# FIRST REVISION TEST - 2024

**B**

## Standard X

Reg.No. | | | | | | |

## MATHEMATICS

*Time : 3.00 hrs* *Marks : 100*

### Part - I

**14 x 1 = 14**

**I. Choose the correct answer:**

1. If the ordered pairs (a+2, 4) and (5, 2a+b) are equal then (a, b) is
   a) (2, –2) b) (5, 1) c) (2, 3) d) (3, –2)
2. If $f(x) = 2x^2$ and $g(x) = \frac{1}{3x}$, then fog is
   a) $\frac{3}{2x^2}$ b) $\frac{2}{3x^2}$ c) $\frac{2}{9x^2}$ d) $\frac{1}{6x^2}$
3. The sum of exponents of the prime factors in the prime factorization of 144 is
   a) 4 b) 5 c) 6 d) 3
4. An A.P consists of 31 terms. If its $16^{th}$ term is m, then the sum of all the terms of this A.P is
   a) 16 m b) 62 m c) $\frac{31}{2}$ m d) 31 m
5. If $ax^2 + bx + c = 0$ has equal roots, then c is equal to
   a) $\frac{b^2}{2a}$ b) $\frac{b^2}{4a}$ c) $-\frac{b^2}{2a}$ d) $-\frac{b^2}{4a}$
6. For the given matrix $A = \begin{pmatrix} 1 & 3 & 5 & 7 \\ 2 & 4 & 6 & 8 \\ 9 & 11 & 13 & 15 \end{pmatrix}$ the order of the matrix $A^T$ is
   a) 2 x 3 b) 3 x 2 c) 3 x 4 d) 4 x 3
7. In a $\Delta ABC$, AD is the bisector of $\angle BAC$. If AB = 8 cm, BD = 6 cm and DC = 3 cm. The length of the side AC is
   a) 6 cm b) 4 cm c) 3 cm d) 8 cm
8. The slope of the line joining (12,3), (4,a) is $\frac{1}{8}$. The value of 'a' is
   a) 1 b) 4 c) –5 d) 2
9. Two straight lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ where the co-efficients are non-zero, then the condition for perpendicular
   a) $a_1b_2 - a_2b_1 = 0$ b) $a_1a_2 - b_1b_2 = 0$
   c) $a_1a_2 + b_1b_2 = 0$ d) $\frac{a_1}{a_2} = \frac{b_1}{b_2}$
10. $\tan\theta \operatorname{cosec}^2\theta - \tan\theta$ is equal to
    a) $\sec\theta$ b) $\cot^2\theta$ c) $\sin\theta$ d) $\cot\theta$

11. The curved surface area of a right circular cone of height 15 cm and base diameter 16 cm is

a) $60\ \pi\ cm^2$ b) $68\ \pi\ cm^2$ c) $120\ \pi\ cm^2$ d) $136\ \pi\ cm^2$

12. A funnel has the shape of the combination of

a) a cone and a cylinder b) frustum of a cone and a cylinder

c) a sphere and a cylinder d) frustum of a cone and a hemi phere

13. The range of the data 8, 8, 8, 8, ..... 8 is

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

14. Which of the following is incorrect?

a) $P(A) > 1$ b) $0 \le P(A) \le 1$

c) $P(\phi) = 0$ d) $P(A) + P(\bar{A}) = 1$

## Part - II

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

15. If $A \times B = \{(3,2), (3,4), (5,2), (5,4)\}$, then find A and B.

16. Find k if fo $f(k) = 5$ where $f(k) = 2k - 1$

17. Find the greatest number that will divide 445 and 572 leaving remainders 4 and 5 respectively.

18. *Find the sum* $3 + 1 + \frac{1}{3} + \ldots\ldots\infty$

19. Find the value of $3A - 9B$ if $A = \begin{pmatrix} 0 & 4 & 9 \\ 8 & 3 & 7 \end{pmatrix}$ and $B = \begin{pmatrix} 7 & 3 & 8 \\ 1 & 4 & 9 \end{pmatrix}$.

20. If $\Delta ABC \sim \Delta DEF$ such that area of $\Delta ABC$ is $9\ cm^2$ and the area of $\Delta DEF$ is $16\ cm^2$ and $BC = 2.1$ cm. Find the length of EF.

21. A man goes 18 m due east and then 24 m due north. Find the distance of his current position from the starting point.

22. Find the equation of a line passing through the point (3,–4) and having slope $-\frac{5}{7}$.

23. Prove that $\sec\theta - \cos\theta = \tan\theta \sin\theta$

24. *If the base area of a hemispherical solid is 1386 sq.m, then find its total surface area?*

25. An aluminium sphere of radius 12 cm is melted to make a cylinder of radius 8 cm. Find the height of the cylinder.

26. Find the range and co-efficient of range of the following data :

25, 67, 48, 53, 18, 39, 44

27. If P(A) = 0.37, P(B) = 0.42, P(A∩B) = 0.09, then find P(A∪B).

28. Find the excluded value of the expression $\frac{x^2+6x+8}{x^2+x-2}$

## Part - III

**III. Answer any 10 questions. (Q.No.42 is compulsory)** **10 x 5 = 50**

29. Let A = {1,2,3,4} and B = {2,5,8,11,14} be two sets. Let f : A→B be a function given by f(x) = 3x – 1. Represent this function

    i) by arrow diagram ii) in a table form

    iii) as a set of ordered pairs iv) in a graphical form

30. Find x if gff(x) = fgg(x), given f(x) = 3x + 1 and g(x) = x + 3

31. The sum of first n, 2n and 3n terms of an A.P are $S_1$, $S_2$ and $S_3$ respectively. Prove that $S_3 = 3(S_2 - S_1)$

32. Rekha has 15 square colour papers of sides 10 cm, 11 cm, 12 cm ..... 24 cm. How much area can be decorated with these colour papers?

33. If $9x^4 + 12x^3 + 28x^2 + ax + b$ is a perfect square, find the values of a and b

34. If $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$, show that $A^2 - 5A + 7I_2 = 0$

35. State and prove Thales theorem.

36. Find the area of the quadrilateral formed by the points (8,6), (5,11), (–5,12) and (–4,3).

37. A line makes positive intercepts on co-ordinate axes whose sum is 7 and it passes through (–3,8). Find its equation.

38. Show that $\left(\frac{1+\tan^2 A}{1+\cot^2 A}\right) = \left(\frac{1-\tan A}{1-\cot A}\right)^2$

39. From the top of a 12 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 30°. Determine the height of the tower.

40. A capsule is in the shape of a cylinder with two hemisphere stuck to each of its ends. If the length of the entire capsule is 12 mm and the diameter of the capsule is 3 mm, how much medicine it can hold?

41. The marks scored by the students in a slip test are given below. Find the standard deviation of their marks.

| x | 4 | 6 | 8 | 10 | 12 |
|---|---|---|---|---|---|
| f | 7 | 3 | 5 | 9 | 5 |

42. Two dice are rolled together. Find the probability of getting a doublet or sum of faces as 4.

## Part - IV

**IV. Answer all the questions.** **2 x 8 = 16**

43. a) Take a point which is 11 cm away from the centre of a circle of radius 4 cm and draw the two tangents to the circle from that point.

***(OR)***

b) Construct a triangle $\Delta PQR$ such that QR = 5 cm, $\angle P = 30^\circ$ and the altitude from P to QR is of a length 4.2 cm.

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

i) y when x = 3 and ii) x when y = 6

***(OR)***

b) Draw the graph of $y = x^2 + 3x - 4$ and hence use it to solve $x^2 + 3x - 4 = 0$

******

Kancheepuram. DT

9/Jan/2024 X Maths Key Answers I st Revision



Part-1

1) d (3, -2)

2) c) $2/9 x^2$

3) c) 6

4) d) 31 m

5) b) $b^2/4a$

6) d) 4×3

7) b) 4cm

8) d) 2

9) c) $a_1a_2 + b_1b_2 = 0$

10) d) $\cot\theta$

11) d) $136\pi cm^2$

12) b) Frustum of cone & a cylinder

13) a) 0

14) a) $P(A) > 1$

PART-II

15) $A = \{3, 5\}$, $B = \{2, 4\}$ //

16) $F(2k-1) = 5$

$2(2k-1) - 1 = 5$

$4k - 3 = 5$

$k = \frac{8}{4} \Rightarrow k = 2$ //

17) 1145 - 4 = 1141, 572 - 5 = 567

$567 = 1141 \times 1 + 126$

$1141 = 126 \times 3 + 63$ ∴ HCF

$126 = 63 \times 2 + 0$ 63 //

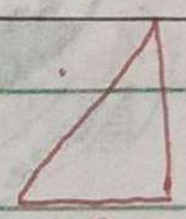
18) $a = 3$, $r = 1/3$

$S_\infty = \frac{a}{1-r} = \frac{3}{1-1/3} = 9/2$ //

19) $3A - 9B = \begin{bmatrix} -63 & -15 & -45 \\ 15 & -27 & -60 \end{bmatrix}$

20) $\frac{9}{16} = \left(\frac{2.1}{EF}\right)^2$

$\frac{3}{4} = \frac{2.1}{EF} \Rightarrow EF = 2.8$ //

21) 


$d = \sqrt{18^2 + 24^2}$

$d = \sqrt{900} = 30m$ //

22) $y - y_1 = m(x - x_1)$

$y + 4 = -5/7 (x - 3)$

$5x + 7y + 13 = 0$ //

23) $\sec\theta - \cos\theta$

$= \frac{1}{\cos} - \cos = \frac{1 - \cos^2}{\cos}$

$= \frac{\sin^2}{\cos}$

$= \tan\theta \sin\theta$.

24) T.S.A $\Rightarrow 3\pi r^2 = 3 \times 1386$

$= 4158 m^2$

25) $\pi r^2 h = \frac{4}{3}\pi r^3$

$8 \times 8 h = \frac{4}{3} \times 12 \times 12 \times 12$

$h = 36$ cm //

26) Range $= L - S$

$= 67 - 18 = 49$ //

$\left.\begin{matrix}\text{Coeff} \\ \text{(Range)}\end{matrix}\right\} = \frac{L-S}{L+S} = \frac{49}{85} = 0.576$

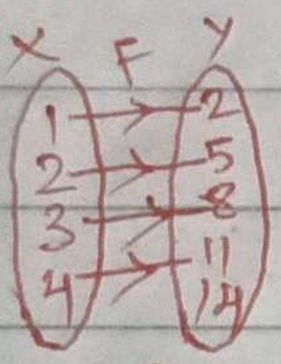
27) $P(A \cup B) = 0.37 + 0.42 - 0.09$

$= 0.70$ //

28) $x = 1,1$ //

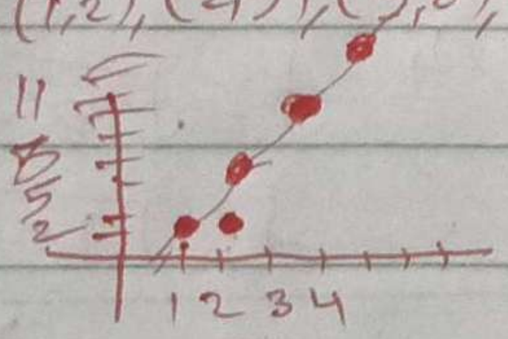
PART - III

29)




| x | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| F | 2 | 5 | 8 | 11 |

$F = \{(1,2), (2,5), (3,8), (4,11)\}$




30) $gff(x) = g(f(3x+1))$

$= g(3(3x+1)+1)$

$= g(9x+4)$

$= 9x+4+3$

$= 9x+7$ — (1)

$fgg(x) = f(g(x+3))$

$= f(3(x+3)+3)$

$= 3(x+6)+1$

$= 3x+19$ — (2)

(1) = (2) $\Rightarrow 9x+7 = 3x+19$

$x = 2$

31) $S_2 - S_1 = \frac{2n}{2}[2a+(2n-1)d] - \frac{n}{2}[2a+(n-1)d]$

$= \frac{n}{2}[2a+(3n-1)d]$

$3(S_2 - S_1) = \frac{3n}{2}[2a+(3n-1)d]$

$3(S_2 - S_1) = S_3$.

32) $(1^2 + \cdots + 24^2) - (1^2 + \cdots + 9^2)$

$\Sigma n^2 = \frac{n(n+1)(2n+1)}{6}$

$= \frac{24(25)(49)}{6} - \frac{9(10)(19)}{6}$

$= 4900 - 285 \Rightarrow 4615\ cm^2$

33)

$3x^2$ | $9x^4 + 12x^3 + 28x^2 + ax + b$ | $3x^2 + 2x + 4$

$9x^4$ (−)

$12x^3 + 28x^2$ (−)

$12x^3 + 4x^2$

$24x^2 + ax + b$ (−)

$24x^2 + 16x + 16$

$0$

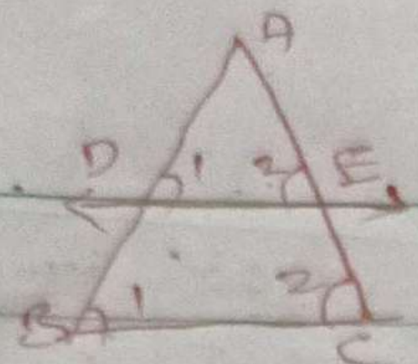
$6x^2 + 4x + 4$ (→)

$a = 16,\ b = 16$

34) $= \begin{pmatrix} 8 & 5 \\ -5 & 3 \end{pmatrix} - \begin{pmatrix} 15 & 5 \\ -5 & 10 \end{pmatrix} + \begin{pmatrix} 7 & 0 \\ 0 & 7 \end{pmatrix}$

$= \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}$

35.)




A line drawn Parallel to a Side of $\Delta$ and Intresecting other 2 Sides in Same ratio

To Prove: $\frac{AD}{DB} = \frac{AE}{EC}$

$\Delta ABC \sim \Delta ADE$

Proof $\frac{AB}{AD} = \frac{AC}{AE}$,

$1 + \frac{DB}{AD} = 1 + \frac{EC}{AE}$

$\frac{AD}{DB} = \frac{AE}{EC}$

36.) $A = \frac{1}{2}\begin{Bmatrix} 8 & 5 & -5 & -4 & 8 \\ 6 & 11 & 12 & 3 & 6 \end{Bmatrix}$

$A = \frac{1}{2}\{158\} = 79$ Sq units.

37.) $\frac{x}{a} + \frac{y}{b} = 1$ $b = 7 - a$

$\frac{-3}{a} + \frac{8}{7-a} = 1$

$a^2 + 4a - 21 = 0$

$a = 3, -7$

$b = 4$

$\frac{x}{3} + \frac{y}{4} = 1$

$4x + 3y - 12 = 0$

38.) $\left(\frac{1+\tan^2 A}{1+\cot^2 A}\right) = \left(\frac{1-\tan A}{1-\cot A}\right)^2$

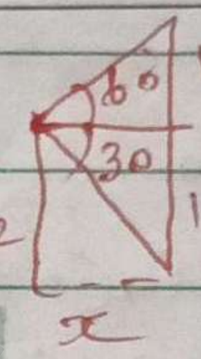
$\frac{1+\tan^2 A}{\tan^2 A + 1} = \left(\frac{1-\tan A}{\frac{\tan A - 1}{\tan A}}\right)^2$

$\frac{1}{\tan^2 A} = \tan^2 A.$

$\tan^2 A = \tan^2 A.$

H.P

39.)




at 30°

$\tan 30° = \frac{12}{x}$

$x = 12\sqrt{3}$ — (1)

at 60°

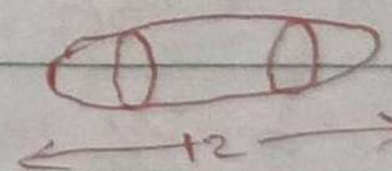
$\tan 60° = \frac{h-12}{x}$

(1) $\Rightarrow \sqrt{3} = \frac{h-12}{12\sqrt{3}}$

$h = 36 + 12$

$h = 48$ m

40.)




$r = \frac{3}{2}$

$h = 9$

$V = V(cyl) + 2(V(HS))$

$= \pi r^2 h + 2\left(\frac{2}{3}\pi r^3\right)$

$= \frac{22}{7} \times \frac{3}{2} \times \frac{3}{2} \times 9 + 2 \times \frac{2}{3} \times \frac{22}{7} \times \frac{3}{2} \times \frac{3}{2} \times \frac{3}{2}$

$= \frac{22}{7} \times \frac{9}{4}\left(9 + \frac{4}{3} \times \frac{3}{2}\right)$

$= 77.79 \text{ mm}^2$

A10)

| x | f | d = x − 4 | fd | $fd^2$ |
|---|---|---|---|---|
| 4 | 7 | −4 | −28 | 112 |
| 6 | 3 | −2 | −6 | 12 |
| 8 | 5 | 0 | 0 | 0 |
| 10 | 9 | 2 | 18 | 36 |
| 12 | 5 | 4 | 20 | 80 |
| | 29 | | 4 | 240 |

$N$ $\quad \Sigma fd \quad \Sigma fd^2$

$$\sigma = \sqrt{\frac{\Sigma fd^2}{N} - \left(\frac{\Sigma fd}{N}\right)^2}$$

$$= \sqrt{\frac{240}{29} - \left(\frac{4}{29}\right)^2}$$

$$= \sqrt{\frac{6944}{29 \times 29}} = 2.87$$

A20) $n(S) = 36$

$A = \{(1,1), (2,2), \ldots (6,6)\}$ $\quad n(A) = 6$

$B = \{(1,3), (2,2), (3,1)\}$ $\quad n(B) = 3$

$A \cap B = \{(2,2)\}$ $\quad n(A \cap B) = 1$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$= \frac{n(A)}{n(S)} + \frac{n(B)}{n(S)} - \frac{n(A \cap B)}{n(S)}$$

$$= \frac{6}{36} + \frac{3}{36} - \frac{1}{36}$$

$$= \frac{2}{9}$$