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the metamorphosis starts from here....



**BRILLIANT
INTERNATIONAL
Olympiad of
MATHEMATICS**

Class-XI (Syllabus and Sample Question Paper)

Sets, Relations and Functions, Coordinate Geometry:- Straight Line, Pair of Straight Line, Conic Section, Basic Concept about 3 dimension (Solid Geometry), Sequence of Series, Complex Number, Quadratic Equation and Expression, Binomial Theorem, Permutation and Combination, Probability, Non-Verbal Reasoning (I.Q.), Central Tendency, Variance and Standard Deviation

The Actual Question Paper Contains 40 Questions. The Duration of the Test Paper is 60 Minutes

- If $\log_{\sqrt{3}} \left(\frac{|z|^2 - |z| + 1}{|z| + 2} \right) < 2$ then the locus of z is?**
(A) A circle (B) A straight line
(C) Interior of a circle of radius 5 (D) Both (B) and
(E) None of these
- If α, β are the roots of $x^2 + px + 1 = 0$ and δ and δ are roots of $x^2 + qx + 1 = 0$ the value of $(\hat{\alpha} - \hat{\alpha})(\hat{\alpha} - \hat{\alpha})(\hat{\alpha} + \hat{\alpha})(\hat{\alpha} + \hat{\alpha})$ is?**
(A) $p^2 - q^2$ (B) $q^2 - p^2$ (C) $p^2 + q^2$ (D) $p^2 q^2$
(E) None of these
- In a triangle ABC, AD is the median A to BC, then its length is equal to?**
(A) $\frac{1}{2} \sqrt{2(b^2 + c^2) - a^2}$ (B) $\sqrt{b^2 + c^2 - \frac{a^2}{2}}$
(C) $\sqrt{\frac{b^2 + c^2 - a^2}{2}}$ (D) $\frac{b+c}{2}$
(E) None of these
- The greatest value of $f(x) = 2\sin x + \sin 2x$ on $\left[0, \frac{3\pi}{2}\right]$ is given by ?**
(A) $\left[\frac{3\sqrt{3}}{2}\right]$ (B) $\left[\frac{4\sqrt{3}}{2}\right]$ (C) $\left[\frac{5\sqrt{3}}{2}\right]$ (D) $\left[\frac{1\sqrt{3}}{2}\right]$
(E) None of these

5. If $1 + \sin x + \sin^{2x} + \dots \text{to } \infty = 4 + 2\sqrt{3}$, $0 < x < \pi$ then x is equal to?

- (A) $\frac{\pi}{3}$ or $\frac{2\pi}{3}$ (B) $\frac{\pi}{3}$ or $\frac{3\pi}{3}$ (C) $\frac{\pi}{2}$ or $\frac{3\pi}{3}$ (D) $\frac{\pi}{2}$ or $\frac{1\pi}{3}$
(E) None of these

6. There is a point on a level plane, a tower, subtends an angle θ and a flag-staff of height 'a' at the top of tower subtends an angle ϕ . The height of the tower is?

- (A) $\frac{a \sin \theta \cdot \cos \phi}{\cos(\theta + \phi)}$ (B) $\frac{a \sin \phi \cdot \cos(\theta + \phi)}{\sin \theta}$ (C) $\frac{a \cos(\theta + \phi)}{\sin \theta - \sin \phi}$ (D) Both (B) and (C)
(E) None of these

7. If in a triangle A, B, C,

$$a \cos\left(\frac{C}{2}\right) + c \cos^2\left(\frac{A}{2}\right) = \frac{3b}{2}, \text{ then the sides a, b and c}$$

- (A) Satisfy $a + b = c$ (B) Are in A.P (C) Are in G.P (D) Are in H.P
(E) None of these

8. The domain of the function $f(x) = \frac{1}{\sqrt{(a-x)(b-x)}}$, where $a > b$ is?

- (A) (a, b) (B) [a, b] (C) (b, a) (D) [b, a]
(E) None of these

9. The interval in which the value of $f(x)$ lie where $f(x) = 3 \sin \sqrt{\frac{\pi^2}{16} - x^2}$ is?

- (A) $\left[-\frac{\pi}{4}, \frac{\pi}{4}\right]$ (B) $[-3, 3]$ (C) $\left[0, \frac{\sqrt{3}}{2}\right]$ (D) $\left[\frac{-\sqrt{3}}{2}, \frac{\sqrt{3}}{2}\right]$
(E) None of these

10. The sum of series $\frac{1}{|2|} - \frac{1}{|3|} + \frac{1}{|4|} - \frac{1}{|5|} + \dots$ up to ∞ is?

- (A) e^{-1} (B) $e^{-\frac{1}{2}}$ (C) $e^{\frac{1}{2}}$ (D) e^{-2}
(E) None of these

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11. The first two terms of a G.P. add up to 12. The sum of third and 4th term is 48. If the terms of the geometric progression are alternately positive and negative, then first term is:
- (A) 12 (B) 4 (C) -4 (D) -12
(E) None of these
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12. If the sum of first n terms of an A.P. is cn^2 then the sum of squares of n terms is?
- (A) $\frac{n(4n^2-1)c^2}{6}$ (B) $\frac{n(4n^2+1)c^2}{3}$ (C) $\frac{n(4n^2-1)c^2}{3}$ (D) $\frac{n(4n^2+1)c^2}{6}$
(E) None of these
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13. If $C_0, C_1, C_2, \dots, C_n$ denotes the coefficients in the expansion of $(1+x)^n$, then the value of $C_1 + 2C_2 + 3C_3 + \dots + nC_n$ is?
- (A) $n2^{n-1}$ (B) $(n+1)2^{n-1}$ (C) $(n+1)2^n$ (D) $(n+2)2^{n-1}$
(E) None of these
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14. Equation of the tangent and normal drawn at the point (6, 0) on the ellipse $\frac{x^2}{36} + \frac{y^2}{9} = 1$ respectively are:
- (A) $y + x - 6 = 0,$ (B) $x = 6, y = 0$
 $y - x + 6 = 0$
(C) $x = -6, y = 0$ (D) $x = 0, y = 3$
(E) None of these
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15. In an experiment with 15 observations on x , the following results were available: $\Sigma x^2 = 2830, \Sigma x = 170$. One observation that was 20 found to be wrong and was replaced by the correct value 30. Then the corrected variance is?
- (A) 78.00 (B) 80.33 (C) 188.66 (D) 177.33
(E) None of these
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ANSWERS

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|-------|-------|-------|-------|-------|
| 1. C | 2. B | 3. A | 4. A | 5. A |
| 6. E | 7. B | 8. C | 9. C | 10. A |
| 11. D | 12. C | 13. A | 14. B | 15. A |