

CLASS - X

- 1) If $a^2 + a - 1 = 0$ then $\frac{34 + a^7}{a + 2} = \underline{\hspace{2cm}}$
 1) 13 2) 22 3) 1 4) 8
- 2) ABC is an equilateral triangle with each side 12 cm $AD \perp BC$, E is the midpoint of AD. Then area of $\triangle BDE = \dots\dots$ Sq cm.
 1) $18\sqrt{3}$ 2) $6\sqrt{3}$ 3) $9\sqrt{3}$ 4) $3\sqrt{3}$
- 3) The maximum volume of a cylinder is cut from a cube of edge x. The volume of remaining solid is Kx^3 , where $K = p/q$ and $\text{g.c.d}(p,q) = 1$ taking $\Pi = 22/7$ then $p + q = \underline{\hspace{2cm}}$
 1) 11 2) 10 3) 17 4) 19
- 4) Let p and q be two real numbers such that $p + q = 3$ and $p^4 + q^4 = 369$ then $\left(\frac{1}{p} + \frac{1}{q}\right)^{-2} = \underline{\hspace{2cm}}$
 1) 4 2) 8 3) 9 4) 24
- 5) If $a + b + c = 1$, $ab + bc + ca = 2$, $abc = 3$ then $a^4 + b^4 + c^4 = \underline{\hspace{2cm}}$
 1) 18 2) 16 3) 13 4) 10
- 6) If $\tan A + \cot A = 4$, then $\cot^4 A + \tan^4 A = \underline{\hspace{2cm}}$
 1) 194 2) 110 3) 127 4) 149
- 7) If $15 \sin^4 A + 10 \cos^4 A = 6$ for some real A then $27 \sec^6 A + 8 \operatorname{cosec}^6 A = \dots$
 1) 350 2) 500 3) 400 4) 250
- 8) If $\tan A \tan(60^\circ - A) \tan(60^\circ + A) = \tan 3A$ then the Value of $\tan 6^\circ \tan 42^\circ \tan 66^\circ \tan 78^\circ = \underline{\hspace{2cm}}$
 1) 2 2) 4 3) 1 4) 12
- 9) $a^3 + b^3 : a^3 - b^3 = 185 : 158$ then $a : b = \dots\dots$
 1) 5 : 4 2) 7 : 3 3) 3 : 7 4) 2 : 3
- 10) The product of roots of the equation $9x^2 - 18|x| + 5 = 0$ is $\underline{\hspace{2cm}}$
 1) 25 / 81 2) 5 / 9 3) 2 4) 5 / 81

- 11) Number of real solutions for the equation $\sqrt{x+1} - \sqrt{x-1} = \sqrt{4x-1}$ is _
 1) 2 2) 1 3) 0 4) 4
- 12) $a = 2583$, $b = -1283$ and $-c = 1300$ then
 $a^2 b^{-1} c^{-1} + a^{-1} b^2 c^{-1} + a^{-1} b^{-1} c^2 = \dots$
 1) Even prime 2) Odd prime 3) Proper fraction 4) Irrational
- 13) $x + y + z = 9$ then maximum value of product xyz is ---- ($x, y, z > 0$)
 1) 27 2) 36 3) 9 4) 360
- 14) $\frac{1^2 - 2^2 + 3^2 - 4^2 + \dots + 2023^2 - 2024^2}{4050} = \underline{\hspace{2cm}}$
 1) -400 2) -506 3) 208 4) 565
- 15) The number of terms common to two A.P's : 3, 7, 11, ..., 407 and 2, 9, 16, ..., 709 is.
 1) 14 2) 15 3) 12 4) 18
- 16) If the ratio of sum to n terms of two A.P's is $(5n + 3) : (3n + 4)$ then ratio of their 17th terms is _____
 1) 172 / 99 2) 168 / 103 3) 175 / 99 4) 171 / 103
- 17) A speaks truth in 75% cases and B in 80% of the cases. In what % of cases are they likely to contradict each other, narrating the same incident?
 1) 5% 2) 15% 3) 35% 4) 45%
- 18) Let (x, y, z) be points with integer co ordinates satisfying the system of equations $3x - y - z = 0$, $-3x + z = 0$, $-3x + 2y + z = 0$ then number of such points for which $x^2 + y^2 + z^2 \leq 100$ is
 1) 3 2) 7 3) 10 4) 11
- 19) $x \cdot 27^x - 1 = 0$ has n solutions then $n^5 + n^4 - n^3 - n^2 + 8 = \text{Perfect} \dots$
 1) Square 2) cube 3) 4th power 4) 6th power
- 20) The diameter of the wheel of a bus is 140 cm. How many revolutions per minute must the wheel make inorder to keep a speed of 66 kmph?
 1) 150 2) 250 3) 220 4) 440
- 21) $(0, 2), (0, 0), (2, 0)$ are midpoints of sides of ΔABC whose centroid is G then $\Delta GCA = \underline{\hspace{1cm}}$ approximately
 1) 2.67 2) 1.67 3) 3.14 4) 4.33

- 22) D, E, F are respectively 3 points on sides BC, CA, AB of ΔABC . AD, BE, CF concur at O inside the triangle. Then $\frac{OD}{AD} + \frac{OE}{BE} + \frac{OF}{CF} = \underline{\hspace{2cm}}$
 1) 3 2) 4 3) 1 4) $1/3$
- 23) X is an interior point of an equilateral ΔPQR . XA, XB, XC respectively are perpendiculars from X to side RQ, RP, PQ. If $XA = 2 - \sqrt{2}$, $XB = \sqrt{2} + 1$, $XC = 1$ then area of ΔPQR is ___sq. u
 1) $\frac{16}{\sqrt{3}}$ 2) $\frac{8}{\sqrt{3}}$ 3) $3\sqrt{3}$ 4) $4\sqrt{32}$
- 24) Circumcentre of ABC with $A = (\cos\theta, \sin\theta)$, $B = (1, 0)$, $C = \left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$ is ____
 1) $\left(\sin\theta, \frac{\cos\theta}{2}\right)$ 2) $\left(\frac{\cos\theta}{\sqrt{2}}, \frac{\sin\theta}{\sqrt{2}}\right)$ 3) $(\cos 90^\circ, \cos 270^\circ)$ 4) $(\sin 45^\circ, \cos 60^\circ)$
- 25) If $A = (x + y + z)$, $B = (x - y + z)$, $C = (x + y - z)$, $D = (x - y - z)$
 then $\frac{A^2 + B^2 + C^2 + D^2}{x^2 + y^2 + z^2} = \text{independent of.....}$
 1) x only 2) y only 3) z only 4) x, y and z
- 26) If $\sin^2\theta + \sin\theta = 1$ then $2\cos^4\theta + \cos^2\theta - 2\sin^2\theta = \underline{\hspace{2cm}}$
 1) 1 2) $\cos^2\theta$ 3) -1 4) $2\cos^2\theta$
- 27) $y = \sqrt{\sin x \sqrt{\sin x \sqrt{\sin x \dots \infty}}} \quad (0 \leq x \leq 90^\circ)$ then $y^2 \operatorname{Cosec}^2 x - 2y \operatorname{Cosec} x + 4 = \dots$
 1) 3 2) $2 \sin^2 x + 3$ 3) $\cos^2 x - 2$ 4) 0
- 28) Degree of expression $(x + 1)(x^2 + 1)(x^3 + 1) \dots (x^{100} + 1)$ is
 1) 100 2) 5050 3) 10100 4) 0
- 29) If $x^3 + 3x(1 + x) + 1 = 0$ then the value of $x^6 - x + 3 = \underline{\hspace{2cm}}$
 1) 4 2) 8 3) 21 4) 5
- 30) The Indian Mathematician who received prize equal to Nobel Prize recently in the field of Statistics.
 1) R.C.Gputha 2) P.C.Mahalanobis 3) C. R. Rao 4) C.V.Raman

- 31) $8x^3 + 6xy + y^3 = 1$ then the possible value of $2x + y$ will be ____
 1) 2 2) -2 3) -3 4) -4
- 32) Median of the first 100 natural numbers is
 1) 50 2) 50.5 3) 51 4) 51.5
- 33) In a moderately asymmetric statistical data mean = 25 , mode = 28 then median exceeds mean by ____
 1) 2 2) 2.5 3) 1.75 4) 1
- 34) The mean of 20 observations is 64 Each observation is multiplied by 5 and then 300 is subtracted from each. New mean of resulting data is ____
 1) 69 2) 20 3) 64 4) 100
- 35) Natural numbers are divided into groups as follows $\{1\}, \{2,3\}, \{4,5,6\}, \{7,8,9,10\}$ the last number in 50th group is ____
 1) 1275 2) 1525 3) 1725 4) 1685
- 36) In a bag there are 5 red and 5 green balls. In succession 3 draws of one ball each are made without replacement. The Probability that all 3 are red balls will be ____
 1) $1/2$ 2) $1/3$ 3) $1/12$ 4) $1/1000$
- 37) The chance that a randomly selected leap year has 53 sundays is ____ approximately
 1) 0.2857 2) 0.3314 3) 0.4137 4) 0.1812
- 38) From first 100 natural numbers one number is selected at random. The probability that the selected number is not divisible by 2 or 5 or 7 ?
 1) 0.26 2) 0.34 3) 0.5 4) 0.62
- 39) Using the formula $\cot\theta + \tan\theta = 2\cot 2\theta$ the value of $1 + 2\tan 70^\circ - \cot 80^\circ - \tan 80^\circ =$ ____
 1) $\tan 45^\circ$ 2) $\cot 30^\circ$ 3) $\sec 45^\circ$ 4) $\sin 60^\circ$
- 40) A taxi number which inspired Mathematician Srinivasa Ramanujan was ____
 1) $10^3 + 9^3 + 1^3$ 2) $12^3 + 1^3$ 3) $7^3 + 21^3$ 4) $6^3 + 18^3$

- 41) Sakshi can do a piece of work in 20 days. Tanya is 25% more efficient than Sakshi. The number of days taken by Tanya to do the same piece of work is ...
 1) 15 2) 16 3) 18 4) 25
- 42) When x, y, z are real, minimum value of $2x^2 + 2y^2 + 5z^2 - 2xy - 4yz - 4x - 2z + 15$ is ____
 1) 10 2) 25 3) 18 4) 5
- 43) The number of natural number pairs (x, y) in which $x > y$ and $\frac{5}{x} + \frac{6}{y} = 1$ is ____
 1) 1 2) 2 3) 3 4) 4
- 44) Which of the following is Kaprekar's constant
 1) 6714 2) 4617 3) 6174 4) 7164
- 45) On which date National Mathematics day is celebrated ?
 1) 22nd December 2) 28th February 3) 25th October 4) 12th December
- 46) Who was considered as Father of Geometry?
 1) Bhaskara charya 2) Pythagorus 3) Hypatia 4) Euclid
- 47) Who was the author of famous book "Leelaisvathi Ganitham" ?
 1) Varaha mihra 2) Leelavathi 3) Sakuntala devi 4) Bhaskara
- 48) A sphere is inscribed in a cube that has a surface area of 24 cm^2 . A second cube is then inscribed within the sphere. The surface area on inner cube in cm^2 is ____
 1) 3 2) 8 3) 6 4) 9
- 49) $A = \frac{1}{101} + \frac{1}{102} + \frac{1}{103} + \dots + \frac{1}{200}$ and $B = 1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \dots + \frac{1}{199} - \frac{1}{200}$
 then $\left(\frac{A}{B} + 1\right)^2 - \left(\frac{B}{A} + 1\right)^2 =$ ____
 1) Positive fraction 2) Negative fraction 3) Prime number 4) Integer
- 50) If 100 cats kill 100 mice in 100 days . In how many days 4 cats kill 4 mice ?
 1) 4 2) 100 3) 10 4) 1

- 51) Which of the following points will always lie within the triangle ?
 1) Ortho centre 2) Circum centre 3) Centroid 4) Excentre
- 52) Distance between circumcentre and centroid of triangle with vertices (6,0), (0,6) and (6,6) is _____ units
 1) $\sqrt{2}$ 2) $3\sqrt{3}$ 3) $4\sqrt{2}$ 4) $6\sqrt{3}$
- 53) The graph of $y = x^2 + x$ represents _____
 1) Circle 2) Parabola 3) Ellipse 4) Hyperbola
- 54) $(x - a)(x - 10) + 1$ can be factorized as product $(x + \alpha)(x + \beta)$; α, β are integers and a is a natural number, sum of possible values of a will be _____
 1) 20 2) 28 3) 12 4) 8
- 55) a and b are roots of $x^2 - 10cx - 11d = 0$ and c, d are roots of $x^2 - 10ax - 11b = 0$ where $a \neq b \neq c \neq d$ then $a + b + c + d =$ _____
 1) 1000 2) 1210 3) 1332 4) 1480
- 56) Number of circles passing through all points (2000, 2007), (2018, 2025), (208, 215), (-30, -23), $(-15/2, -1/2)$ is _____
 1) 1 2) 5 3) 0 4) Infinite
- 57) A circle has centre C and Chord AB of length $\sqrt{98}$ units. P is external point to this circle and PA and PB are perpendicular tangents to it. Then the area of the circle = _____ Sq.units approximately.
 1) 154 2) 77 3) 196 4) 84
- 58) A number when divided by 55 leaves remainder 28. The same number when divided by 11 leaves remainder _____
 1) 5 2) 7 3) 6 4) 8
- 59) Consider first 1000 natural numbers. The number of numbers among them which are neither divisible by 2 nor by 3 nor by 7 is _____
 1) 286 2) 189 3) 427 4) 500
- 60) Full form of IMO is _____
 1) Indian Mathematical olympiad 2) International Mathematical Olympiad
 3) Indian Mathematical Organisation 4) International Maths Organisation

