

UP Board Class 12 Mathematics 2026 Question Paper

Time Allowed :3 Hours	Maximum Marks :100	Total questions :38
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General Instructions

Read the following instructions very carefully and strictly follow them:

1. The paper is divided into two sections – Section A (Compulsory) and Section B (Elective).
2. Section A is compulsory for all candidates and generally includes objective-type questions, short answer questions, and long answer questions from the prescribed syllabus.
3. In Section A, candidates are required to answer all questions. The questions will cover topics from ancient, medieval, and modern history as prescribed by the syllabus.
4. Section B consists of elective questions. Candidates are required to attempt questions from the chosen topic according to the provided options.
5. The questions in Section A will be in the form of multiple-choice, short answer, and essay-type questions.
6. Answers to all questions must be written in neat and legible handwriting. Candidates must adhere strictly to the word limit mentioned in the questions.
7. Use of unfair means or electronic devices during the examination is strictly prohibited.
8. Candidates must ensure that they write their answers in the correct format, following the instructions given for each section.

1. The value of $\int_0^{\pi/2} \frac{dx}{1 + \sqrt{\tan x}}$ will be

- (A) 0
 - (B) $\frac{\pi}{2}$
 - (C) $\frac{\pi}{4}$
 - (D) $\frac{\pi}{8}$
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2. The degree of differential equation

$$9 \frac{d^2 y}{dx^2} = \left\{ 1 + \left(\frac{dy}{dx} \right)^2 \right\}^{\frac{1}{3}} \text{ is}$$

- (A) 1
 - (B) 6
 - (C) 3
 - (D) 2
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3. The value of expression $\hat{i} \cdot \hat{i} - \hat{j} \cdot \hat{j} + \hat{k} \times \hat{k}$ is

- (A) 0
 - (B) 1
 - (C) 2
 - (D) 3
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4. The modulus function $f : \mathbb{R} \rightarrow \mathbb{R}^+$ given by $f(x) = |x|$ is

- (A) one-one and onto
 - (B) many-one and onto
 - (C) one-one but not onto
 - (D) neither one-one nor onto
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5. A relation $R = \{(a, b) : a = b - 1, b \geq 3\}$ is defined on set N , then

- (A) $(2, 4) \in R$

(B) $(4, 5) \in R$

(C) $(4, 6) \in R$

(D) $(1, 3) \in R$

6. Prove that the function $f(x) = |x|$, is continuous at $x = 0$.

7. Find the degree of the differential equation

$$xy \frac{d^2y}{dx^2} + x \left(\frac{dy}{dx} \right)^2 - y \left(\frac{dy}{dx} \right) = 2$$

8. If $P(A) = 0.12$, $P(B) = 0.15$ and $P(B/A) = 0.18$, then find the value of $P(A \cap B)$.

9. Find the angle between the vectors $-2\hat{i} + \hat{j} + 3\hat{k}$ and $3\hat{i} - 2\hat{j} + \hat{k}$.

10. If $f : \mathbb{R} \rightarrow \mathbb{R}$ and $g : \mathbb{R} \rightarrow \mathbb{R}$ be functions defined by $f(x) = \cos x$ and $g(x) = 3x^2$ respectively, then prove that $g \circ f \neq f \circ g$.

11. Find the general solution of differential equation $ydx + (x - y^2)dy = 0$.

12. Prove that $(4, 4, 2)$, $(3, 5, 2)$ and $(-1, -1, 2)$ are vertices of a right angle triangle.

13.

$|\vec{b}| = 4$ and $|\vec{c}| = 2$, then find the value of $\vec{a} \cdot \vec{b} + \vec{b} \cdot \vec{c} + \vec{c} \cdot \vec{a}$.

If three vectors \vec{a} , \vec{b} and \vec{c} satisfying the condition $\vec{a} + \vec{b} + \vec{c} = 0$. If $|\vec{a}| = 3$,

$|\vec{b}| = 4$ and $|\vec{c}| = 2$, then find the value of $\vec{a} \cdot \vec{b} + \vec{b} \cdot \vec{c} + \vec{c} \cdot \vec{a}$.

14. The radius of an air bubble is increasing at the rate of $\frac{1}{2}$ cm/s. At what rate is the volume of the bubble increasing while the radius is 1 cm?

15. Show that the function $f(x) = 7x^2 - 3$ is an increasing function when $x > 0$.

16. Find the unit vector perpendicular to each of the vectors $(\vec{a} + \vec{b})$ and $(\vec{a} - \vec{b})$ where

$$\vec{a} = \hat{i} + \hat{j} + \hat{k}, \vec{b} = \hat{i} + 2\hat{j} + 3\hat{k}.$$
