MH Board Class 12 Mathematics and Statistics Question Paper(Memory Based)

Time Allowed :3 Hours	**Maximum Marks :**70	**Total questions :**37

General Instructions

Read the following instructions very carefully and strictly follow them:

1. Please check that this question paper contains 23 printed pages.
2. 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.
3. Please check that this question paper contains 37 questions.
4. 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 candidates will read the question paper only and will not write any answer on the answer-book during this period.

1. Write the dual of the statement $p \wedge [\neg q \vee (p \wedge q) \vee \neg r]$**.**

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2. Find the area of a triangle with vertices $A(1, 2, 3), B(2, 3, 4)$**, and** $C(3, 4, 5)$**.**

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3. Differentiate $\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)$ **with respect to** x**.**

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4. Find the principal value of $\sin^{-1}\left(-\frac{1}{2}\right)$**.**

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5. Write the converse, inverse, and contrapositive of: "If voltage increases, then current decreases".

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6. Evaluate $\int \frac{x+2}{2x^2+6x+5}\,dx$ **using the substitution or partial fraction method.**

7. A die is tossed twice. If a "success" is getting a number greater than 4, find the probability distribution of the number of successes.

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8. The population of a town grows at a rate proportional to its size. If it grows from 40,000 to 60,000 in 40 years, what will it be in another 20 years?

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9. Prove that $\int \sqrt{a^2 - x^2}\, dx = \frac{x}{2}\sqrt{a^2 - x^2} + \frac{a^2}{2}\sin^{-1}\left(\frac{x}{a}\right) + C$**.**

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10. Prove the Section Formula for internal division in vectors.
