From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20m high building are 45° and 60° respectively. Find the height of the tower.

Prove that $\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \frac{1}{\sec\theta - \tan\theta}$ using the identity $\sec^2\theta = 1 + \tan^2\theta$

Or

Write all the other trigonometric ratios of $\angle A$ in terms of sec A.

9. A girl of height 90cm is walking away from the base of a lamp-post at a speed of 1.2m/s. If the lamp is 3.6m above the ground, find the length of her shadow after 4 seconds.

Or

If AD and PM are the medians of triangles ABC and PQR, respectively where $\Delta ABC \sim \Delta PQR$, Prove that $\frac{AB}{PQ} = \frac{AD}{PM}$.

Or

The altitude of a right triangle is 7cm less than its base. If the hypotenuse is 13cm, find the other two sides.

36. A cubical block of side 7cm is surmounted by a hemisphere. What is the greatest diameter the hemisphere can have? Find the surface area of the solid.

Or

A Gulab Jamun, contains sugar syrup upto about 30% of its volume. Find approximately how much syrup would be found in 45 Gulab Jamuns, each shaped like a cylinder with two hemispherical ends with length 5cm and diameter 2.8 cm.

10. The roots of the quadratic equation $2x^2 - 5x + 3 = 0$ are

(a) 2, 3

(b) 1, $\frac{2}{3}$

(c) 1, $\frac{3}{2}$

(d) None of these

11. Prime factorization of 8190 is $2^3 \times 3^2 \times 5 \times 7$. (True / False)

12. The common difference of A.P. $\frac{1}{2q}, \frac{1-2q}{2q}, \frac{1-4q}{2q}, \ldots\ldots\ldots$ is

(a) 1

(b) -1

(c) 2q

(d) None of these

Or

PQ is a chord of length 8cm of a circle of radius 5cm. The tangents at P and Q intersect at a point T. Find the length TP.

30. D is a point on the side BC of a triangle ABC such that $\angle ADC = \angle BAC$. Show that $CA^2 = CB.\ CD$.

31. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio. Prove it.

32. Prove that $3+2\sqrt{5}$ is irrational.

33. How many terms of the A.P:

9, 17, 25, ... must be taken to give a sum of 636 ?

40. The distribution below gives the weights of 30 students of a class. Find the median weight of the students.

Weight (in kg)	Number of Students
40-45	2
45-50	3
50-55	8
55-60	6
60-65	6
65-70	3
70-75	2

*****

23. 2 cubes each of volume $64cm^3$ are joined end to end. Find the surface area of the resulting cuboid.

Or

Find the slant height of a Cone of radius = 2.5cm and height = 6cm.

24. Given that $\tan A = \frac{4}{3}$, find the other trigonometric ratios of angle A.

25. Find the point on the x – axis which is equidistant from (2, – 5) and (–2, 9).

Or

Find a relation between x and y such that the point (x, y) is equidistant from the points (3, 6) and (–3, 4).

13. For any event A associated to a random experiment, we have $0 \leq P(A) \leq 1$. (True / False)

14. Two figures having the same shape but not necessarily the same size are called _____ figures. (Congruent/Similar)

15. A circle may have _____ parallel tangents.

16. Write the first three terms of the sequence $a_n = (-1)^n . 2^n$.

17. The pair of equations $2x + 3y - 9 = 0$ and $4x + 6y - 18 = 0$ are dependent equations. (True / False)

18. Sec $A = \frac{12}{5}$ for some value of angle A. (True / False)

Or

$Sec^2A = 1 +$ _____ for $0° \leq A < 90°$.

6. The midpoint of the line segment joining A(–2, 8) and B(–6, –4) is

(a) (–4, 2)

(b) (4, 2)

(c) (–4, –6)

(d) None of these

7. L.C.M of 6 and 72 is :

(a) 72

(b) 6

(c) 12

(d) None of these

8. If P(A) = 0.6, then P(not A) is

(a) 0.04

(b) 0.4

(c) 0.004

(d) None of these

9. Volume of hemisphere is

(a) $\frac{3}{2}\pi r^3$

(b) $\frac{2}{3}\pi r^3$

(c) $\frac{4}{3}\pi r^3$

(d) None of these

Or

How many three-digit numbers are divisible by 7 ?

34. A die is thrown once. Find the probability of getting.

(i) a prime number

(ii) a number lying between 2 and 6.

SECTION–D

(4 marks each)

35. Rohan's mother is 26 years older than him. The product of their ages (in years) 3 years from now will be 360. Find Rohan's present age.

Total No. of Questions : 40] [Total No. of Printed Pages : 15

10th ARNKD(W/Z) JKLUT-2025

1003-B

MATHEMATICS

Time : 3 Hours] **[Maximum Marks : 80**

Note:- **"Attempt any 68 Marks out of 80 Marks".**

SECTION–A

(1 mark each)

1. Which of the following represents an irrational number?

(a) $\frac{3}{7}$ (b) 0.333.....

(c) $2+\sqrt{3}$ (d) None of these

4. Which of the following is the 5th term of the A.P : 7, 14, 21, ...?

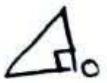
(a) 28

(b) 35

(c) 53

(d) None of these

5. Which of the following is the ratio of adjacent side to the hypotenuse in a right triangle for acute angle θ.



(a) Sin θ

(b) Sec θ

(c) Tan θ

(d) None of these

26. Find the zeroes of the polynomial $6x^2 - 3 - 7x$ and verify the relationship between the zeroes and the coefficients.

SECTION–C

(3 marks each)

27. If A and B are (–2, –2) and (2, –4) respectively, find the co-ordinates of P such that $AP = \frac{3}{7} AB$ and P lies on the line segment AB.

28. A chord of a circle of radius 12 cm subtends an angle of 120° at the centre. Find the area of the corresponding segment of the circle. (use $\pi = 3.14$ and $\sqrt{3} = 1.73$).

29. Two concentric circles are of radii 5cm and 3cm. Find the length of the chord of the larger circle which touches the smaller circle.

2. If $4x + 2 = 10 - 2y$, What is the value of y when $x = 0$?

(a) –4

(b) 4

(c) 5

(d) None of these

3. The Co-efficient of x^2 in the polynomial $5x^3 - 2x^2 + 3x - 4$ is

(a) 2

(b) –4

(c) –2

(d) None of these

19. Calculate mean of first 5 prime numbers. 5.6

20. Write the empirical relation between mean, mode and median.
mean − mode = 3(

Or

Write the formula for mode of Grouped data.

SECTION–B

(2 marks each)

21. The larger of two supplementary angles exceeds the smaller by 18 degrees. Find them.

22. Find the roots of the quadratic equation $2x^2 + x - 300 = 0$ by factorisation.