

SECOND REVISION TEST - 2025

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Standard X MATHEMATICS

Reg.No.

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Marks : 100

Time : 3.00 hrs

Part - I

14 x 1 = 14

I. Choose the correct answer:

1. $A = \{a, b, p\}$, $B = \{2, 3\}$, $C = \{p, q, r, s\}$ then $n[(A \cup C) \times B]$ is
a) 8 b) 20 c) 12 d) 16
2. $f(x) = (x + 1)^3 - (x - 1)^3$ represents a function which is
a) linear b) cubic c) reciprocal d) quadratic
3. $7^{4k} \equiv \underline{\hspace{2cm}} \pmod{100}$
a) 1 b) 2 c) 3 d) 4
4. If the HCF of 65 and 117 is expressible in the form of $65m - 117$, then the value of m is
a) 4 b) 2 c) 1 d) 3
5. The values of a and b if $4x^4 - 24x^3 + 76x^2 + ax + b$ is a perfect square are
a) 100, 120 b) 10, 12 c) -120, 100 d) 12, 10
6. Transpose of a column matrix is
a) Unit matrix b) Diagonal matrix c) Column matrix d) Row matrix
7. A tangent is perpendicular to the radius at the
a) Centre b) Point of contact c) Infinity d) Chord
8. If in triangles ABC and EDF , $\frac{AB}{DE} = \frac{BC}{FD}$ then they will be similar
a) $\angle B = \angle E$ b) $\angle A = \angle D$ c) $\angle B = \angle D$ d) $\angle A = \angle F$
9. If $(5, 7)$, $(3, p)$ and $(6, 6)$ are collinear, then the value of p is
a) 3 b) 6 c) 9 d) 12
10. $(2, 1)$ is the point of intersection of two lines
a) $x - y - 3 = 0$; $3x - y - 7 = 0$ b) $x + y = 3$; $3x + y = 7$
c) $3x + y = 3$; $x + y = 7$ d) $x + 3y - 3 = 0$; $x - y - 7 = 0$
11. The angle of elevation _____ as we move towards the foot of the vertical object like tower or building.
a) decreases b) equal c) 45° d) increases

12. If the radius of the base of a cone is tripled and the height is doubled then the volume is
 a) made 6 times b) made 18 times c) made 12 times d) unchanged
13. The range of the data 8,8,8,8,8 8 is
 a) 0 b) 1 c) 8 d) 3
14. A, B are said to be mutually exclusive events if
 a) $A \cap B = \phi$ b) $A \cap B = A$ c) $A \cap B = B$ d) $A \cap A' = A'$

Part - II

II. Answer any 10 questions. (Q.No.28 is compulsory) 10 x 2 = 20

15. A relation R is given by the set $\{(x,y) / y = x + 3, x \in \{0,1,2,3,4,5\}\}$. Determine its domain and range.
16. Let be a function $f : N \rightarrow N$ be defined by $f(x) = 3x + 2, x \in N$, find the images of 1,2,3
17. If $1 + 2 + 3 + \dots + k = 325$ then find $1^3 + 2^3 + 3^3 + \dots + k^3$
18. Simplify : $\frac{x-3}{x^2-9}$
19. If the difference between a number and its reciprocal is $\frac{24}{5}$, find the number.

20. In the matrix $A = \begin{pmatrix} 8 & 9 & 4 & 3 \\ -1 & \sqrt{7} & \frac{\sqrt{3}}{2} & 5 \\ 1 & 4 & 3 & 0 \\ 6 & 8 & -11 & 1 \end{pmatrix}$,

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write (i) The number of elements (ii) The order of the matrix

21. State the Menelaus Theorem.
22. Show that the points P(-1.5, 3) Q(6, -2), R(-3, 4) are collinear.
23. To prove : $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \operatorname{cosec}\theta + \cot\theta$
24. Calculate the slope and y-intercept of the straight line $8x - 7y + 6 = 0$
25. If the ratio of radius of two spheres is 4 : 7, find the ratio of their volumes.
26. Find the diameter of a sphere whose surface area is 154 m^2 .
27. Write the sample space for tossing three coins using tree diagram.
28. Find the standard deviation of first 21 natural numbers.

III. Answer any 10 questions. (Q.No.42 is compulsory)

10 x 5 = 50

29. Let A = The set of all natural numbers less than 8, B = The set of all prime numbers less than 8, C = The set of even prime numbers. Verify that $A \times (B - C) = (A \times B) - (A \times C)$

30. If the function f is defined by $f(x) = \begin{cases} x+2, & x > 1 \\ 2, & -1 \leq x \leq 1 \\ x-1, & -3 < x < -1 \end{cases}$, find the values of

(i) f(3) (ii) f(0) (iii) f(-1.5)

31. Find the sum of all natural numbers between 300 and 600 which are divisible by 7

32. $A = \begin{pmatrix} 1 & 2 \\ 1 & 3 \end{pmatrix}$, $B = \begin{pmatrix} 4 & 0 \\ 1 & 5 \end{pmatrix}$, show that $(A - B)^T = A^T - B^T$.

33. Solve : $3x - 2y + z = 2$, $2x + 3y - z = 5$, $x + y + z = 6$

34. Show that in a triangle, the medians are concurrent.

35. Show that the given points form a parallelogram A(2.5, 3.5), B(10, -4), C(2.5, -2.5), D(-5, 5)

36. A mobile phone is put to use when the battery power is 100%. The percent of battery power "y" (in decimal) remaining after using the mobile phone for x-hours is assumed as $y = -0.25x + 1$

i) Find the number of hours elapsed if the battery power is 40%

ii) How much time does it take so that the battery has no power?

37. If $\operatorname{cosec}\theta + \cot\theta = P$, then prove that $\cos\theta = \frac{P^2 - 1}{P^2 + 1}$

38. An aeroplane at an altitude of 1800 m finds that two boats are sailing towards it in the same direction. The angles of depression of the boats as observed from the aeroplane are 60° and 30° respectively. Find the distance between the two boats. ($\sqrt{3} = 1.732$)

39. A cylindrical drum has a height of 20 cm and base radius of 14 cm. Find its curved surface area and the total surface area.

40. Find the mean and variance of the first "n" natural numbers.

41. In a class of 50 students, 28 opted for NCC, 30 opted for NSS and 18 opted both NCC and NSS. One of the students is selected at random. Find the probability that

- The student opted for NCC but not NSS
- The student opted for NSS but not NCC
- The student opted for exactly one of them

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42. Find the sum to n terms of the series $5 + 55 + 555 + \dots$

Part - IV

IV. Answer all the questions.

2 x 8 = 16

43. a) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{3}$ of the corresponding sides of the triangle PQR. (Scale factor $\frac{7}{3} > 1$)

(OR)

b) Draw a circle of diameter 6 cm from a point P, which is 8 cm away from its centre. Draw the two tangents PA and PB to the circle and measure their lengths.

44. a) Draw the graph of $xy = 24$, $x, y > 0$, using the graph, find

- y when $x = 3$ and
- x when $y = 6$

(OR)

b) Draw the graph of $y = x^2 + x - 2$ and hence solve $x^2 + x - 2 = 0$
