



ST. JOSEPH'S COLLEGE, PRAYAGRAJ

HALF YEARLY EXAMINATION 2025 – 26

MATHEMATICS

TIME: 3 Hour

CLASS – IX

MM: 80

1. Answers to this Paper must be written on the paper provided separately.
2. You will not be allowed to write during first 15 minutes.
3. This time is to be spent in reading the question paper.
4. **The time given at the head of this paper is the time allotted for writing the answers.**
5. Attempt all questions from Section A and any four questions from Section B
6. **All working, including rough work, must be clearly shown, and must be done on the same sheet as the rest of the answer.**
7. **Omission of essential working will result in loss of marks.**
8. The intended marks for questions or parts of questions are given in brackets [].
9. **Mathematical tables are not provided.**

SECTION A (40 Marks)

(Attempt all questions from this section)

Question 1.

Choose the correct answers to the questions from the given options.

(Do not copy the questions, write the correct answers only)

[15]

- 1) $\sqrt{10} \times \sqrt{15}$ is equal to
 - a. $6\sqrt{5}$
 - b. $5\sqrt{6}$
 - c. $\sqrt{25}$
 - d. $10\sqrt{5}$
- 2) The compound interest on ₹1000 at 10% p.a. compounded annually for 2 years is
 - a. ₹190
 - b. ₹200
 - c. ₹210
 - d. ₹1210
- 3) If $\frac{x}{y} + \frac{y}{x} = 1$; ($x, y \neq 0$), then the value of $x^3 + y^3$ is
 - a. 1
 - b. -1
 - c. 0
 - d. 0.5
- 4) One of the factors of $x^2 - 4x - 12$ is
 - a. $(6 + x)$
 - b. $(x - 2)$
 - c. $(2 - x)$
 - d. $(x - 6)$
- 5) $\sqrt[4]{3\sqrt{22}}$ is equal to
 - a. $2^{-\frac{1}{6}}$
 - b. 2^{-6}
 - c. $2^{\frac{1}{6}}$
 - d. 2^6
- 6) If $\log_5(0.04) = x$, then the value of x is
 - a. 2
 - b. 4
 - c. -4
 - d. -2
- 7) In $\triangle ABC$, $AB = AC$ and $\angle B = 50^\circ$, then $\angle C$ is equal to
 - a. 40°
 - b. 50°
 - c. 80°
 - d. 130°
- 8) If the length of two sides of an isosceles triangle is 4cm and 10cm, then the length of the third side is
 - a. 4cm
 - b. 10cm
 - c. 7cm
 - d. 14cm
- 9) If a ladder 10m long reaches a window 8m above the ground, then the distance of the foot of the ladder from the base of the wall is
 - a. 18m
 - b. 8m
 - c. 6m
 - d. 4m
- 10) AD is a diameter of a circle and AB is a chord. If $AD = 34\text{cm}$ and $AB = 30\text{cm}$, then the distance of AB from the centre of the circle is
 - a. 17cm
 - b. 15cm
 - c. 4cm
 - d. 8cm
- 11) If $\cos A = \frac{4}{5}$, then the value of $\tan A$ is
 - a. $\frac{3}{5}$
 - b. $\frac{3}{4}$
 - c. $\frac{4}{3}$
 - d. $\frac{5}{3}$
- 12) The value of $\frac{1}{\sin 30^\circ} - \frac{\sqrt{3}}{\cos 30^\circ}$ is
 - a. 2
 - b. 1
 - c. $\frac{1}{2}$
 - d. 0
- 13) If ABC is a right-angled triangle, right angled at B, and $AB = 10\text{cm}$, $\angle C = 30^\circ$, then the length of the side BC is
 - a. $\frac{10}{\sqrt{3}}\text{cm}$
 - b. $10\sqrt{3}\text{cm}$
 - c. 20cm
 - d. 5cm
- 14) The value of $2 + \log_{10}(0.01)$ is
 - a. 4
 - b. 3
 - c. 1
 - d. 0

15) Which of the following is equal to x

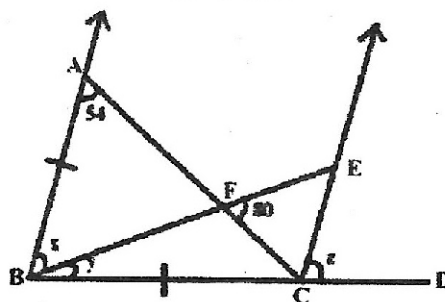
- $x^{\frac{12}{7}} - x^{\frac{5}{7}}$
- $\sqrt[12]{(x^4)^{\frac{1}{3}}}$
- $(\sqrt{x^3})^{\frac{2}{3}}$
- $x^{\frac{12}{7}} \times x^{\frac{7}{12}}$

Question 2.

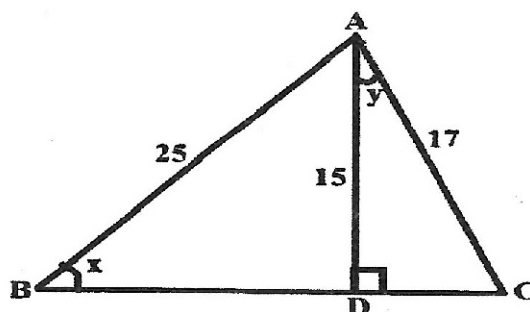
- If p, q are rational numbers and $p - \sqrt{15}q = \frac{2\sqrt{3}-\sqrt{5}}{4\sqrt{3}-3\sqrt{5}}$, find the values of p and q . [4]
- Factorise: $x^6 + 63x^3 - 64$. [4]
- For going to Delhi(D) from Lucknow(L), there is route via Bareilly(B) such that $BL \perp DB$, $BL = 2x$ km and $BD = 2(x + 7)$ km. It is proposed to construct a 26km highway which directly connects the two cities Lucknow and Delhi. Find how much distance will be saved in reaching Delhi from Lucknow after the construction of highway. [4]

Question 3.

- In the figure given below, $AB \parallel CE$, $\angle BAF = 54^\circ$ and $\angle CFE = 80^\circ$, find the measure of [4]
 - $\angle ABF$
 - $\angle CBF$
 - $\angle ECD$



- If $a^2 - 3a + 1 = 0$, find: [4]
 - $a^2 + \frac{1}{a^2}$
 - $a^3 + \frac{1}{a^3}$
- From the figure given below, find the value of $5\cos x - 17\sin y - \tan x$ [5]



SECTION B (40 Marks)

(Attempt any four questions from this section)

Question 4.

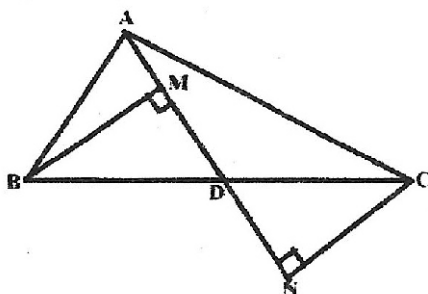
- Find the amount and the compound interest on ₹2000 in 2 years if the rate is 4% for the first year and 3% for the second year. [3]
- Determine $(8x)^x$, if $9^{x+2} = 240 + 9^x$ [3]
- Two chords AB and CD of lengths 5cm and 11cm respectively of a circle are parallel to each other and are on the opposite sides of the centre. If the distance between AB and CD is 6cm, find the radius of the circle. [4]

Question 5.

- If $x = 5 - 2\sqrt{6}$, find the value of [3]
 - $\frac{1}{x}$
 - $x + \frac{1}{x}$
 - $x^2 + \frac{1}{x^2}$
- Solve for x : $\log_3(x+1) - 1 = 3 + \log_3(x-1)$ [3]
- If $\tan(A+B) = \sqrt{3}$, $\tan(A-B) = 1$ and A, B ($B < A$) are acute angles, find the values of A and B . [4]

Question 6.

- Factorise: $x^4 + 4$ [3]
- In the figure given below, AD is a median of $\triangle ABC$, BM and CN are perpendiculars drawn from B and C respectively on AD and AD produced. Prove that $BM = CN$. [3]



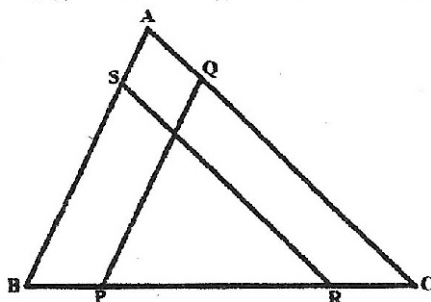
- Solve for x & y : $(\sqrt{32})^x \div 2^{y+1} = 1, 16^{4-\frac{x}{2}} - 8^y = 0$ [4]

Question 7.

- Without using trigonometrical tables, evaluate: [3]
 $\sin^2 34^\circ + \sin^2 56^\circ + 2 \tan 18^\circ \tan 72^\circ - \cot^2 30^\circ$
- Solve for x : $\log_2 x + \log_4 x + \log_{16} x = \frac{21}{4}$ [3]
- The length of the common chord of two intersecting circles is 30cm. If the radii of the two circles are 25cm and 17cm, find the distance between their centres. [4]

Question 8.

- A sum of ₹25000 invested at 8% p.a. compounded semi-annually amounts to ₹28121.60. Compute the time period of investment. [3]
- Without using mathematical table find the value of: [3]
 $2\sqrt{2} \cos 45^\circ \cos 60^\circ + 2\sqrt{3} \sin 30^\circ \tan 60^\circ$
- In the figure given below, $PQ \parallel BA$ and $RS \parallel CA$. If $BP = RC$, prove that: [4]



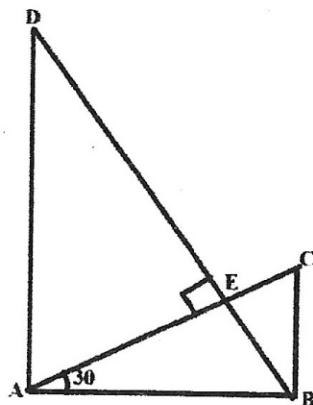
- $\triangle BSR \cong \triangle PQC$
- $RS = CQ$

Question 9.

- Factorise: $9x^3y + 41x^2y^2 + 20xy^3$ [3]
- Simplify the following: [3]

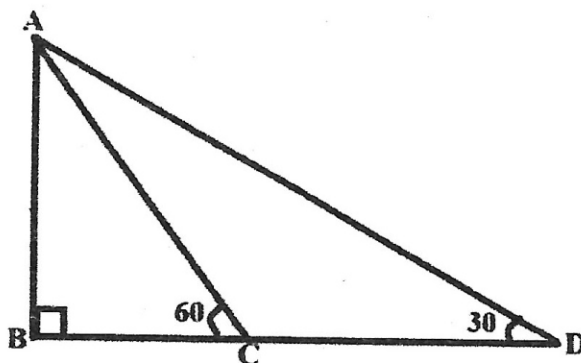
$$\frac{5(25)^{n+1} - 25(5)^{2n}}{5(5)^{2n+3} - (25)^{n+1}}$$

- 3) In the figure given below, ABC is right-angled triangle at B and ABD is right angled triangle at A. If $BD \perp AC$, $\angle BAC = 30^\circ$ and $BC = 2\sqrt{3}\text{cm}$, find the length of AD. [4]



Question 10.

- 1) Prove that $\sqrt{3}$ is an irrational number. [5]
2) In the figure given below, ABC is a right-angled triangle in which $\angle ABC = 90^\circ$ and $\angle ACB = 60^\circ$. BC is produced to D such that $\angle ADB = 30^\circ$. If $CD = 4\text{cm}$, find the lengths of AB and BC. [5]



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