time (in hours)	Number of Lamps
300 - 400	14
400 - 500	56
500 - 600	60
600 - 700	86
700 - 800	74
800 - 900	62
900 - 1000	48

(i) Represent the given information with help of histogram.

(ii) How many lamps have life time of more than 700 hours ?

OR

Draw a histogram to represent the following grouped frequency.

Age (in yrs)	5-9	10-14	15-19	20-24	25-29	30- 34	35- 39
No. of persons	10	28	32	48	50	35	12

Also draw frequency polygon. A I

Q. 35. Factorize : $x^{12} - y^{12}$. A I

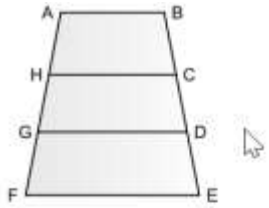
Section-E

Cased Based Subjective Questions.

Read the following passage and answer the following questions:

Q. 36. Father's Day is a celebration of fathers, honouring fatherhood, paternal bonds and the role fathers play in society. On this day, children show acknowledgement and appreciation to their father for their contribution to their own families and society at large.

Rohan wants to show gratitude towards his father by giving him a hand-made card to him. He has pasted three trapezium one above the other as shown below. $AB||HC||GD||FE$. Also, $BC = CD = DE$ and $GF = 6$ cm. He wants to decorate the card by putting up a coloured tape on non-parallel sides of trapezium.



(i) If $\angle A = 140°$ then $\angle F = ?$ 1

(ii) What is the perimeter of trapezium $HCDG$, if $HC = 7$ cm, $BC = 3$ cm and $DG = 8$ cm ? 2

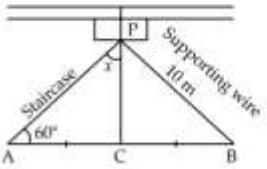
OR

Find the total length of coloured tape used on the non-parallel boundary of the card, if $DE = 4$ cm 2

(iii) When a trapezium can be called a parallelogram? 1

Q. 37. Read the following passage and answer the following questions:

In Rajesh village there was a big pole PC. This pole was tied with a strong wire of 10 m length. Once there was a big spark on this pole, thus wires got damaged very badly. Any small fault was usually repaired with the help of a rope which normal board electricians were carrying on bicycles. This time electricians need a staircase of 10 m, so that it can reach at point P on the pole and this should make 60° with line AC.



(i) In ΔPAC and ΔPBC which side is common? 1

(ii) In figure, ΔPAC and ΔPBC are congruent due to which criterion? 2

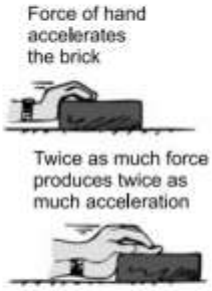
OR

Find the value of $\angle x$? 2

(iii) Find the measure of $\angle PBA$? 1

Q.38. Read the following passage and answer the following questions:

The force applied on a body is directly proportional to the acceleration produced in the body. Assume x be acceleration produced in the body and y be the force. Take constant as 10. (S.I unit of force is Newton and S.I. unit of acceleration is m/sec^2.



(i) Write an equation to express the above situation. 1

(ii) Find acceleration produced in the body, if force applied is 10 newton. 2

OR

Find force applied, if acceleration produced is 2.5 m/sec^2. 2

(iii) Which mathematical concept is used here? 1

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Series TNPS/02/04 **SET – 4**

ROLL No. **Q.P Code 09/02/04**

Candidates must write the Q.P Code on the title page of the Answer book.

- Please check that this question paper contains 7 printed pages.
- Please check that this question paper contains 38 questions.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please write down the serial number of the question in the answer-book before attempting it.
- 15 minute time has been allotted to read this question paper.
- The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

गणित
MATHEMATICS

निर्धारित समय : 3 घण्टे *अधिकतम अंक : 80*

Time allowed : 3 hours *Maximum Marks : 80*

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper contains **38** questions. **All** questions are **compulsory**.*

(ii) *This question paper is divided into **five** Sections – **A**, **B**, **C**, **D** and **E**.*

(iii) *In **Section A**, Questions no. **1** to **18** are multiple choice questions (MCQs) and questions number **19** and **20** are Assertion-Reason based questions of **1** mark each.*

(iv) *In **Section B**, Questions no. **21** to **25** are very short answer (VSA) type questions, carrying **2** marks each.*

(v) *In **Section C**, Questions no. **26** to **31** are short answer (SA) type questions, carrying **3** marks each.*

(vi) *In **Section D**, Questions no. **32** to **35** are long answer (LA) type questions carrying **5** marks each.*

(vii) *In **Section E**, Questions no. **36** to **38** are case study based questions carrying **4** marks each.*

(viii) *There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 3 questions in Section C, 2 questions in Section D and 2 questions in Section E.*

(ix) *Use of calculators is **not** allowed.*

Section-A

Consists of Multiple Choice Type questions of 1 mark each.

Q. 1. **Decimal representation of a rational number cannot be**

(A) terminating **(B)** non-terminating

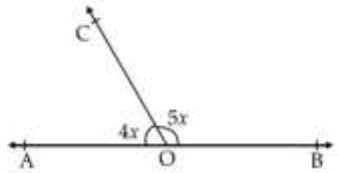
(C) non-terminating / repeating **(D)** non-terminating / non-repeating

Q. 2. **The basic facts which are taken for granted, without proof and which are specific to geometry are called**

(A) Axiom **(B)** Postulates **(C)** Theorem **(D)** Definition

Q. 3. **In the given figure, AOB is a straight line. If $\angle AOC = 4x$ and $\angle BOC = 5x$ then $\angle AOC$ is.**

(A) 40° **(B)** 60° **(C)** 80° **(D)** 100°



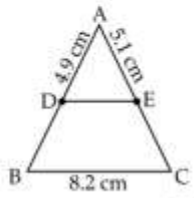
Q. 4. **In triangles ABC and DEF, $AB = FD$ and $\angle A = \angle D$. The two triangles will be congruent by SAS axiom if**

(A) $BC = EF$ **(B)** $AC = DE$ **(C)** $AC = EF$ **(D)** $BC = DE$

Q. 5. **If $p(x) = x^2 - 2\sqrt{2}x + 1$, then $p(2\sqrt{2})$ is equal to**

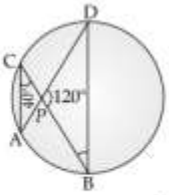
(A) 0 **(B)** 1 **(C)** $4\sqrt{2}$ **(D)** $8\sqrt{2}+1$

Q. 6. **In fig. D and E are the mid-points of AB and AC respectively. The length of DE is**



(A) 8.2 cm **(B)** 4.1 cm **(C)** 4.9 cm **(D)** 5.1 cm

Q. 7. In the given figure, $\angle ACP = 40°$ and $\angle BPD = 120°$, then $\angle CBD$ is



(A) 40° (B) 120° (C) 60° (D) 20°

Q. 8. Value of $\sqrt[4]{81^{-2}}$ is

(A) $\frac{1}{9}$ (B) $\frac{1}{3}$ (C) 9 (D) $\frac{1}{81}$

Q. 9. Any solution of the linear equation : $2x + 0y + 9 = 0$ in two variables is of the form

(A) $\left(-\frac{9}{2}, m\right)$ (B) $\left(n, \frac{9}{2}\right)$ (C) $\left(0, \frac{9}{2}\right)$ (D) $(-9, 0)$

Q. 10. If perimeter of an equilateral triangle is 60 m, then area of this triangle is

(A) $10\sqrt{3}$ m^2 (B) $15\sqrt{3}$ m^2 (C) $20\sqrt{3}$ m^2 (D) $100\sqrt{3}$ m^2

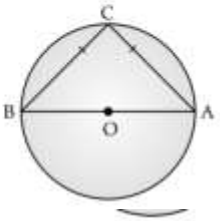
Q. 11. The surface areas of two spheres are in the ratio 16 : 9. The ratio of their volumes is

(A) 4 : 3 (B) 64 : 27 (C) 16 : 9 (D) $16^3 : 9^3$

Q. 12. A triangle having sides equal to 7 cm, 24 cm and 25 cm forms a cone when revolved about 24 cm side. What is the volume of a cone formed?

(A) 1225 cm^3 (B) 1232 cm^3 (C) 4000 cm^3 (D) 3696 cm^3

Q. 13. In the given figure, if AOB is a diameter of the circle and $AC = BC$, then $\angle CAB$ is equal to



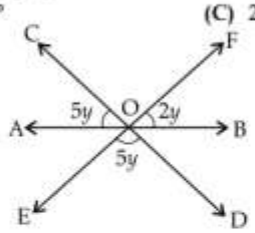
(A) 30° (B) 60° (C) 90° (D) 45°

Q. 14. In ΔABC, $BC = AB$ and $\angle B = 80°$. Then $\angle A$ is equal to

(A) 80° (B) 40° (C) 50° (D) 100°

Q. 15. In the figure given below, the value of y is.

(A) 15° (B) 12° (C) 25° (D) 55°



Q. 16. Signs of the abscissa and ordinate of a point in the second quadrant respectively are

(A) +, + (B) −, − (C) −, + (D) +, −

Q. 17. Which of the following is a factor of $(x + y)^3 - (x^3 + y^3)$?

(A) $x^2 + y^2 + 2xy$ (B) $x^2 + y^2 - xy$ (C) xy^2 (D) $3xy$

Q. 18. The product of any two irrational numbers is

(A) always an irrational number (B) always a rational number
(C) always an integer (D) sometimes rational, sometimes irrational

Directions : In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

(A) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

Q. 19. **Assertion (A):** Value of $\sqrt{5+2\sqrt{6}}$ is an irrational number.

Reason (R): Product of a rational number and an irrational number is irrational, when rational number is not equal to 0.

Q. 20. **Assertion (A):** $(3x + 4y)^3 = 27x^3 + 64y^3 + 36xy(3x + 4y)$

Reason (R): $(x + y)^3 = x^3 + y^3 + 3xy(x + y)$

Section-B

Consists of 5 questions of 2 marks each.

Q. 21. Classify the following as linear, quadratic and cubic polynomials :

(a) $x^2 + x$ (b) $x - x^3$ (c) $1 + x$ (d) $7x^3$

Q. 22. If the point $(2k - 3, k + 2)$ lies on the graph of the equation $2x + 3y + 15 = 0$, find value of k. A I

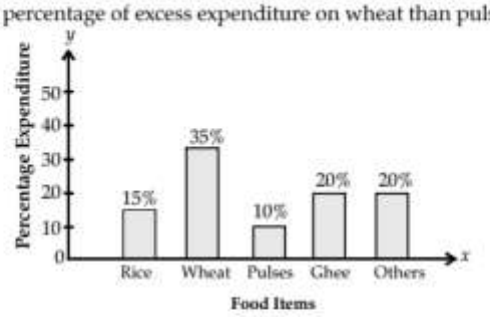
Q. 23. Simplify : $\left[5\left[8^{\frac{1}{3}} + 27^{\frac{1}{3}}\right]^3\right]^{\frac{1}{4}}$. A I

Q. 24. ABC is an isosceles triangle with $AB = AC$. Draw $AP \perp BC$. Show that $\angle B = \angle C$.

OR

PS is an altitude of an isosceles triangle PQR in which $PQ = PR$. Show that PS bisects $\angle P$.

Q. 25. Read the bar graph. Find the percentage of excess expenditure on wheat than pulses and ghee taken together.



OR

The class marks of a distribution are 37, 42, 47, 52, 57. Determine the class size and the class limits of one last class mark.

Section-C

Consists of 6 questions of 3 marks each.

Q. 26. Prove that every line segment has one and only one mid-point. A I

Q. 27. Using a suitable identity, find $(98)^3$. A I

Q. 28. Two coins were tossed 20 times simultaneously. Each time the number of "Heads" occurring was noted down as follows :

0, 1, 1, 2, 0, 1, 2, 0, 0, 1, 2, 2, 0, 2, 1, 0, 1, 1, 0, 2.

Prepare a frequency distribution table for the data.

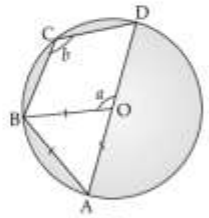
OR

A family with a monthly income of ₹ 20,000 had planned the following expenditure per month under various heads.

Heads	Expenditure (in thousands rupees)
Grocery	04
Rent	05
Education	05
Medicine	02
Fuel	02
Entertainment	01
Miscellaneous	01

Draw a bar graph for the data above.

Q. 29. In the given figure, AB is a chord equal to the radius of the given circle with centre O. Find the values of a and b.



OR

If a line is drawn parallel to the base of an isosceles triangle to intersect its equal sides, prove that the quadrilateral so formed is cyclic.

Q. 30. For what value of k, the linear equation $2x + ky = 8$ has $x = 2$ and $y = 1$ as its solution ?
If $x = 4$, then find the value of y.

Q. 31. In which quadrant or on which axis do the points $(-2, -4)$, $(2, 4)$, $(0, -2)$ and $(4, -6)$ lie ? A I

Section-D

Consists of 4 questions of 5 marks each.

Q. 32. A student Amit of class IX is unable to write in his examination, due to fracture in his arm. Akhil a student of class VI writes for him. The sum of their ages is 25 years. A I

(i) Write a linear equation for the above situation.
(ii) Find the age of Akhil, when age of Amit is 14 years.

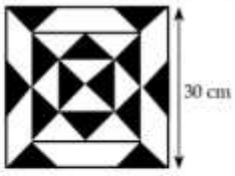
OR

Fahrenheit (F) and Celsius (C) are two different units of temperature and the relation between them is given by $C = \frac{5}{9}(F - 32)$. At what temperature both units read the same, also find temperature °C, which is equal to 30 °F. A I

Q. 33. Two sides AB and BC and median AM of one triangle ΔABC are respectively equal to sides PQ and QR and median PN of ΔPQR. Show that A I

(i) $\Delta ABM \cong \Delta PQN$ (ii) $\Delta ABC \cong \Delta PQR$

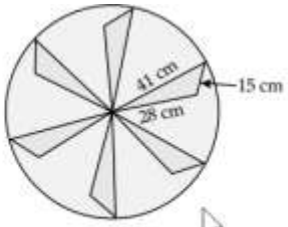
Q. 34. The design on a title is made of isosceles triangles. The side lengths of the triangles are 6 cm, 6 cm and 8 cm.



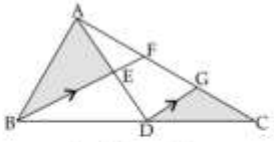
How much area of the title is black?

OR

Two identical circles with same inside design as shown in the figure are to be made at the entrance. The identical triangular leaves are to be painted red and the remaining are to be painted green. Find the total area to be painted red. A I



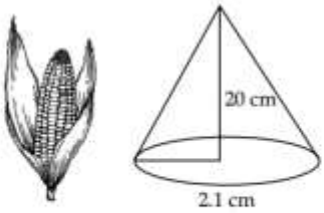
Q. 35. In given fig., AD is the median of ΔABC. E is the mid-point of AD. $DG \parallel BF$. Prove that $AC = 3AF$.



Section-E

Cased Based Subjective Questions.

Q. 36. A farmer Rajesh grows a corn cob in his farm. Corn cob contains valuable Vitamin B, Antioxidants, Carotenoids, Lutein and Zeaxanthin which are useful for body growth.



A corn cob (above figure). Shaped some what likes a cone, has the radius of its broadest end as 2.1 cm and length as 20 cm.
Then, answer the following questions.

(i) Write the formula to find the curved surface area of cone? **1**

(ii) Slant height of the conical corn cob will be? **2**

OR

Curved surface area of the corn cob in cm^2 is? **2**

(iii) Find the volume of corn cob? **1**

Q. 37. Read the following passage and answer the following questions:

In a classroom activity on real numbers, the students have to give answers of some questions framed by their teacher on basis of number cards picked up by first 3 roll numbers.

(i) Reena picked up $\sqrt{7}$ and question asked by teacher was, whether $\sqrt{7}$ is rational or irrational number. **1**

(ii) Saumya picked third card on which $\frac{1}{\sqrt{45}}$ was written. Now teacher asked students to write the rationalizing factor of $\frac{1}{\sqrt{45}}$. **2**

OR

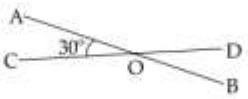
Rajiv picked up card on which it is written $\sqrt{15} - \sqrt{10}$ and again teacher asked whether it is rational or irrational. **2**

(iii) Which mathematical concept is used here? **1**

Q. 38. Harry was going on a road trip with his father. They were travelling on a straight road. After riding for some distance, they reach a cross road where one straight road cuts the other at 30°.
Now using the given information, answer the following questions.

(i) Find the measure of $\angle BOD$. **1**

(ii) Which property is used in this case. **2**



OR

Find the measure of $\angle AOD$ **2**

(iii) Is $\angle BOC$ equal to $\angle AOD$. If yes give reason to support your answer? **1**

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Series TNPS/02/05 **SET – 5**

ROLL No. **Q.P Code 09/02/05**

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- Please check that this question paper contains 38 questions.
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गणित
MATHEMATICS

निर्धारित समय : 3 घण्टे *अधिकतम अंक : 80*

Time allowed : 3 hours *Maximum Marks : 80*

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper contains **38** questions. **All** questions are **compulsory**.*

(ii) *This question paper is divided into **five** Sections – **A**, **B**, **C**, **D** and **E**.*

(iii) *In **Section A**, Questions no. **1** to **18** are multiple choice questions (MCQs) and questions number **19** and **20** are Assertion-Reason based questions of **1** mark each.*

(iv) *In **Section B**, Questions no. **21** to **25** are very short answer (VSA) type questions, carrying **2** marks each.*

(v) *In **Section C**, Questions no. **26** to **31** are short answer (SA) type questions, carrying **3** marks each.*

(vi) *In **Section D**, Questions no. **32** to **35** are long answer (LA) type questions carrying **5** marks each.*

(vii) *In **Section E**, Questions no. **36** to **38** are case study based questions carrying **4** marks each.*

(viii) *There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 3 questions in Section C, 2 questions in Section D and 2 questions in Section E.*

(ix) *Use of calculators is **not** allowed.*

Section-A

Consists of Multiple Choice Type questions of 1 mark each.

Q. 1. **Every rational number is**

(A) a natural number **(B)** an integer **(C)** a real number **(D)** a whole number

Q. 2. **The equation $2x + 5y = 7$ has a unique solution, if x, y are**

(A) natural numbers **(B)** positive real numbers **(C)** real numbers **(D)** rational numbers

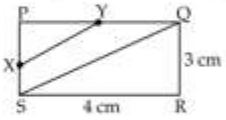
Q. 3. **'Lines are parallel if they do not intersect' is stated in the form**

(A) an axiom. **(B)** a definition. **(C)** a postulate. **(D)** a proof.

Q. 4. **In ΔABC, $AB = AC$ and $\angle B = 50°$. Then $\angle C$ is equal to**

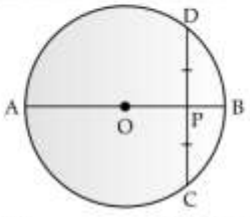
(A) 40° **(B)** 50° **(C)** 80° **(D)** 130°

Q. 5. **In fig. PQRS is a rectangle X and Y are mid-points of PS and PQ respectively. The length of XY is**



(A) 4 cm **(B)** 5 cm **(C)** 2.5 cm **(D)** 2 cm

Q. 6. **In the given figure, O is the centre of a circle and diameter AB bisects the chord CD at a point P such that $CP = PD = 10$ cm and $PB = 6$ cm, then the radius of the circle is**



(A) 12.3 cm **(B)** 11.3 cm **(C)** 13 cm **(D)** 10.3 cm

Q. 7. An isosceles right triangle has area 8 cm^2. The length of its hypotenuse is

(A) $\sqrt{32}$ cm (B) $\sqrt{16}$ cm (C) $\sqrt{48}$ cm (D) $\sqrt{24}$ cm

Q. 8. The radius of a hemispherical balloon increases from 6 cm to 12 cm as air is being pumped into it. The ratios of the surface areas of the balloon in the two cases is

(A) 1 : 4 (B) 1 : 3 (C) 2 : 3 (D) 2 : 1

Q. 9. This is the picture of an ice-cream cone.

The radius of the cone is 4 cm and the height is 15 cm.
An ice-cream seller keeps $1/4^{th}$ of it empty.
What is the volume (in cm^3) of the empty part of the cone?

(A) 12π (B) 15π (C) 19π (D) 20π

Q. 10. An exterior angle of a triangle is 105° and its two interior opposite angles are equal. Each of these equal angles is

(A) $37\frac{1}{2}°$ (B) $52\frac{1}{2}°$ (C) $72\frac{1}{2}°$ (D) 75°

Q. 11. AD is a diameter of a circle and AB is a chord. If AD = 34 cm, AB = 30 cm, the distance of AB from the centre of the circle is

(A) 17 cm (B) 15 cm (C) 4 cm (D) 8 cm

Q. 12. One of the factors of $(25x^2 - 1) + (1 + 5x)^2$ is

(A) $5 + x$ (B) $5 - x$ (C) $5x - 1$ (D) $10x$

Q. 13. It is given that $\Delta ABC \cong \Delta FDE$ and AB = 5 cm, $\angle B = 40°$ and $\angle A = 80°$. Then which of the following is true?

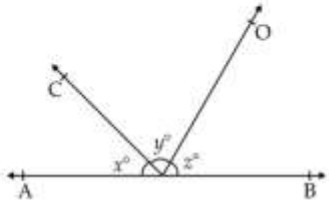
(A) DF = 5 cm, $\angle F = 60°$ (B) DF = 5 cm, $\angle E = 60°$
(C) DE = 5 cm, $\angle E = 60°$ (D) DE = 5 cm, $\angle D = 40°$

Q. 14. Value of $256^{0.16} \times 256^{0.09}$ is

(A) 4 (B) 16 (C) 64 (D) 256.25

Q. 15. In the adjoining figure, AOB is a straight line. If $x : y : z = 4 : 5 : 6$, then y = ?

(A) 60° (B) 80° (C) 48° (D) 72°



Q. 16. Point (–3, 5) lies in the

(A) first quadrant (B) second quadrant (C) third quadrant (D) fourth quadrant

Q. 17. If $\frac{x}{y} + \frac{y}{x} = -1 \quad (x, y \neq 0)$, then value of $x^3 - y^3$ is

(A) 1 (B) −1 (C) 0 (D) $\frac{1}{2}$

Q. 18. A rational number between $\sqrt{2}$ and $\sqrt{3}$ is

(A) $\frac{\sqrt{2}+\sqrt{3}}{2}$ (B) $\frac{\sqrt{2}-\sqrt{3}}{2}$ (C) 1.5 (D) 1.8

Directions : In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

(A) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

Q. 19. **Assertion (A):** e is an irrational number.
Reason (R): π is an irrational number.

Q. 20. **Assertion (A):** Degree of the polynomial $4x^4 + 0x^3 + 0x^5 + 5x + 7$ is 4.
Reason (R): The highest power of the variable is 4, so the degree of polynomial is 4.

Section-B

Consists of 5 questions of 2 marks each.

Q. 21. In the figure below, the diagonal AC of quadrilateral $ABCD$ bisects $\angle BAD$ and $\angle BCD$. Prove that $BC = CD$.

Q. 22. If $y = 2$ and $y = 0$ are the zeroes of the polynomial $f(y) = 2y^3 - 5y^2 + ay + b$, find the value of a and b. A I

Q. 23. The relative humidity (in %) of a certain city of month of 30 days was as follows :

98	98	99	90	86	95	92	96	94	95
89	92	97	93	92	95	97	93	95	97
96	92	84	90	95	98	97	96	92	89

Construct a grouped frequency distribution table with classes 84-88, 88-92 etc.

Q. 24. Show that : $\frac{x^{a(b-c)}}{x^{b(a-c)}} \div \left[\frac{\left(x^b\right)}{\left(x^a\right)}\right]^{c} = 1.$ A I

OR

Find the value of $(1^3 + 2^3 + 3^3)^{-3/2}$.

Q. 25. If the area of an equilateral triangle is $81\sqrt{3}$ cm^2. Find its perimeter.

OR

If the sides of a triangle are 26 cm, 28 cm and 30 cm. Find the area of triangle. A I

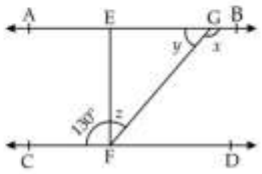
Section-C

Consists of 6 questions of 3 marks each.

Q. 26. In the co-ordinate plane, draw a square of side 3 units, taking origin as one vertex. Also, write the co-ordinates of its vertices.

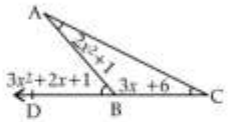
Q. 27. Express y in terms of x from the equation $3x + 2y = 8$ and check whether the point $(4, -2)$ lies on the line.

Q. 28. In the figure $AB \parallel CD$, $EF \perp CD$ and $\angle GFC = 130°$. Find x, y and z.

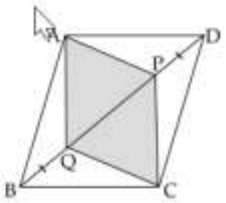


OR

In the figure given below, $\angle ABD$ is an exterior angle of $\angle ABC$. Find $\angle ABC$.



Q. 29. In the given parallelogram $ABCD$, two points P and Q are taken on the diagonal BD such that $DP = BQ$. Show that :



(i) $\Delta APD \cong \Delta CQB$

(ii) $\Delta AQB \cong \Delta CPD$

(iii) $APCQ$ is a parallelogram

OR

PQRS is a parallelogram and PL and RM are perpendiculars drawn from the vertices P and R of the parallelogram on diagonal SQ. Show that

(i) $\Delta PQL \cong \Delta RMS$ **(ii)** $PL = RM$

Q. 30. Consider two 'postulates' given below :

(i) Given any two distinct points A and B, there exists a third point C which is in between A and B.

(ii) There exist at least three points that are not on the same line.

Do these postulates contain any undefined term ? Are these postulates consistent ?

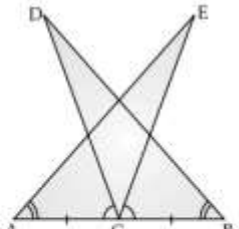
Do they follow with Euclid's postulates ? Explain.

Q. 31. ABCD is a square. Co-ordinates of A and C are (–1, –1) and (1, 1) respectively. Write the coordinates of B and D. Also write the equations of all the sides of square.

Section-D

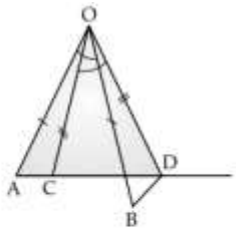
Consists of 4 questions of 5 marks each.

Q. 32. In the given figure, if $AC = BC$, $\angle DCA = \angle ECB$ and $\angle DBC = \angle EAC$, then prove that $BD = AE$.



OR

In the figure, $OA = OB$, $OC = OD$ and $\angle AOB = \angle COD$. Prove that $AC = BD$.



A I

Q. 33. Find the value of the polynomial $x^2 - 3x + 6$ at

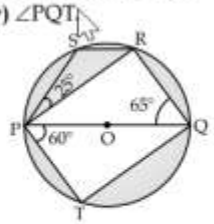
(i) $x = \sqrt{2}$, **(ii)** $x = 3$.

Q. 34. A circular park of radius 20 m is situated in a village. Three girls Rita, Sita and Gita are sitting at equal distance on its boundary each having a toy telephone in their hands to talk to each other. Find the length of the string of each phone. (There is no slack in the string).

OR

In the given figure, PQ is the diameter of the circle. If $\angle PQR = 65°$, $\angle QPT = 60°$, then find the measure of :

(i) $\angle$QPR **(ii)** $\angle$PRS **(iii)** $\angle$PSR **(iv)** $\angle$PQT



Q. 35. A triangular park has sides 60 m, 40 m and 26 m. Gardener has to put a fence all around its boundary and also plant grass inside.

Find the area in which grass will be planted. Also calculate the cost of fencing it with barbed wire at the rate of ₹ 30 per meter, leaving a spare 2 m wide for a gate on one side.

Section-E

Cased Based Subjective Questions.

Q. 36. Decimal form of rational numbers can be classified into two types. Let x be a rational number whose decimal expansion terminates.

Then x can be expressed in the form $\frac{p}{q}$ where p and q are co-prime and the prime factorisation of q is of the form 2^n5^m, where n and m are non-negative and vice-versa. Let $x = \frac{p}{q}$ be a rational number, such that the prime factorisation of q is not of the form 2^n5^m where n and m are non-negative integers, Then x has a non-terminating repeating decimal expansion.

(i) Solve: $\frac{29}{5^2 \times 2^3}$ **1**

(ii) Express $\frac{49}{100}$ in decimal form and say what kind of decimal expansion each has? **2**

OR

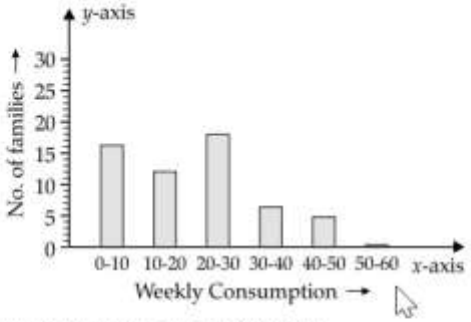
Express $\frac{2}{15}$ in decimal form and say what kind of decimal expansion each has? **2**

(iii) What will be the decimal expansion of $\frac{441}{2^2 \times 5^7 \times 7^2}$ is. **1**

Q. 37. Electricity energy consumption is the form of energy consumption that uses electric energy. Global electricity consumption continues to increase faster than world population, leading to an increase in the average amount of electricity consumed per person (per capita electricity consumption).

S

A survey is conducted for 56 families of a colony A. The following bar graph gives the weekly consumption of electricity of these families.



(i) How many families weekly consumption is 50-60 units? **1**

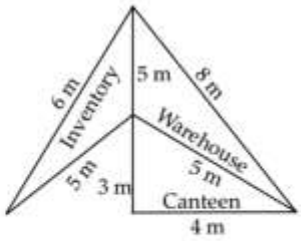
(ii) What is the difference in the number of families which consumes (30-40) and (40-50) units? **2**

OR

Tell whether families which consume (30-40) and (40-50) units are increasing or decreasing? **2**

(iii) What is the weekly consumption of maximum number of families? **1**

Q. 38. Ajay bought some land for carrying out his wholesale business as shown in the figure below. He plans to divide this land into 3 parts for warehouse, inventory and canteen. Now using the given information, answer the following questions.



(i) Find the area of inventory? **1**

(ii) Find the area of the canteen? **2**
Find the area of warehouse? **2**

(iii) Find cost of whole land at the rate of ₹ 500 per m^2? **1**

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Series TNPS/02/06

SET – 6

ROLL No.

Q.P Code 09/02/06

Candidates must write the Q.P Code on the title page of the Answer book.

- Please check that this question paper contains 7 printed pages.
- Please check that this question paper contains 38 questions.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please write down the serial number of the question in the answer-book before attempting it.
- 15 minute time has been allotted to read this question paper.
- The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

गणित
MATHEMATICS

निर्धारित समय : 3 घण्टे | *अधिकतम अंक : 80*

Time allowed : 3 hours | *Maximum Marks : 80*

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper contains **38** questions. **All** questions are **compulsory**.*

(ii) *This question paper is divided into **five** Sections – **A**, **B**, **C**, **D** and **E**.*

(iii) *In **Section A**, Questions no. **1** to **18** are multiple choice questions (MCQs) and questions number **19** and **20** are Assertion-Reason based questions of **1** mark each.*

(iv) *In **Section B**, Questions no. **21** to **25** are very short answer (VSA) type questions, carrying **2** marks each.*

(v) *In **Section C**, Questions no. **26** to **31** are short answer (SA) type questions, carrying **3** marks each.*

(vi) *In **Section D**, Questions no. **32** to **35** are long answer (LA) type questions carrying **5** marks each.*

(vii) *In **Section E**, Questions no. **36** to **38** are case study based questions carrying **4** marks each.*

(viii) *There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 3 questions in Section C, 2 questions in Section D and 2 questions in Section E.*

(ix) *Use of calculators is **not** allowed.*

Section-A

Consists of Multiple Choice Type questions of 1 mark each.

1. **What is the common factor of $x^3 - x^2$ and $-22x^2 + 142x - 120$?**

(A) x **(B)** $(x-1)$ **(C)** x^2 **(D)** 1

2. **Highways 20A and 56C run parallel to each other for 20 km in a state.**

Which of the following statements is most likely to be true regarding them?

(A) Both highways are of the same length.

(B) There can be no link road between them.

(C) The highways make an angle 90° with each other.

(D) The distance between the two highways remains almost the same in the state.

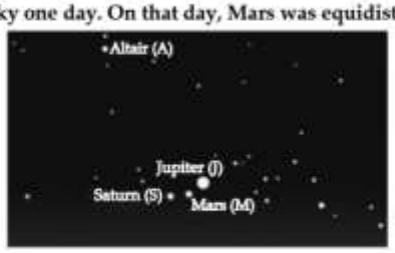
3. **The equation of a line is $ax + by + c = 0$.**

What conditions ensure that the distance of the line from an axis is constant?

(A) $c = 0$ and $a, b \neq 0$ **(B)** $c < 0$ and $a, b \neq 0$ **(C)** $c, b \neq 0$ and $a = 1$ **(D)** $c, b \neq 0$ and $a = 0$

4. **Atul likes to observe the stars with his telescope. He likes to track the movements of stars in the sky.**

He took a picture of the night sky one day. On that day, Mars was equidistant from Saturn and Jupiter.



He draws a circle such that the dots showing the planets Mars (M), Jupiter (J), Saturn (S) and a star Altair (A) lies on the boundary of a circle and $\angle SMJ = 150°$.

What is the measure of $\angle SAJ$?

(A) 30° (B) 45° (C) 150° (D) 210°

5. Histogram graphically represent the grouped frequency distribution with

(A) Upper limits of the classes (B) Continuous classes

(C) Discontinuous classes (D) Maximum frequency

6. $2\sqrt{3} + \sqrt{3}$ is equal to

(A) $2\sqrt{6}$ (B) 6

(C) $3\sqrt{3}$ (D) $4\sqrt{6}$

7. The linear equation $3x - 4y = 9$ has

(A) a unique solution (B) two solutions

(C) infinitely many solution (D) no solution

8. The control room receives a message about trespassers located at (–9, –8). The trespassers were seen moving towards Road X on foot. The ranger immediately dispatches a team of guards in a jeep towards them. The guards encounter the trespassers before crossing Road X.

Which of the following is most likely to be the location of the encounter?

(A) (–9, –14) (B) (–9, –5) (C) (–9, 4) (D) (9, 5)

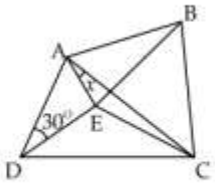
9. Which will be the reflection of the points (–3, –2) in y-axis.

(A) (3, –2) (B) (–3, 2) (C) (3, 2) (D) (2, 3)

10. The equation $x = 5$, in two variables can be written as

(A) $1.x + 1.y = 5$ (B) $1.x + 0.y = 5$ (C) $0.x + 1.y = 5$ (D) $0.x + 0.y = 5$

11. In the quadrilateral $ABCD$ given below, $\angle DAC = 90°$ and $AB = AC = AD = DE = EB$.



What is the value of $\angle ABE$?

(A) 20° (B) 30° (C) 45° (D) 60°

12. In an equilateral triangle ABC, D and E are the mid-points of sides AB and AC respectively, then length of DE is

(A) $\frac{1}{2}$ BC (B) $\frac{1}{2}$ AB (C) $\frac{1}{2}$ AC (D) $\frac{2}{3}$ BC

13. ΔABC is an isosceles right angled triangle in which $\angle A = 90°$. The value of $\angle B$ is

(A) 65° (B) 45° (C) 90° (D) 75°

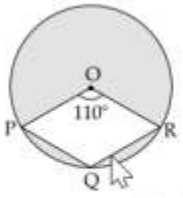
14. Value of an angle which is five times its complement is

(A) 85° (B) 55° (C) 75° (D) 65°

15. After rationalizing the denominator of $\frac{7}{3\sqrt{3}-2\sqrt{2}}$, we get the denominator as

(A) 13 (B) 19 (C) 5 (D) 35

16. In the given figure, if $\angle POR$ is 110°, then find the value of $\angle PQR$.



(A) 125° (B) 135° (C) 105° (D) 115°

17. A circle divides the plane, on which it lies, in _____ parts.

(A) 1 (B) 2 (C) 3 (D) 4

18. **What will be the curved surface area of a hemisphere whose diameter is 14 cm?** A1

(A) 308 cm² **(B)** 544 cm² **(C)** 208 cm² **(D)** 754 cm²

Directions : In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

(A) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

19. **Assertion (A):** Three rational numbers between $\frac{2}{5}$ and $\frac{3}{5}$ are $\frac{9}{20}$, $\frac{10}{20}$ and $\frac{11}{20}$.

Reason (R): A rational number between two rational numbers p and q is $\frac{1}{2}(p+q)$.

20. **Assertion (A):** $x+2y-\frac{2}{9}=0$ is a linear equation.

Reason (R): A linear equation in two variables is of the form $ax + by + c = 0$

Section-B

Consists of 5 questions of 2 marks each.

21. Ravi planted a Red maple tree sapling. The height of the sapling is 0.25 m. The average growth rate of the height of a Red maple tree is 0.27 m per year.

The average lite of a Red maple tree is 80-100 years. Ravi estimated that his tree will grow up to 27 m.

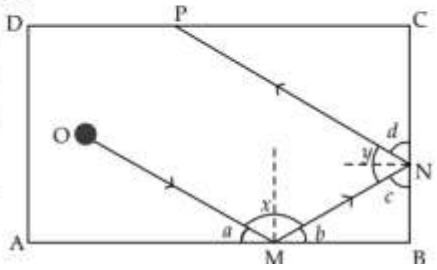
What is the likely reason behind his estimation?

22. Find distances of points C (–3, –2) and D (5, 2) from X-axis and Y-axis.

23. The game of billiards is played with balls placed on a rectangular table. One ball is struck with the end of a stick, called a cue. The ball bounces into other balls and reflects off the sides of the table. In a real game, the ball may spin, but for mathematical purposes, it is considered that the ball travels in a straight line with the same reflection and incidence angles.

On a billiard table $ABCD$, the ball placed at O is struck with the cue.

Why is the line OM parallel to PN?



24. Rita says, 'For two triangles to be congruent, any three parameters of the six (3 sides and 3 angles) should be equal.'

Give examples in favour of and against her statement.

OR

'Two triangles with a pair of equal angles are congruent.'

Why is it necessary to have the side between the two angles be of the same length for both the triangles?

25. Find the value of k, if $x = 2$, $y = 1$ is a solution of the equation $2x + 3y = k$.

OR

Find two different solutions of the equation $3x + y = 19$.

Section-C

Consists of 6 questions of 3 marks each.

26. A number line consists of an infinite number of points. Points on it are associated with a rational number.

Khushi says – 'A point on the number line can represent different forms of a rational number.

Akash says – 'I think each point represents a unique rational number.

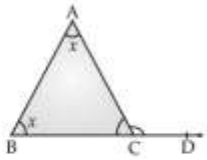
Who is correct? Given an example to support your argument.

27. The area of a triangle is equal to the area of a rectangle.

The area of the rectangle is equal to the area of a parallelogram.

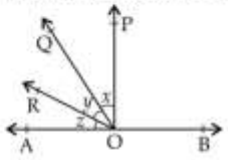
What is the relation between the area of the triangle and the area of the parallelogram?

28. In the fig. given below, an exterior angle of a triangle is 130° and the two interior opposite angles are equal. Find each angle of the triangle.



OR

In given figure $PO \perp AB$, if $x : y : z = 1 : 3 : 5$, then find the degree measure of x, y and z.



29. Factorize : $x^3 - 3x^2 - 9x - 5$.

OR

Factorize : $2y^3 + y^2 - 2y - 1$.

30. What is the area of a triangle with side lengths 20 cm, 20 cm and 8 cm?

31. Simplify: $(2a + 3b)^3 - (2a - 3b)^3$.

Section-D

Consists of 4 questions of 5 marks each.

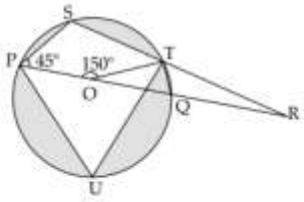
32. If $f(x) = x^3 - 5x + 7$, evaluate $f(2) - f(-1) + f\left(\frac{1}{3}\right)$.

OR

If $f(x) = x^4 - 4x^3 + 3x^2 - 2x + 1$, then check whether $f(0) \times f(-1) = f(2)$ is true or not. A I

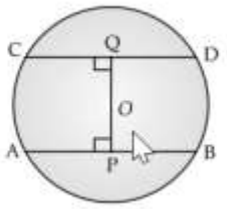
33. The blood groups of 30 students of class IX are recorded as follows :
A, B, O, O, AB, O, A, O, B, A, O, B, A, O, O,
A, AB, O, A, A, O, O, AB, B, A, O, B, A, B, O.
(i) Represent this data in the form of a frequency distribution table.
(ii) Which is the most common and which is the rarest blood group among these students ?

34. In the given figure $\angle SPQ = 45°$, $\angle POT = 150°$ and O is the centre of circle. Find the measures of $\angle RQT$, $\angle RTQ$ and $\angle PUT$. A I



OR

In the given figure, AB and CD are two parallel chords of a circle with centre O and radius 5 cm such that $AB = 8$ cm and $CD = 6$ cm. If OP is perpendicular to AB and OQ is perpendicular to CD, determine the length of PQ.



35. A right triangle ABC with sides 5 cm, 12 cm and 13 cm is revolved about the side 5 cm. Find the volume of the solid so obtained. If, it is revolved about the side 12 cm, what would be the ratio of volumes of two solids obtained in two cases ? A I

Section-E

Cased Based Subjective Questions.

36. Read the following passage and answer any four questions.

Democracy has given people a powerful right to VOTE. In India, every citizen over 18 years of age has the right to vote. Instead of enjoying it as a holiday, one must vote if he/she truly wants to contribute to the nation-building process and bring about a change.

A survey was done in a small area in which $\sqrt{9+2x}-\sqrt{2x}$ voters were men and $\frac{5}{\sqrt{9+2x}}$ voters were women.

(i) Find x, if number of men is equal to number of women. **2**

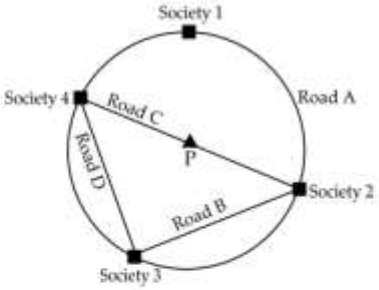
(ii) Find value of $\frac{7^{\frac{1}{5}}}{7^{\frac{1}{3}}} = 1$

OR

If r is rational and s is irrational, then what will be the result of their sum, difference, multiplication and division. **2**

(iii) Which mathematical concept is used here? **1**

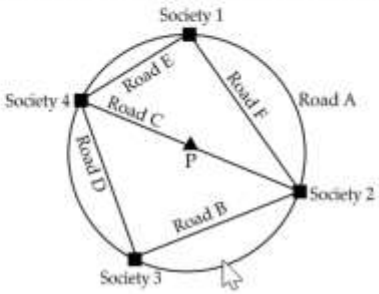
37. Given below is the map giving the position of four housing societies in a township connected by a circular road A.



Society 2 and 3 are connected by straight Road B, Society 4 and 2 are connected by straight Road C and Society 4 and 3 are connected by Road D. Point P denotes the position of a park. The park is equidistant to all four societies.

Rubina claims that it is not possible to construct another circular road connecting all four societies.

Two new roads, Road E and Road F were constructed between Society 4 and 1 and Society 1 and 2.



(i) What is the position of the park P with respect to Road A? 1

(ii) What would be the measure of the sum of angles formed by the straight roads at society 1 and society 3? 2

OR

Priya said, "Minor arc corresponding to Road B is congruent to minor arc corresponding to Road D."

Do you agree with Priya? Give reason to support your answer. 2

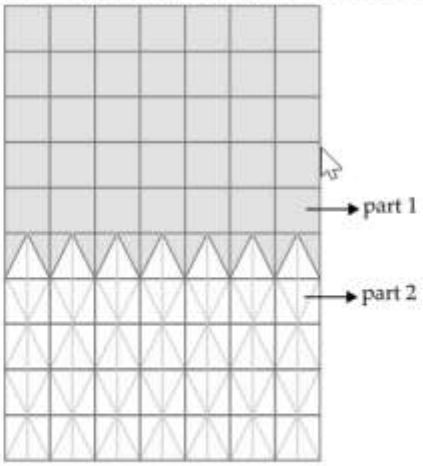
(iii) Alex says, "The angle made by road B on road D is a right angle."
Jai and Angad give different justifications to support Alex's claim.

Jai says, "Angles in the same segment of a circle are equal."

Angad says, "The angle in a semicircle is a right angle."

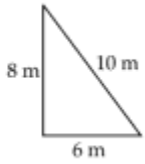
Who has given the correct justification? 1

38. Glass buildings can be strengthened using iron frames. A glass structure and its iron frame are shown below.



The frame consists of equal triangles. The dimensions of a triangle are shown below.

The frame consists of equal triangles. The dimensions of a triangle are shown below.



(i) How much area is enclosed by one triangle? 1

(ii) What is the area of part 1 of the frame? 2

OR

Is the area of part 1 equal to the area of part 2? Why? 2

(iii) Maintenance of the building's exterior is done by a company. The company charges ₹ 750 per square meter per month. 1

What will be the monthly maintenance charges?

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Series TNPS/02/07 **SET – 7**

ROLL No. **Q.P Code 09/02/07**

Candidates must write the Q.P Code on the title page of the Answer book.

- Please check that this question paper contains 7 printed pages.
- Please check that this question paper contains 38 questions.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please write down the serial number of the question in the answer-book before attempting it.
- 15 minute time has been allotted to read this question paper.
- The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

गणित
MATHEMATICS

निर्धारित समय : 3 घण्टे *अधिकतम अंक : 80*

Time allowed : 3 hours *Maximum Marks : 80*

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper contains **38** questions. **All** questions are **compulsory**.*

(ii) *This question paper is divided into **five** Sections – **A**, **B**, **C**, **D** and **E**.*

(iii) *In **Section A**, Questions no. **1** to **18** are multiple choice questions (MCQs) and questions number **19** and **20** are Assertion-Reason based questions of **1** mark each.*

(iv) *In **Section B**, Questions no. **21** to **25** are very short answer (VSA) type questions, carrying **2** marks each.*

(v) *In **Section C**, Questions no. **26** to **31** are short answer (SA) type questions, carrying **3** marks each.*

(vi) *In **Section D**, Questions no. **32** to **35** are long answer (LA) type questions carrying **5** marks each.*

(vii) *In **Section E**, Questions no. **36** to **38** are case study based questions carrying **4** marks each.*

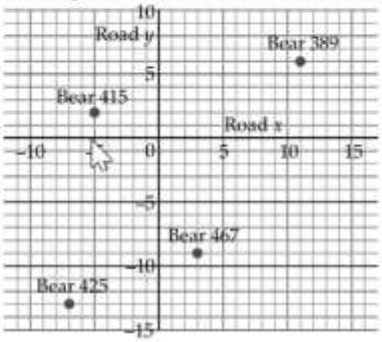
(viii) *There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 3 questions in Section C, 2 questions in Section D and 2 questions in Section E.*

(ix) *Use of calculators is **not** allowed.*

Section-A

Consists of Multiple Choice Type questions of 1 mark each.

1. **A forest ranger keeps track of bears in his area. He plotted their location on a graph. The origin represents the ranger's control room's location. To access and maintain equipment, Road x and Road y have been laid and paved inside the forest. They pass through the control room.**



One unit on the graph paper represents 1 km.

Which bear is nearest to a paved road?

(A) Bear 389 **(B)** Bear 415 **(C)** Bear 425 **(D)** Bear 467

2. **Ravi planted a red maple tree sapling. The height of the sapling is 0.25 m. The average growth rate of the height of a red maple tree is 0.27 m per year.**
The average life of a red maple tree is 80–100 years. Ravi estimated that his tree will grow up to 27 m.
What is the likely reason behind his estimation?
Which of the following equations represents the height (h) of the red maple tree after 't' years of planting?

(A) $h = 0.25 + 0.27$ **(B)** $h = 0.25t + 0.27$ **(C)** $h = 0.25 + 0.27t$ **(D)** $h = 0.25 + 27t$

3. **Two lines intersect at a point P.**
Which of the following is true for the distance between the two lines as they travel beyond point P?

(A) The distance becomes constant.
(B) The distance increases continuously.
(C) The distance decreases continuously.
(D) The distance increases and decreases depending upon the intersection point.

4. Angle which is one-fifth of its complement is

(A) 25° (B) 45° (C) 15° (D) 55°

5. The sum of the opposite angles of a cyclic quadrilateral is

(A) 90° (B) 180° (C) 100° (D) 360°

6. $\frac{1}{\sqrt{9}-\sqrt{8}}$ is equal to

(A) $\frac{1}{2}(3-2\sqrt{2})$ (B) $\frac{1}{3+2\sqrt{2}}$ (C) $3-2\sqrt{2}$ (D) $3+2\sqrt{2}$

7. What is the degree of the polynomial $(x^3 + 5)(4 - x^5)$?

(A) 5 (B) 8 (C) 2 (D) 7

8. Which out of the following is not the linear equation in two variables ?

(A) $2x = 3$ (B) $4 = 5x - 4y$ (C) $x^2 + x = 1$ (D) $x - \sqrt{2}y = 3$

9. A triangle whose all three sides are unequal is called

(A) Scalene triangle (B) Isosceles triangle (C) Equilateral triangle (D) Right triangle

10. In parallelogram $ABCD$, $AB = (2y - 3)$ and $CD = 5$ cm then value of y is

(A) 8 cm (B) 4 cm (C) 6 cm (D) 10 cm

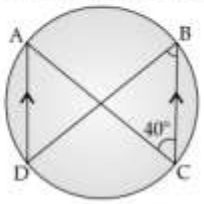
11. The radius and slant height of a cone are in the ratio 4 : 7. If its curved surface area is 792 cm², then its radius is

(A) 8 cm (B) 12 cm (C) 6 cm (D) 15 cm A I

12. $\frac{1}{\sqrt{2}}$ is a/an ..... number.

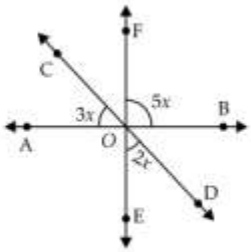
(A) Rational (B) Irrational (C) Fractional (D) None of these

13. In the given figure, $AD \parallel BC$ and $\angle BCA = 40°$. The measure of $\angle DBC$ is equal to



(A) 40° (B) 60° (C) 50° (D) 75°

14. In the given figure, lines AB, CD and EF meet at O. The value of x is



(A) 36° (B) 90° (C) 54° (D) 18°

15. The volume of a right circular cone with radius 6 cm and height 7 cm is

(A) 264 cm³ (B) 165 cm³ (C) 184 cm³ (D) 225 cm³ A I

16. Euclid's belong to the country

(A) Babylonia (B) Egypt (C) Greece (D) India

17. A diagonal of a parallelogram divides it into two _____ triangles.

(A) Similar (B) Congruent (C) Equilateral (D) Right angled

18. Euclid's divided his famous treatise 'The Elements' into

(A) 13 chapters (B) 12 chapters (C) 11 chapters (D) 9 chapters

Directions : In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

(A) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

19. **Assertion (A):** The point of the form $(a, -a)$ lies on the line $x + y = 0$.
Reason (R): Any point which satisfies the equation $ax + by + c = 0$ is the solution of the equation.

20. **Assertion (A):** If the volumes of two spheres are in the ratio 27 : 8, then their surface areas are in the ratio 3 : 2.
Reason (R): Volume of sphere $= \frac{4}{3}\pi r^3$

Surface area of a sphere $= 4\pi r^2$

Section-B

Consists of 5 questions of 2 marks each.

21. Find the value of k, if $x - 2$ is a factor of $f(x) = x^2 + kx + 2k$.

22. Karan marks his city on the map as point A.

Savita says, 'A dot is dimensionless, so your city is also dimensionless.' Why is Savita wrong? Justify your answer.

23. Represent the following frequency distribution by means of a histogram.

Marks	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
Number of Students	7	11	9	13	16	4

24. Sanya has a triangular piece of land. She wants to divide it into four equal areas. Suggest a way to do so?

OR

Does joining four distinct points always produce a quadrilateral? Justify your answer.

25. Factorize : $8a^3 + 8b^3$

OR

Factorize : $8x^3 - (2x - y)^3$

Section-C

Consists of 6 questions of 3 marks each.

26. Irrational numbers can provide more precision on measuring scale.
What can be the possible arguments in favour and against this statement?

27. A polynomial is expressed as: $p(x) = x^3 + x^2 - x - 1$
At what values of x is the polynomial $p(x) = 0$?

28. **(i)** Find values of a and b, if two ordered pairs $(a - 3, -6)$ and $(4, a + b)$ are equal. **2**

(ii) Find in which quadrant point (a, b) lies. **1**

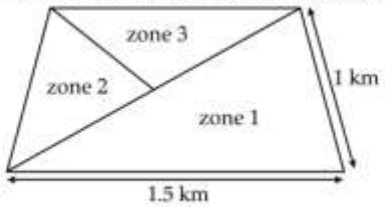
OR

If the coordinates of a point A are $(-2, 9)$ which can also be expressed as $(1 + x, y^2)$ and $y > 0$, then find in which quadrant do the following points lie :
P(y, x), S$(2x, -3y)$

29. A joker's cap is in the from of right circular cone of base radius 7 cm and slant height 25 cm. Find the area of sheet required for 10 such caps.

OR

A zoo is in the shape of an isosceles trapezium.
It is divided into three zones – Zone 1, Zone 2 and Zone 3.
Animals are kept without cages in Zone 1. Zone 2 is for visitors and Zone 3 is reserved for park authorities.

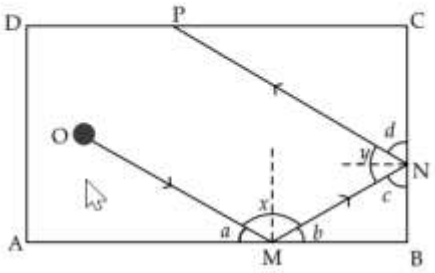


To avoid the entry of animals in Zones 2 and 3, a 1.8 km long wired fencing is installed.
"The area reserved for animals is twice the area reserved for the zoo authorities." Do you have enough information to support this statement? Explain your answer.

30. A tile is made by joining the vertices of four equilateral triangles. The side length of the triangles is 15 cm. What is the area of the tile?

31. The game of billiards is played with balls placed on a rectangular table. One ball is struck with the end of a stick, called a cue. The ball bounces into other balls and reflects off the sides of the table. In a real game, the ball may spin, but for mathematical purposes, it is considered that the ball travels in a straight line with the same reflection and incidence angles.

On a billiard tables ABCD, the ball placed at O is struck with the cue.



What is the value of $\angle a + \angle d$?

Section-D

Consists of 4 questions of 5 marks each.

32. If $a = \frac{2^{x-1}}{2^{x-2}}$, $b = \frac{2^{-x}}{2^{x+1}}$ and $a - b = 0$, find the value of x.

OR

If $x = \frac{\sqrt{5}+1}{\sqrt{5}-1}$ and $y = \frac{\sqrt{5}-1}{\sqrt{5}+1}$, then find the value of $x^2 + y^2$.

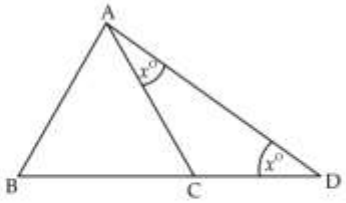
33. PQ and RS are two parallel chords of a circle whose centre is O and radius is 10 cm. If PQ = 16 cm and RS = 12 cm, find the distance between PQ and RS if

(i) On the same side of the centre O. **(ii)** On opposite side of the centre.

34. Using factor theorem, show that $(m - n)$, $(n - p)$ and $(p - m)$ are factors of

$m(n^2 - p^2) + n(p^2 - m^2) + p(m^2 - n^2)$

35. In the figure below, $BC = AC$.



What is the measure of $\angle BAD$?

Section-E

Cased Based Subjective Questions.

36. Prime Minister's National Relief Fund (also called PMNRF in short) is the fund raised to provide support for people affected by natural and man-made disasters. Natural disasters that are covered under this include flood, cyclone, earthquake etc. Man-made disasters that are included are major accidents, acid attacks, riots, etc.

Two friends Sita and Gita, together contributed ₹ 200 towards Prime Minister's Relief Fund. **1**

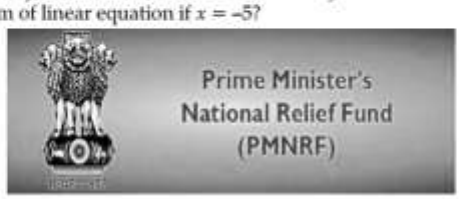
(i) How to represent the above situation in linear equations in two variables ?

(ii) If Sita contributed ₹ 76, then how much was contributed by Gita ? **2**

OR

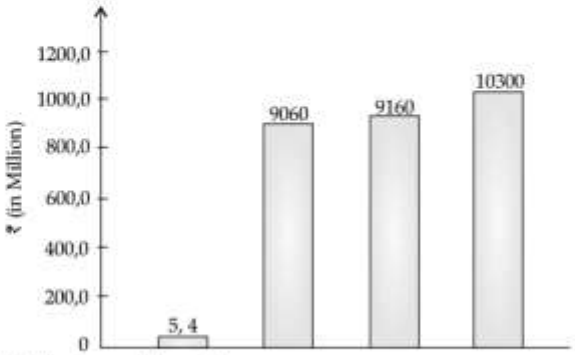
If both contributed equally, then how much is contributed by each? **2**

(iii) Write the standard form of linear equation if $x = -5$? **1**



37. Ladli Scheme was launched by the Delhi Government in the year 2008. This scheme helps to make women strong and will empower a girl child. This scheme was started in 2008.

Read the above bar graph and answer the following questions :



(i) In which year the budget was minimum? 1
(ii) What is Bar-graph? 2

OR

Which scheme was launched by government and in which year the budget was maximum? 2
(iii) What was the difference in the budget in the year 2008-2009 and 2009-10? 1

38. Isosceles triangles were used to construct a bridge in which the base (unequal side) of an isosceles triangle is 4 cm and its perimeter is 20 cm.

(i) What will be the semi perimeter of the highlighted triangle? 1
(ii) What is the area of the highlighted triangle? 2

OR

What will be the length of equal sides? 2
(iii) Which formula is used to calculate area of the triangle? 1

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Series TNPS/02/08 **SET – 8**

ROLL No. **Q.P Code 09/02/08**

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- Please check that this question paper contains 7 printed pages.
- Please check that this question paper contains 38 questions.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
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गणित
MATHEMATICS

निर्धारित समय : 3 घण्टे *अधिकतम अंक : 80*

Time allowed : 3 hours *Maximum Marks : 80*

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper contains **38** questions. **All** questions are **compulsory**.*

(ii) *This question paper is divided into **five** Sections – **A**, **B**, **C**, **D** and **E**.*

(iii) *In **Section A**, Questions no. **1** to **18** are multiple choice questions (MCQs) and questions number **19** and **20** are Assertion-Reason based questions of **1** mark each.*

(iv) *In **Section B**, Questions no. **21** to **25** are very short answer (VSA) type questions, carrying **2** marks each.*

(v) *In **Section C**, Questions no. **26** to **31** are short answer (SA) type questions, carrying **3** marks each.*

(vi) *In **Section D**, Questions no. **32** to **35** are long answer (LA) type questions carrying **5** marks each.*

(vii) *In **Section E**, Questions no. **36** to **38** are case study based questions carrying **4** marks each.*

(viii) *There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 3 questions in Section C, 2 questions in Section D and 2 questions in Section E.*

(ix) *Use of calculators is **not** allowed.*

Section-A

Consists of Multiple Choice Type questions of 1 mark each.

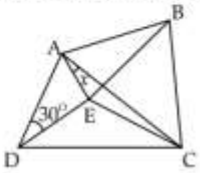
1. **A polynomial is expressed as $x^3 + bx^2 + cx + d = 0$. The same polynomial can be written in factor form as $x + px + qx + r = 0$.**
How is the constant term in the polynomial related to its factors p, q, and r?
(A) $d = p + q + r$ **(B)** $d = (p + q) \times r$ **(C)** $d = p \times q \times r$ **(D)** $d = pq + qr + pr$

2. **The number obtained on rationalizing the denominator of $\frac{1}{\sqrt{7}-2}$ is**
(A) $\frac{\sqrt{7}+2}{3}$ **(B)** $\frac{\sqrt{7}-2}{3}$ **(C)** $\frac{\sqrt{7}+2}{5}$ **(D)** $\frac{\sqrt{7}+2}{45}$

3. **Which of the following is not true?**
(A) A line has one dimension.
(B) A plane has two dimensions.
(C) A circle can be drawn with any radius and at any point.
(D) Two distinct lines can pass through a point in the same direction.

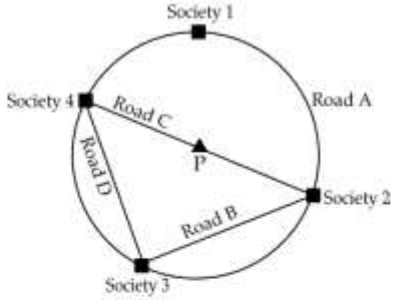
4. **If $a + b + c = 0$, then $a^3 + b^3 + c^3$ is equal to**
(A) 0 **(B)** abc **(C)** $3abc$ **(D)** $2abc$

5. **In the quadrilateral $ABCD$ given below, $\angle DAC = 90°$ and $AB = AC = AD = DE = EB$.**



What is the value of $\angle EAC$?
(A) 15° **(B)** 30° **(C)** 45° **(D)** 90°

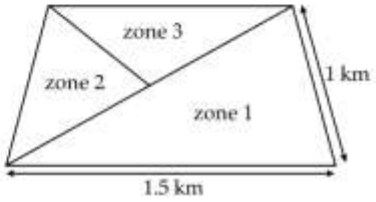
6. Given below is the map giving the position of four housing societies in a township connected by a circular road *A*.



Society 2 and 3 are connected by straight Road *B*, Society 4 and 2 are connected by straight Road *C* and Society 4 and 3 are connected by Road *D*. Point *P* denotes the position of a park. The park is equidistant to all four societies.
Rubina claims that it is not possible to construct another circular road connecting all four societies.
The length of Road *B* is equal to the length of Road *D*.
Which of the following options can be true for the roads in the township?

(A) Road B bisects Road D.
(B) Road B and Road D make an acute angle.
(C) Road B, Road C and Road D are of equal length.
(D) Road B and Road D subtend equal angles at society 1.

7. **A zoo is in the shape of an isosceles trapezium.**
It is divided into three zones – Zone 1, Zone 2 and Zone 3.
Animals are kept without cages in Zone 1. Zone 2 is for visitors and Zone 3 is reserved for park authorities.



To avoid the entry of animals in zones 2 and 3, a 1.8 km long wired fencing is installed.
Which of the following calculations shows the area for animals?

(A) $\sqrt{1.35\times0.65\times1.15}$ km^2
(B) $\sqrt{2.15\times0.35\times0.65\times1.15}$ km^2
(C) $\sqrt{3.15\times1.35\times1.65\times1.15}$ km^2
(D) $\sqrt{4.30\times1.35\times0.65\times1.15}$ km^2

8. $5^{4x} = 125^2$, then x = ...
(A) 2 **(B)** 3 **(C)** 1 **(D)** 4

9. **Which of the following is true for the line with equation: $1.x + 0.y - 4 = 0$?**
(A) The distance of the line from the x-axis is 1.
(B) The distance of the line from the y-axis is 4.
(C) The distance of the line from the y-axis is –1.
(D) The distance of the line from the x-axis changes from 1 to –4.

10. **If** $49x^2 - \left(\sqrt{b}\right)^2 = \left(7x + \frac{1}{2}\right)\left(7x - \frac{1}{2}\right)$, **then the value of b is**

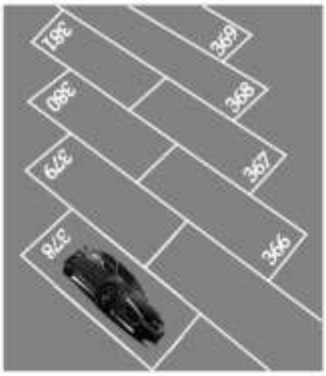
(A) 0 **(B)** $\frac{1}{\sqrt{2}}$ **(C)** $\frac{1}{4}$ **(D)** $\frac{1}{2}$

11. **If $30x = y$, then standard form of equation will be**
(A) $30x - y + 0 = 0$ **(B)** $30x + y + 0 = 0$ **(C)** $30x - y - 0 = 0$ **(D)** $30x - y = 0$

12. **How much is the volume of a hemisphere if the radius of the base is 3.5 m?**
(A) 87.53 m^3 **(B)** 90.22 m^3 **(C)** 75.34 m^3 **(D)** 89.83 m^3

13. **The area of an isosceles triangle having base 2 cm and the length of one of the equal sides 4 cm, is**
(A) $\sqrt{15}$ cm^2 **(B)** $\sqrt{\frac{15}{2}}$ cm^2 **(C)** $2\sqrt{15}$ cm^2 **(D)** $4\sqrt{15}$ cm^2

14. **A parking lot for a city mall is shown below. The painted lines that separate the parking spaces are parallel.**



Parking space number 378 is inclined at 60° to the horizon line. At what angle is parking space 380 inclined to the horizontal line?

(A) 120° **(B)** 90° **(C)** 60° **(D)** 30°

15. **What is the type of solution of the equation $30x = y$ formed?**

(A) a unique solution **(B)** only two solutions

(C) no solution **(D)** infinitely many solutions

16. **How much cloth material will be required to cover 4 small domes of Taj Mahal each of radius 2 m?**

(A) 99 m^2 **(B)** 100.57 m^2 **(C)** 98.23 m^2 **(D)** 75 m^2

17. **What do we call a triangle if the angles are in the ratio 5 : 3 : 7 ?**

(A) Acute angled triangle **(B)** Obtuse angled triangle

(C) Right angled triangle **(D)** Complete angled triangle

18. **Formula for the volume of hemisphere is**

(A) $\frac{1}{3}\pi r^3$ **(B)** $\frac{2}{3}\pi r^3$ **(C)** $2\pi r^3$ **(D)** $\frac{4}{3}\pi r^3$

Directions : In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

(A) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).

(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

(C) Assertion (A) is true, but Reason (R) is false.

(D) Assertion (A) is false, but Reason (R) is true.

19. **Assertion (A):** Value of $(32)^{2/5} + (-7)^0$ is a rational number.
Reason (R): $(a)^0 \neq 1$; where $a > 0$ and a is a real number.

20. **Assertion (A):** The class interval needs to be continuous while drawing a Histogram.
Reason (R): Histogram is a rectangular diagram using frequency distributions which are joined to one another.

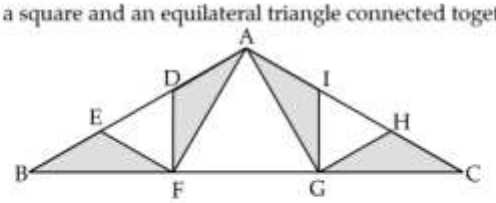
Section-B

Consists of 5 questions of 2 marks each.

21. If $a = 2$ and $b = 3$, then find the value of :

(i) $(a^b + b^a)^{-1}$ **(ii)** $(a^a + b^b)^{-1}$

22. The figure below consists of a square and an equilateral triangle connected together with a common side.



In the design, DF and IG are two iron rods perpendicular to BC. The measure of $\angle BAC = 120°$.
The central triangle AFG is equilateral. What is the measure of $\angle FDA$?

23. In a school camp, 40 students were divided into two groups to play a game.

The table given below shows the scores of team *A* and team *B*.

Time(s) in minutes	Cumulative Score of Team A	Cumulative Score of Team B
0-5	14	20
5-10	35	27
10-15	30	31
15-20	35	31
20-25	44	37
25-30	52	50

Which team scored more points during last 5 minutes? Justify your answer.

24. Expand by using identity $(2x - y + z)^2$.

OR

Expand : $\left(\frac{1}{3}x - \frac{2}{3}y\right)^3$

25. If $x = 3 - 2\sqrt{2}$, find the value of $\sqrt{x} + \frac{1}{\sqrt{x}}$.

OR

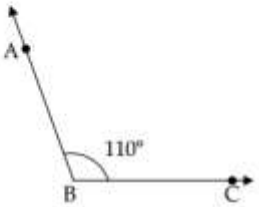
Taking $\sqrt{2} = 1.414$ and $\pi = 3.141$, evaluate $\frac{1}{\sqrt{2}} + \pi$ upto three places of decimal.

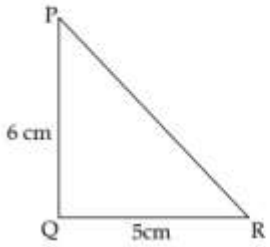
Section-C

Consists of 6 questions of 3 marks each.

26. If $x = \sqrt{2} - 1$, then find the value of $\left(x - \frac{1}{x}\right)^3$.

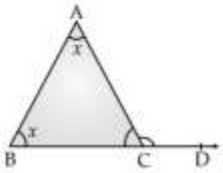
27. Raghvan claims that the magnitude of the angle *ABC* is greater than the magnitude of the area of the right triangle *PQR*.





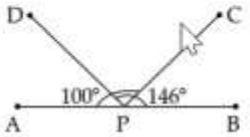
Is his claim correct? Why?

28. In the fig. given below, an exterior angle of a triangle is 130° and the two interior opposite angles are equal. Find each of these angles.



OR

In the figure given below $\angle APC = 100°$ and $\angle BPD = 146°$. Find $\angle CPD$?



29. The following table gives the pocket money (in ₹) given to children per day by their parents :

Pocket Money	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
Number of Children	12	23	35	20	10

Represent the data in the form of a histogram.

OR

Consider the marks out of 100, obtained by 50 students of a class in a test, given as below.

Marks	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
Number of Students	15	10	10	11	4

Draw a frequency polygon representing the data.

30. In a rectangle $ABCD$, E is a point on AB such that $\frac{2}{3}$. If $AB = 6$ km and $AD = 3$ km, then find DE.

31. Evaluate : $(\sqrt{2}+\sqrt{3})^2+(\sqrt{5}-\sqrt{2})^2$

Section-D

Consists of 4 questions of 5 marks each.

32. Prove that $(a^2-b^2)^3+(b^2-c^2)^3+(c^2-a^2)^3 = 3(a+b)(b+c)(c+a)(a-b)(b-c)(c-a)$.

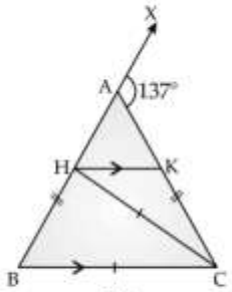
OR

Prove that $x^3+y^3+z^3-3xyz = \frac{1}{2}(x+y+z)[(x-y)^2+(y-z)^2+(z-x)^2]$ A I

33. **(a)** A hemispherical tank has inner radius of 2.8 m. Find its capacity in liters.

(b) Find the volume of a right circular cone with radius 6 cm and height 7 cm. A I

34. In figure, $AB = AC$, $CH = CB$ and $HK \| BC$. If $\angle CAX = 137°$, then find $\angle CHK$.

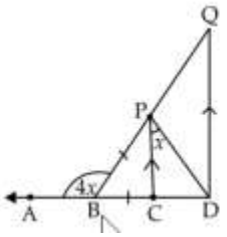


OR

In the given figure, ABCD and BPQ are straight lines. If $BP = BC$ and DQ is parallel to CP prove that :

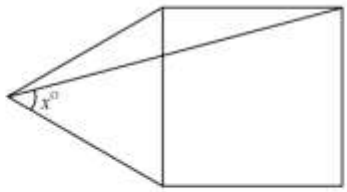
(i) $CP = CD$

(ii) DP bisects $\angle CDQ$



A I

35. The figure below consists of a square and an equilateral triangle connected together with a common side.

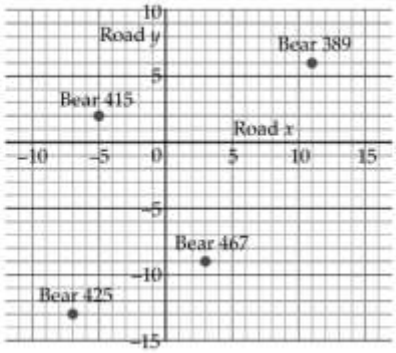


What is the measure of 'x'?

Section-E

Cased Based Subjective Questions.

36. A forest ranger keeps track of bears in his area. He plotted their location on a graph. The origin represents the ranger's control room's location. To access and maintain equipment, Road x and Road y have been laid and paved inside the forest. They pass through the control room.



One unit on the graph paper represents 1 km.

(i) Bear 467 has been injured. The forest rescue team starts from the control room and decides to use the paved road as much as possible. Which road should they take? **1**

(ii) A tiger is at (11, 4). How far from it is the nearest bear? **2**

OR

In the forest, rain shelters are at an interval of 2 km along paved roads. A forest ranger is travelling on Road x. He crosses a rain shelter located at (3, 0). **2**

What is likely to be the location of the next shelter?

(iii) How far is Bear 425 from Road x? **1**

37. Two brothers Ashish and Amit wanted to start a business together. They decided to share their amount depending upon the variable expenditure. The amount of two partners is given by the expression $12x^2 + 11x - 15$, which is the product of their individual share factors.

On the basis of above information answer the following questions.

(i) Which method of factorisation will be used to find individual share of Ashish and Amit? **1**

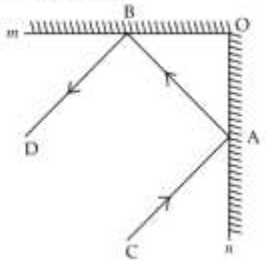
(ii) Find the total expenditure of Ashish and Amit when x = ₹ 100? **2**

OR

Find individual share factor of Ashish and Amit in terms of x? **2**

(iii) Find value of x if their shares are equal? **1**

38. A plane mirror is mirror with a flat reflective surface.



An incident ray is ray of light that strikes a surface. The reflected ray corresponding to a given incident ray, is the ray that represents the light reflected by the surface.

In figure, m and n are two plane mirror perpendicular to each other.

(i) What is the property of parallel lines? **1**

(ii) Find value of $\angle BOA$? **2**

OR

Find AO if $BO = 3$ cm, $AB = 5$ cm? **2**

(iii) Incident ray CA and ray BD are parallel or perpendicular to each other? **1**

THE NANDYAL PUBLIC SCHOOL :: NANDYAL

Series TNPS/02/09 **SET – 9**

ROLL No. **Q.P Code 09/02/09**

Candidates must write the Q.P Code on the title page of the Answer book.

- Please check that this question paper contains 7 printed pages.
- Please check that this question paper contains 38 questions.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please write down the serial number of the question in the answer-book before attempting it.
- 15 minute time has been allotted to read this question paper.
- The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

गणित
MATHEMATICS

निर्धारित समय : 3 घण्टे *अधिकतम अंक : 80*

Time allowed : 3 hours *Maximum Marks : 80*

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper contains **38** questions. **All** questions are **compulsory**.*

(ii) *This question paper is divided into **five** Sections – **A**, **B**, **C**, **D** and **E**.*

(iii) *In **Section A**, Questions no. **1** to **18** are multiple choice questions (MCQs) and questions number **19** and **20** are Assertion-Reason based questions of **1** mark each.*

(iv) *In **Section B**, Questions no. **21** to **25** are very short answer (VSA) type questions, carrying **2** marks each.*

(v) *In **Section C**, Questions no. **26** to **31** are short answer (SA) type questions, carrying **3** marks each.*

(vi) *In **Section D**, Questions no. **32** to **35** are long answer (LA) type questions carrying **5** marks each.*

(vii) *In **Section E**, Questions no. **36** to **38** are case study based questions carrying **4** marks each.*

(viii) *There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 3 questions in Section C, 2 questions in Section D and 2 questions in Section E.*

(ix) *Use of calculators is **not** allowed.*

Section-A

Consists of Multiple Choice Type questions of 1 mark each.

1. **The value of $\frac{\sqrt{32}+\sqrt{48}}{\sqrt{8}+\sqrt{12}}$ is equal to**

(A) $\sqrt{2}$ **(B)** 2 (C) 4 (D) 8

2. **A soap manufacturer makes fragrant and non-fragrant liquid soaps. The liquid soaps are filled in plastic bottles and packed in equal size cartons for transportation. Each carton contains 50 bottles.**
The mass of a full bottle of soap is 220 gm and that of a half-filled bottles is 120 gm. What will be the mass (gm) of the empty bottle?

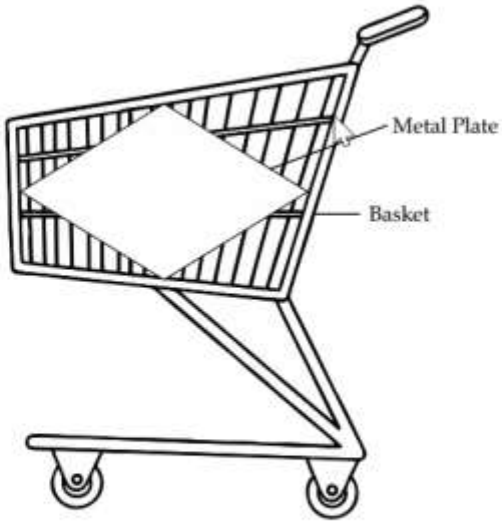
(A) 10 **(B)** 20 (C) 100 (D) 110

3. **The map shows three cities Conlen (C), Stratford (S), and Texhoma (T) on a straight highway.**

Which of the following is true for the length of the highway between them?

(A) The length of the highway between C and S is equal to the length of the highway between S and T.
(B) The length of the highway between C and S is three-fourth of the length of the highway between S and T.
(C) The length of the highway between S and T is the sum of the lengths of the highway between CT and CS.
(D) The length of the highway between C and T is the sum of the lengths of the highway between CS and ST.

4. **The figure below shows the side view of a shopping trolley. The metal plate is fixed on the side by the store keeper for advertisement.**



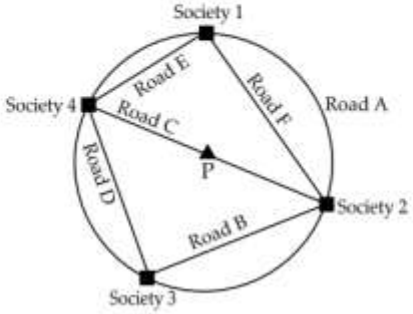
Three angles of the basket are obtuse. Which type of angle is the fourth?

(A) Acute **(B)** Obtuse **(C)** Right **(D)** Reflex

5. **In parallelogram $ABCD$, $\angle A = (4x + 3)^\circ$ and $\angle D = (5x - 3)^\circ$, then the value of $\angle B$ is**

(A) 87° **(B)** 97° **(C)** 65° **(D)** 77°

6. **Given below is the map giving the position of four housing societies in a township connected by a circular Road A. Society 2 and 3 are connected by straight Road B, society 4 and 2 are connected by straight Road C and society 4 and 3 are connected by Road D. Point P denotes the position of a park. The park is equidistant to all four societies. Two new roads, Road E and Road F were constructed between society 4 and 1 and society 1 and 2.**



Road G, perpendicular to Road F was constructed to connect the park and Road F.

Which of the following is true for Road G and Road F?

(A) Road G and Road F are of same length.

(B) Road F divides Road G into two equal parts.

(C) Road G divides Road F into two equal parts.

(D) The length of Road G is one-fourth of the length of Road F.

7. **A charity surveys the people of a village for their haemoglobin counts. 25 out of 100 adult females in the village were tested. The result is given in this table.**

Haemoglobin (mg/dl) counts	No. of females
5	3
6	3
7	2

8	5
9	1
10	1
11	3
12	4
13	2
14	1

A haemoglobin counts below 12 is considered deficient.
What proportion of females in the survey can be considered deficient?

(A) $\frac{3}{25}$ (B) $\frac{4}{25}$ (C) $\frac{18}{25}$ (D) $\frac{22}{25}$

8. **Points (1, –1), (2, –2), (4, –5), (–3, –4)**
(A) lie in II quadrant (B) lie in III quadrant
(C) lie in IV quadrant (D) do not lie in the same quadrant

9. **$x = 5, y = 2$ is a solution of the linear equation**
(A) $x + 2y = 7$ (B) $5x + 2y = 7$ (C) $x + y = 7$ (D) $5x + y = 7$

10. **The sum of $2\sqrt{5}$ and $3\sqrt{7}$ is .....**
(A) $5\sqrt{12}$ (B) $2\sqrt{5} + 3\sqrt{7}$ (C) $2 + 3\sqrt{5} + \sqrt{7}$ (D) $5\sqrt{5} + \sqrt{7}$

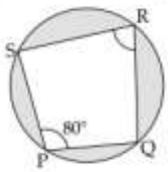
11. **$(x + a)(x + b) = x^2 +$ ..... $x + ab$**
(A) $a + b$ (B) ab (C) $a - b$ (D) $\frac{a}{b}$

12. **If the coordinates of the two points are P (–2, 3) and Q (–3, 5), then (abscissa of P) – (abscissa of Q) is**
(A) –5 (B) 1 (C) –1 (D) –2

13. **Two sides of a triangle are 13 cm and 14 cm and its semi-perimeter is 18 cm, then what will be the third side of the triangle ?**
(A) 9 cm (B) 15 cm (C) 6 cm (D) 12 cm

14. **Balan says, 'The measure of all right angles cannot be equal as their arms can be of different lengths.'**
Why is Balan's statement not true?
(A) The measure of an angle depends upon its orientation.
(B) The measure of an angle depends upon the instrument used to measure it.
(C) The measure of an angle depends on the length of its angle arms.
(D) The measure of an angle depends upon the rotation of one arm on another.

15. **In the given figure, quadrilateral *PQRS* is cyclic. If $\angle P = 80°$, then $\angle R$ is equal to ..... .**



(A) 120° (B) 100° (C) 110° (D) 90°

16. **How can a parallelogram be formed by using paper folding ?**
(A) By joining any two vertices (B) By joining one pair of opposite vertices.
(C) By joining mid points of sides of a quadrilateral (D) None of the above

17. ***D, E, F* are the mid-points of sides *BC, CA* and *AB* of ΔABC. If perimeter of ΔABC is 12.8 cm, then perimeter of ΔDEF is**
(A) 4.6 cm (B) 6.4 cm (C) 6.5 cm (D) 4.2 cm

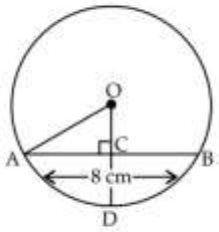
18. $(x, y) = (y, x)$, *if*

(A) $x > y$ (B) $x < y$ (C) $\frac{x}{y} = 1$ (D) $x = \frac{1}{y}$

Directions : In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

(A) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

19. **Assertion (A):** In the given figure, if $OA = 5$ cm, $AB = 8$ cm and OD is perpendicular to AB, then CD is equal to 2 cm.



Reason (R): Perpendiculars bisectors of two chords of a circle intersect each other at the centre of the circle.

20. **Assertion (A):** The point P(–6, –4) lies in the quadrant III.

Reason (R): The signs of points in quadrants I, II, III, IV are respectively (+, +), (–, +), (–, –), (+, –).

Section-B

Consists of 5 questions of 2 marks each.

21. A soap manufacturer makes fragrant and non-fragrant liquid soaps. The liquid soaps are filled in plastic bottles and packed in equal size cartons for transportation. Each carton contains 50 bottles.

Write an equation representing the number of fragrant and non-fragrant bottles in the carton.

22. If in ΔABC, $\angle A = \angle B + \angle C$, then write the shape of the given triangle.

23. Five friends Anchal, Amisha, Mahi, Vaishu and Sahar are living in a hostel.

At the end of every month, they calculate the expenses on food and shopping.

The table given below shows their monthly expenses for the month of November.

Name	Anchal	Amisha	Mahi	Vishu	Sahar
Expenditure (in ₹)	3000	5000	6000	4500	7000

What is the average expense of the friends for the month of November?

24. If $-2y + 3x = 14$, then express y in terms of x. A I

OR

Express $\frac{x}{4} - 3y = 7$ in the form of $ax + by + c = 0$. A I

25. Find the value of 'a' for which $(x - 1)$ is a factor of the polynomial $a^2x^3 - 4ax + 4a - 1$. A I

OR

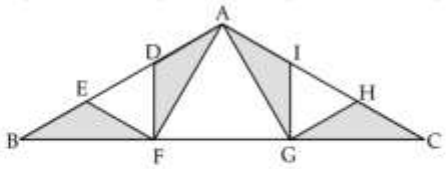
For what value of k, is the polynomial $p(x) = 2x^3 - kx^2 + 3x + 10$ exactly divisible by $(x + 2)$?

Section-C

Consists of 6 questions of 3 marks each.

26. The area of a rectangle is $(3x^2 + x - 2)$ square units. Its width is $(1 + x)$ units. What is the length of the rectangle?

27. The figure below consists of a square and an equilateral triangle connected together with a common side.



In the design, DF and IG are two iron rods perpendicular to BC. The measure of $\angle BAC = 120°$.

The length of IG is half of the length of GC. Write a proof for the statement.

28. Draw a frequency polygon for the data given below, without drawing a histogram.

Classes	Frequency
150 - 160	5
160 - 170	15
170 - 180	20
180 - 190	25
190 - 200	15
200 - 210	5

OR

The following data on the number of girls (to the nearest ten) per thousand boys in different sections of Indian Society is given below :

Sections of Society	Number of girls per thousand boys
Schedule Caste (SC)	940
Schedule Tribe (ST)	970
Non–SC/ST	920
Backward districts	950
Non-backward districts	920
Rural	930
Urban	910

Represent the information above by a bar graph.

29. In ΔABC, if AD is a median, then show that $AB + BC > \angle AD$.

OR

There is a slide in a park. One of its side walls has been painted in some colour with a message "KEEP THE PARK GREEN AND CLEAN". If the sides of the wall are 15 m, 11 m and 6 m, find the area painted in colour.

30. $\sqrt{2}$ is an irrational number. Prove that $3-\sqrt{2}$ is also an irrational number

31. If $p(x) = x^2 - 3x + 2$, then what is the value of $p(0) + p(2)$?

Section-D

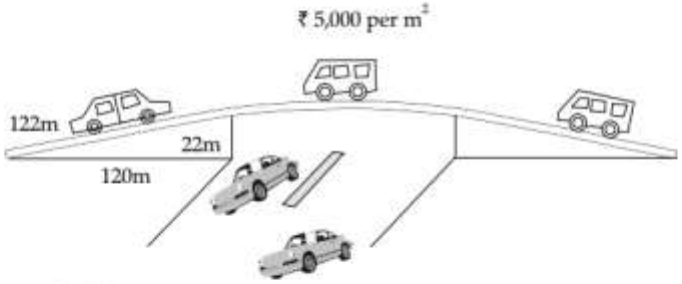
Consists of 4 questions of 5 marks each.

32. Simplify : $2\sqrt[4]{81} - 8\sqrt[3]{216} + 15\sqrt[5]{32} + \sqrt{225} - \sqrt[4]{16}$

OR

Evaluate : $\left(\frac{81}{16}\right)^{\frac{-3}{4}} \times \left[\left(\frac{9}{25}\right)^{\frac{3}{2}} + \left(\frac{5}{2}\right)^{-3}\right]$.

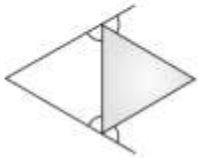
33. The triangular side walls of a flyover have been used for advertisements. The sides of the walls are 122 m, 22 m and 120 m. The advertisements yield an earning of ₹ 5,000 per m^2 per year. A company hired one of its walls for 3 months.



(a) What is the area of wall?

(b) How much rent did it pay?

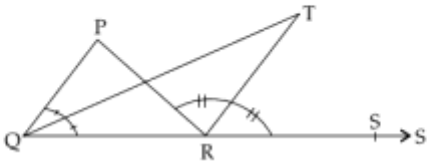
34. The figure below shows an equilateral triangle bounded by two straight lines.



What is the sum of the four marked angles?

OR

If the given figure, the side QR of ΔPQR is produced to a point S. If the bisects of $\angle PQR$ and $\angle PRS$ meet at point T, then prove that $\angle QTR = \frac{1}{2}\angle QPR$.



35. If $x - \frac{1}{x} = 2$, find $x^4 + \frac{1}{x^4}$.

Section-E

Cased Based Subjective Questions.

36. Nikita has to make her project on 'Monument in India'. She decided to make her project on Gol Gumbaz monument. She already knows following things about it :

- It is located in a small town in Northern Karnataka.
- It reaches up to 51 meters in height while the giant dome has an external diameter of 44 meters, making it one of the largest domes ever built.

- At each of the four corners of the cube is a dome shaped octagonal tower seven stories high with a staircase inside.

Help her in making project by answering the following questions :

(i) Which mathematical concept is be used here? **1**

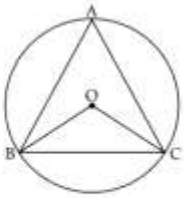
(ii) What is the curved surface area of hemispherical dome ? **2**

OR

What is the circumference of the base of the dome ? **2**

(iii) Find the cost of painting the dome, given the cost of painting is ₹ 100 per cm^2. **1**

37. Three STD booth are placed at A, B and C in the figure and these are operated by handicapped persons. These three booth are equidistant from each other as shown in figure given below.



(i) What is the value of $\angle BAC$? **1**

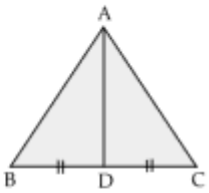
(ii) What will be the value of $\angle OBC$? **2**

OR

What will be the value of $\angle OBC$? **2**

(iii) Which angle will be equal to $\angle OBC$? **1**

38. Neeraj has a plot in the shape of a triangle said ABC with AD as the perpendicular bisector of BC such that $BD = DC$.



(i) Which rule is applied to prove the congruency of ΔABD and ΔACD? **1**

(ii) If $AB = 10$ cm and $BD = 6$ cm, then find perimeter of ΔABD ? **2**

OR

Find the perimeter of ΔABC? **2**

(iii) In ΔADC, find $\angle ACD$ if given $\angle BAC = 80°$ and AD is the angle bisector of $\angle ABC$. **1**

THE NANDYAL PUBLIC SCHOOL :: NANDYAL

Series TNPS/02/10 **SET – 10**

ROLL No. **Q.P Code 09/02/10**

Candidates must write the Q.P Code on the title page of the Answer book.

- Please check that this question paper contains 7 printed pages.
- Please check that this question paper contains 38 questions.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please write down the serial number of the question in the answer-book before attempting it.
- 15 minute time has been allotted to read this question paper.
- The question paper will be distributed at 10.15 a.m. From 10.15 a.m. to 10.30 a.m., the students will read the question paper only and will not write any answer on the answer-book during this period.

गणित
MATHEMATICS

निर्धारित समय : 3 घण्टे *अधिकतम अंक : 80*

Time allowed : 3 hours *Maximum Marks : 80*

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) *This question paper contains **38** questions. **All** questions are **compulsory**.*

(ii) *This question paper is divided into **five** Sections – **A**, **B**, **C**, **D** and **E**.*

(iii) *In **Section A**, Questions no. **1** to **18** are multiple choice questions (MCQs) and questions number **19** and **20** are Assertion-Reason based questions of **1** mark each.*

(iv) *In **Section B**, Questions no. **21** to **25** are very short answer (VSA) type questions, carrying **2** marks each.*

(v) *In **Section C**, Questions no. **26** to **31** are short answer (SA) type questions, carrying **3** marks each.*

(vi) *In **Section D**, Questions no. **32** to **35** are long answer (LA) type questions carrying **5** marks each.*

(vii) *In **Section E**, Questions no. **36** to **38** are case study based questions carrying **4** marks each.*

(viii) *There is no overall choice. However, an internal choice has been provided in 2 questions in Section B, 3 questions in Section C, 2 questions in Section D and 2 questions in Section E.*

(ix) *Use of calculators is **not** allowed.*

Section-A

Consists of Multiple Choice Type questions of 1 mark each.

1. If $\sqrt{2} = 1.4142...$ then is $\sqrt{\frac{\sqrt{2}-1}{\sqrt{2}+1}}$ equal to

(A) 2.4142 (B) 5.8282 (C) 0.4142 (D) 0.1718

2. A soap manufacturer makes fragrant and non-fragrant liquid soaps. The liquid soaps are filled in plastic bottles and packed in equal size cartons for transportation. Each carton contains 50 bottles.
A carton is checked randomly. Which of the following cannot be the number of fragrant and non-fragrant liquid bottles in the carton?

(A) (5, 45) (B) (15, 35) (C) (20, 30) (D) (30, 40)

3. A number Y is greater than a number X and another number $Z < 0$.
Which of the following relations can be true for a unique value of Z?

(A) $X \times Z = Y \times Z$ (B) $X \div Z = Y \div Z$ (C) $X - Z = Y$ (D) $X + Z = Y$

4. The figure below shows the side view of a shopping trolley. The metal plate is fixed on the side by the storekeeper for advertisement.

What is the shape of the metal plate?

(A) Square (B) Rectangle (C) Rhombus (D) Parallelogram

5. **The facts or information collected with a definite purpose is called**

(A) Class-mark (B) Class-size (C) Data (D) Class- intervals

6. **Five friends Anchal, Amisha, Mahi, Vishu and Sahar are living in a hostel.**
At the end of every month, they calculate the expenses on food and shopping.
The table given below shows their monthly expenses for the month of November.

Name	Anchal	Amisha	Mahi	Vishu	Sahar
Expenditure (in ₹)	3000	5000	6000	4500	7000

Which graphical representation method would best represent the data given?

(A) Histogram (B) Bar Graph (C) Frequency polygon (D) Ogive

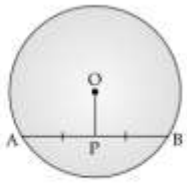
7. **The edges of a triangular board are 6 cm, 8 cm and 10 cm. The cost of painting it at the rate of 9 paise per cm^2 is**

(A) ₹ 2.00 (B) ₹ 2.16 (C) ₹ 2.48 (D) ₹ 3.00

8. **If the height and the radius of cone is tripled, then the ratio of volume of new cone to that of original cone will be**

(A) 27 : 1 (B) 9 : 1 (C) 3 : 1 (D) 6 : 1

9. **In the given figure, O is the centre of the circle and $PA = PB$.**



Value of $\angle OPA$ is

(A) 60° (B) 90° (C) 80° (D) 100°

10. **Which statement is incorrect about the parallelogram ?**

(A) Consecutive angles are supplementary (B) Opposites sides are parallel
(C) Diagonal bisects each other (D) Diagonals are equal in length

11. If the number of square centimetres in the surface area of a sphere is equal to the number of cubic cm in its volume, then the diameter of the sphere is

(A) 8 cm (B) 6 cm (C) 4 cm (D) 10 cm

12. Value of $7^{10} \times 8^{10}$ is ..... .

(A) $(15)^{10}$ (B) $(56)^{10}$ (C) $(15)^{20}$ (D) $(56)^{20}$

13. Two consecutive angles of a parallelogram are in the ratio 1 : 3, then value of smaller angle is

(A) 35° (B) 55° (C) 75° (D) 45°

14. An isosceles triangle has

(A) 3 sides equal (B) 2 sides equal
(C) None of these sides equal (D) All angles equal

15. When spherical ball of diameter 4.2 cm, is completely immersed in water , then the amount of water displaced by a solid will be

(A) 388.08 mL (B) 3.8808 mL (C) 38.808 mL (D) 0.38808 mL

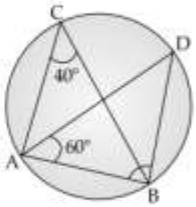
16. Diagonals AC and BD of a parallelogram $ABCD$ intersect each other at O. If $OA = 3$ cm and $OD = 2$ cm, the lengths of AC and BD are

(A) $AC = 6$ cm, $BD = 4$ cm (B) $AC = 4$ cm, $BD = 6$ cm
(C) $AC = 8$ cm, $BD = 2$ cm (D) $AC = 3$ cm, $BD = 2$ cm

17. How many lines can be passed through two distinct points ?

(A) 2 **(B)** 1 **(C)** 3 **(D)** 4

18. In the given figure, A, B, C and D are the points on a circle such that $\angle ACB = 40°$ and $\angle DAB = 60°$, the measure of $\angle DBA$ is ..... .



(A) 80° **(B)** 40° **(C)** 60° **(D)** 70°

Directions : In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Mark the correct choice as:

(A) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(C) Assertion (A) is true, but Reason (R) is false.
(D) Assertion (A) is false, but Reason (R) is true.

19. **Assertion (A):** According to statistics more female children are born each year than male children in India.
Reason (R): In India the death rate of a male child is higher than that of the female child.

20. **Assertion (A):** If the height of cone is 24 cm and diameter of base is 14 cm, then the slant height of cone is 25 cm.

Reason (R): If r be radius and h be the slant height of cone then the slant height $l = \sqrt{h^2 + r^2}$.

Section-B

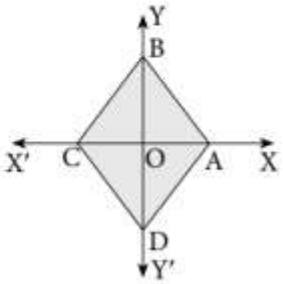
Consists of 5 questions of 2 marks each.

21. Write ordinates of following points :

(3, 4), (4, 0), (0, 4), (5, –3)

22. Find the point at which the equation $3x - 2y = 6$ meets the x-axis.

23. In the given figure, ΔABC and ΔADC are equilateral triangles on common base AC, each side of triangles being $2a$ units. Vertices A and C lies on X-axis, vertices B and D lies on Y-axis. O is the mid-point of AC and BD. Find the co-ordinates of the point B.



24. Find any two irrational numbers between 0.1 and 0.12.

OR

Find an irrational number between $\frac{1}{7}$ and $\frac{2}{7}$, when it is given that $\frac{1}{7} = 0.\overline{142857}$

25. Find the value of k, so that polynomial $x^3 + 3x^2 - kx - 3$ has one factor as $x + 3$.

OR

Find the value of the polynomial : $p(x) = x^3 - 3x^2 - 2x + 6$ at $x = \sqrt{2}$

Section-C

Consists of 6 questions of 3 marks each.

26. Hard plastic square shaped sheets are available.

The side length of sheets is as per requirement.

The price of a sheet is z per square meter.

Anuj requires two sheets – a smaller sheet with side length x m and a larger sheet with side length y m. He has two choices:

Choice 1 – buy two separate sheets of side lengths x m and y m.

Choice 2 – buy a single sheet with side length $(x + y)$ m.

What is the difference in price between the two choices?

27. Evaluate : $\sqrt{5+2\sqrt{6}}+\sqrt{8-2\sqrt{15}}$.

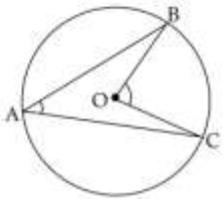
28. Find the value of $\frac{4}{(216)^{-\frac{2}{3}}}-\frac{1}{(256)^{-\frac{3}{4}}}$.

OR

Simplify : $\left(\frac{5^{-4}\times 7^{2}}{5^{2}\times 7^{-4}}\right)^{\frac{7}{2}}\times\left(\frac{5^{-3}\times 7^{3}}{5^{3}\times 7^{-5}}\right)^{-\frac{5}{2}}$

29. Given below is the figure of a circle with centre O.

The measure of $\angle BOC = 88°$.



Priya claims, "The length of OB is equal to the length of OC."

Siya and Aditi provide different justifications for Priya's clam.

Siya says, "OB and OC are radii of the same circle."

Aditi says, "OC is the base of $\angle BOC$."

Who has given the correct justification for Priya's claim?

OR

A chord of a circle is equal to the radius of the circle. Find the angle subtended by the chord at a point on the minor arc and also at a point on the major arc.

30. Represent the following frequency distribution by means of a histogram.

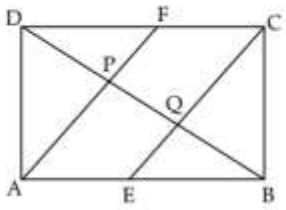
Marks	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
Number of Students	7	11	9	13	16	4

31. **Simplify :** $\left(\sqrt{x}\right)^{-\frac{2}{3}}\sqrt{y^{4}}+\sqrt{(xy)^{-\frac{1}{2}}}$.

Section-D

Consists of 4 questions of 5 marks each.

32. In the figure, *ABCD* is a parallelogram. *E* and *F* are the mid-points of sides *AB* and *CD* respectively. Show that the line segments *AF* and *EC* trisect the diagonal *BD*.



OR

Show that the line segments joining the mid-points of the opposite sides of a quadrilateral bisect each other.

33. **(a)** Simplify : $\frac{73\times73\times73+27\times27\times27}{73\times73-73\times27+27\times27}$ **[4]**

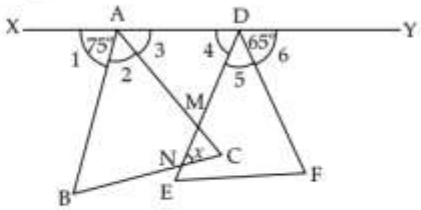
(b) What is the degree of polynomial $\sqrt{3}$? **[1]**

34. A bus stop is barricaded from the remaining part of the road, by using 50 hollow cone made of recycled cardboard. Each cone has a base diameter of 40 cm and height 1 m. If the outer side of each of the cones is to be painted and the cost of painting is ₹ 15 per m^2, what will be the cost of painting all these cones? (Use $\pi = 3.14$ and take $\sqrt{1.04} = 1.02$).

OR

A hemispherical dome, open at base is made from sheet of fibre. If the diameter of hemispherical dome is 80 cm and $\frac{13}{170}$ of sheet actually used was wasted in making the dome, then find the cost of dome at the rate of ₹ $\frac{35}{100}$ cm^2.

35. Two equilateral triangles on a straight line are shown below.



What is the measure of 'x'?

Section-E

Cased Based Subjective Questions.

36. Cleanliness drive is the way to raise awareness on the importance of cleanliness in one's neighbourhood. Residents of a certain locality joined 'Cleanliness drive' together to clean their area. Participation of the women was 10 more than men. Taking x as number of women and y as number of men.

(i) Which mathematical concept is used here? **1**

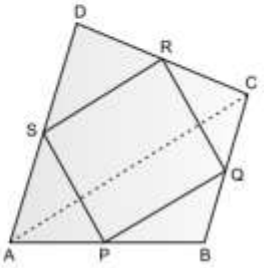
(ii) Write the suitable linear equation in two variables for above? **1**

OR

If the number of women is double of the number of men then what is the number of women? **2**

(iii) Find the number of women if number of men is 30. **2**

37. Maths teacher of class 9th gave students coloured paper in the shape of quadrilateral and then ask the students to make parallelogram from it by using paper folding as shown in given figure :



(i) If $\angle RSP = 30°$, then find $\angle RQP$. **1**

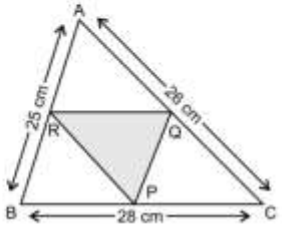
(ii) If $\angle RSP = 50°$, then find $\angle SPQ$. **2**

OR

If $SP = 3$ cm, then measure of side RQ will be? **2**

(iii) State property about the diagonals of a parallelogram? **1**

38. Shakshi prepared a Rangoli in triangular shape on Diwali. She makes a small triangle under a big triangle as shown in figure.



Sides of big triangle are 25 cm, 26 cm and 28 cm. Also, ΔPQR is formed by joining mid points of sides of ΔABC. Use the above data to help her in resolving below doubts.

(i) Which theorem will be used to calculate sides of ΔPQR? **1**

(ii) What is the semi-perimeter of ΔABC ? **2**

OR

What is the length of RQ, PQ and QR? **2**

(iii) If colourful rope is to be placed along the sides of small ΔPQR. What is the length of the rope ? **1**