Target Mathematics by- Dr.Agyat Gupta
Resi.: D-79 Vasant Vihar ; Office : 89-Laxmi bai colony
visit us: agyatgupta.com;Ph. :7000636110(O) Mobile : 9425109601(P)

SAMPLE PAPER-OOC

MATHEMATICS

*A Highly Simulated Practice Questions Paper for CBSE **Class XII** (Term I) Examination*

Instructions

*1. This question paper contains **three sections - A, B and C**. Each section is compulsory.*
*2. **Section - A** has 20 MCQs, attempt **any 16 out of 20**.*
*3. **Section - B** has 20 MCQs, attempt **any 16 out of 20**.*
*4. **Section - C** has 10 MCQs, attempt **any 8 out of 10**.*
5. There is no negative marking.
6. All questions carry equal marks.

Roll No. | | | | | | | |

Maximum Marks : 40
Time allowed : 90 min

Section A

In this section, attempt any 16 questions out of Questions 1-20. Each question is of 1 mark weightage.

1. The point at which the tangent to the curve $y = \sqrt{4x-3} - 1$ has its slope $\frac{2}{3}$, is

(a) (2, 3) (b) (3, 2) (c) (3, 1) (d) (1, 3)

2. The value of $\begin{bmatrix}1\\1\\2\end{bmatrix}[1 \quad -1 \quad 2]\begin{bmatrix}2\\1\\0\end{bmatrix}$ is

(a) $\begin{bmatrix}1\\0\\0\end{bmatrix}$ (b) $[1 \quad 1 \quad 2]$ (c) $\begin{bmatrix}1\\1\\2\end{bmatrix}$ (d) $\begin{bmatrix}2\\1\\3\end{bmatrix}$

3. If for any 2×2 square matrix A, $A\,\text{adj}(A) = \begin{bmatrix}5 & 0\\0 & 5\end{bmatrix}$, then the value of $\frac{|A|}{5}$ is

(a) 64 (b) 1 (c) 5 (d) 32

4. If $\begin{bmatrix}4 & 3\\x & 5\end{bmatrix} = \begin{bmatrix}y & z\\1 & 5\end{bmatrix}$, then the value of xyz is

(a) 10 (b) 12 (c) 15 (d) 0

5. If $x = \sin\theta$, $y = \tan\theta$, then $\frac{dy}{dx}$ at $\theta = \frac{\pi}{3}$ is equal to

(a) 1 (b) 8 (c) 3 (d) 4

6. If A is a square matrix such that $A^2 = I$, then $A + A^{-1}$ is equal to

(a) $A + I$ (b) A (c) 0 (d) $2A$

7. The equation of tangent to the curve $y = 2x^2 + 3\sin x$ and (0, 0) is

(a) $y = 3x$ (b) $y = -3x$ (c) $x = 3y$ (d) $x = -3y$

8. If $[x \quad 1]\begin{bmatrix} 1 & 0 \\ -2 & 0 \end{bmatrix} = 0$, then x^2 is equal to

(a) 2 (b) 4 (c) 8 (d) 1

9. The value of $\cos\left(\frac{1}{2}\sin^{-1}\frac{\sqrt{3}}{2}\right)$ is

(a) $\frac{1}{2}$ (b) $\frac{\sqrt{3}}{2}$ (c) $\frac{1}{\sqrt{2}}$ (d) None of these

10. The principal value of $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$ is

(a) $\frac{-2\pi}{3}$ (b) $-\frac{\pi}{3}$ (c) $\frac{4\pi}{3}$ (d) $\frac{5\pi}{3}$

11. Let X be the set of all persons living in a city. Persons x, y in X are said to be related as $x < y$, if y is atleast 5 yr older than x. Which one of the following is correct?

(a) The relation is an equivalence relations on X
(b) The relation is transitive but neither reflexive nor symmetric
(c) The relations is reflexive but neither transitive nor symmetric
(d) The relation is symmetric but neither transitive nor reflexive

12. Let S denote set of all integers. Define a relation R on S as 'aRb' if $ab \geq 0$, where $a, b \in S$. Then, R is

(a) reflexive but neither symmetric nor transitive relation
(b) reflexive, symmetric but not transitive relation
(c) an equivalence relation
(d) symmetric but neither reflexive nor transitive relation

13. If $\begin{bmatrix} x+y \\ x-y \end{bmatrix} = \begin{bmatrix} 2 & 1 \\ 4 & 3 \end{bmatrix}\begin{bmatrix} 1 \\ -2 \end{bmatrix}$, then (x, y) is

(a) (1, 1) (b) (1, −1) (c) (−1, 1) (d) (−1, −1)

14. If $\Delta = \begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & 7 \end{vmatrix}$, then $\frac{M_{21}}{M_{32} - 1}$ is equal to

(a) 1 (b) 2 (c) 3 (d) 4

15. If $\begin{vmatrix} x & -1 \\ 9 & x \end{vmatrix} = \begin{vmatrix} 6 & 2 \\ 9 & 6 \end{vmatrix}$, then x is equal to

(a) 6 (b) ±3 (c) −3 (d) 3

16. The function $f(x) = \log x$ is strictly increasing on

(a) $[-1, 0]$ (b) $(0, \infty)$ (c) $(-\infty, \infty)$ (d) None of these

17. The function $f(x) = x^3 - 3x^2 + 3x - 10$ in the interval $(-\infty, \infty)$ is

(a) decreasing (b) increasing (c) strictly increasing (d) strictly decreasing

18. The slope of the tangent to the curve $x = 3t^2 + 1$, $y = t^3 - 1$ at $x = 1$ is

(a) -1 (b) 1 (c) 0 (d) 2

19. If $x\begin{bmatrix} 2x & 2 \\ 3 & x \end{bmatrix} + 2\begin{bmatrix} 8 & 5x \\ 4 & 4x \end{bmatrix} = 2\begin{bmatrix} x^2 + 8 & 24 \\ 10 & 6x \end{bmatrix}$, then x^2 is equal to

(a) 4 (b) 16 (c) 2 (d) 1

20. The point on the curve $y = x^2 - 4x + 5$, where tangent to the curve is parallel to the X-axis is

(a) (0, 5) (b) $(-1, 0)$ (c) (1, 2) (d) (2, 1)

Section B

In this section, attempt any 16 questions out of Questions 21-40. Each question is of 1 mark weightage.

21. If $y = (\cot^{-1} x)^2$ and $(x^2 + 1)^2 \frac{d^2y}{dx^2} + 2x(x^2 + 1)\frac{dy}{dx} = K$, then K is equal to

(a) 1 (b) 2 (c) 5 (d) 7

22. If $A = \begin{bmatrix} 1 & 1 \\ 0 & 2 \end{bmatrix}$, then $A^2 + 3A - 2I$ is equal to

(a) $\begin{bmatrix} 2 & 6 \\ 0 & 8 \end{bmatrix}$ (b) $\begin{bmatrix} 2 & 0 \\ 4 & 6 \end{bmatrix}$ (c) $\begin{bmatrix} 0 & 6 \\ 2 & 4 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & 1 \\ 2 & 3 \end{bmatrix}$

23. The equation of normal at the point (1, 1) on the curve $2y + x^2 = 3$ is

(a) $x + y = 0$ (b) $x - y = 0$ (c) $x + y + 1 = 0$ (d) $x - y = 1$

24. If $x = a(t - \sin t)$, $y = a(1 + \cos t)$, then $\frac{dy}{dx}$ at $t = \frac{\pi}{2}$ is equal to

(a) -1 (b) 0 (c) 3 (d) 8

25. If $y = \log(xy)$, then $\frac{dy}{dx}$ at (1, 2) is equal to

(a) 1 (b) 2 (c) 3 (d) 4

26. The maximum value of the function $f(x) = -(x - 1)^2 + 8$ is

(a) 7 (b) 8 (c) 0 (d) 1

27. The value of $\sin\left[\frac{\pi}{2} - \sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)\right]$ is

(a) $\frac{1}{2}$ (b) $-\frac{1}{2}$ (c) 1 (d) -1

28. The function $f : R \to R$ defined by $f(x) = \frac{x}{x^2 + 1}$, $\forall\, x \in R$ is

(a) one-one (b) not one-one (c) bijective (d) None of these

29. Let $f:[0,1]\to[0,\infty)$ be defined by $f(x)=\frac{x}{1+x}$, then f is

(a) one-one but not onto (b) onto but not one-one
(c) both one-one and onto (d) neither one-one nor onto

30. If $A=\begin{bmatrix}1 & 5\\ 3 & 9\end{bmatrix}$ and $B=\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$, then

(a) $AB=BA$ (b) $AB\neq BA$ (c) $A^2=B$ (d) None of these

31. If $A=\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}$, then $|3A|$ is equal to

(a) $3|A|$ (b) $9|A|$ (c) $|A|$ (d) $27|A|$

32. If at $x=1$, then function $f(x)=x^4-62x^2+ax+9$ attains its maximum value on the interval $[0, 2]$, then the value of a is

(a) 124 (b) 120 (c) -120 (d) 128

33. If $y=3\cos x+3\sin x$, then $\frac{d^2y}{dx^2}+y$ is equal to

(a) 0 (b) 1 (c) 2 (d) 3

34. If $y=e^{-3x}$ and $\frac{d^2y}{dx^2}=Ky$, then K is equal to

(a) $\frac{1}{9}$ (b) 9 (c) 2 (d) 1

35. If $y=2\log\sin x$, then $\frac{d^2y}{dx^2}$ is equal to

(a) $-2\operatorname{cosec}^2x$ (b) $2\operatorname{cosec}^2x$ (c) $2\cot^2x$ (d) $\sec^2x$

36. If $x=at^2$ and $y=at^3$, then $\frac{d^2y}{dx^2}$ at $t=\frac{3}{4}$ is equal to

(a) a (b) $\frac{1}{a}$ (c) 4 (d) -1

37. If $y=a\cos^3 t$ and $x=a\sin^3 t$, then $\frac{dy}{dx}$ at $t=\frac{\pi}{4}$ is

(a) 1 (b) -1 (c) 0 (d) 2

38. The function $f(x)=(x-1)e^x+2$ on $[0,\infty)$ is

(a) increasing (b) decreasing (c) strictly decreasing (d) None of these

39. For real numbers x and y, define a relation R, xRy if only if $x-y+\sqrt{2}$ is an irrational number. The, the relation R is

(a) reflexive (b) symmetric
(c) transitive (d) an equivalence relation

40. The function $f(x)=x^3+x^2+x+1$ has

(a) maximum value at $x=-1$ (b) minimum value at $x=-1$
(c) neither maximum nor minimum value (d) None of these

Section C

In this section, attempt any 8 questions. Each question is of 1 mark weightage. Questions 46-50 are based on Case-Study.

41. If $x = \tan\left(\frac{1}{a}\log y\right)$ and $(1+x^2)\frac{d^2y}{dx^2} + 2x\frac{dy}{dx} = k\frac{dy}{dx}$, then k is equal to

(a) a (b) $\frac{a}{2}$ (c) $2a$ (d) 1

42. If $A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$, then A^{50} is equal to

(a) $2^{49}A$ (b) $2A$ (c) $49A$ (d) $2^{99}A$

43. The function f given by $f(x) = x^2 - x + 1$ on $(-1, 1)$ is

(a) strictly decreasing (b) strictly increasing
(c) neither strictly increasing nor strictly decreasing (d) None of these

44. If $y = \sin^{-1} x$ and $(1-x^2)\frac{d^2y}{dx^2} = k\frac{dy}{dx}$, then k is equal to

(a) x (b) x^2 (c) 1 (d) 0

45. If $\lambda^3 = -2$, then the value of $\begin{vmatrix} 1 & 2\lambda & 1 \\ \lambda^2 & 1 & 3\lambda^2 \\ 2 & 2\lambda & 1 \end{vmatrix}$ is

(a) -11 (b) -12 (c) -13 (d) 0

CASE STUDY

Suppose a dealer in rural area wishes to propose a number of sewing machines. He has some money to invest and has space for few items for storage.
Let x denotes the number of electronic sewing machines and y denotes the number of manually operated sewing machines purchased by the dealer. For the same, constraint related to investment is given by $3x + 2y \le 48$.
And objective function is $Z = 22x + 18y$.
And other constraints consists the following $x + y \le 20$, $x, y \ge 0$.
Based on above information, answer the following questions.

46. Number of corner points of the feasible region is

(a) 3 (b) 4 (c) 5 (d) 6

47. Sum of values of Z at all the corner points is

(a) 1008 (b) 1104 (c) 1100 (d) 1108

48. To get the maximum profit (i.e. maximise Z) how many electronic sewing machines should be purchased by the dealer.

(a) 12 (b) 8 (c) 10 (d) 5

49. To get the maximum profit (i.e. maximise Z) how many manually operated sewing machines should be purchased by the dealer.

(a) 10 (b) 5 (c) 8 (d) 12

50. $Z|_{max} - Z|_{min}$ is equal to

(a) 360 (b) 392 (c) 352 (d) None of these