CAREERS360

A Career is a Life

MBSE HSLC MATHS

SAMPLE PAPER-1

Mizoram Board
Class X
Mathematics
Sample Paper – 1

Time: 3 hrs **Total Marks: 80**

General Instructions:

1. The question paper consists of 44 questions.
2. All questions are compulsory.
3. Internal choices have been provided in some questions.
4. Marks allocated to every question are indicated against it.

Section A
(Questions 1 to 24 carry 1 mark each)

1. A letter is chosen at random from the word 'PROBABILITY'. The probability that it is a vowel is

(i) $\frac{1}{11}$

(ii) $\frac{2}{11}$

(iii) $\frac{3}{11}$

(iv) $\frac{4}{11}$

2. If the length of the shadow cast by a pole is $\sqrt{3}$ times the length of the pole, then the angle of elevation of the Sun is

(i) 45^{o}

(ii) 30^{o}

(iii) 60^{o}

(iv) 90^{o}

3. If $\triangle ABC \sim \triangle RQP$, $\angle A = 80°$, $\angle B = 60°$, the value of $\angle P$ is:

(i) 60°

(ii) 50°

(iii) 40°

(iv) 30°

4. If $\frac{1}{2}$ is a root of the equation $x^2 + kx - \frac{5}{4} = 0$, then the other root of the quadratic equation is

(i) $-\frac{5}{2}$

(ii) -2

(iii) $\frac{1}{4}$

(iv) $-\frac{1}{2}$

5. The decimal expansion of the rational number $\frac{2^3}{2^2.5}$ will terminate after which of the following conditions:

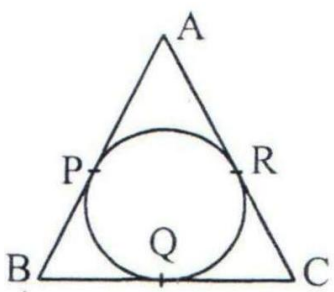
(i) One decimal place

(ii) Two decimal places

(iii) Three decimal places

(iv) More than three decimal places

6. In Fig., the sides AB, BC and CA of a triangle ABC, touch a circle at P, Q and R respectively. If PA = 4 cm, BP = 3 cm and AC = 11 cm, then the length of BC (in cm) is:



(i) 11

(ii) 10

(iii) 14

(iv) 15

7. A cylinder and a cone are of the same base radius and height. The ratio of the volume of the cylinder to that of the cone is:

(i) 1:2

(ii) 2:3

(iii) 3:1

(iv) 1:3

8. Which of the following equations has the sum of its roots as 3?

(i) $2x^2 - 3x + 6 = 0$

(ii) $-x^2 + 3x - 3 = 0$

(iii) $x^2 + 5x + 6 = 0$

(iv) $3x^2 - 3x + 3 = 0$

9. The distance between the points (3, 4) and (8, −6) is

(i) $\sqrt{5}$ units

(ii) $2\sqrt{5}$ units

(iii) $3\sqrt{5}$ units

(iv) $5\sqrt{5}$ units

10. If $\frac{4}{5}$, a, and 2 are three consecutive terms of an A.P., then the value of a is:

(i) $\frac{1}{5}$

(ii) $\frac{2}{5}$

(iii) $\frac{7}{5}$

(iv) $\frac{9}{5}$

11. HCF of 96 and 404 is

(i) 16

(ii) 4

(iii) 4696

(iv) 96

12. If (x+1) is a factor of $2x^3+ax^2+2bx+1$, then find the values of a and b, given that 2a-3b=4

(i) a=5, b=2

(ii) a=2, b=5

(iii) a=5, b=5

(iv) a=2, b=2

13. How many solutions are possible for the following pair of equation?

2 x + 4 y -12= 0 and x + 2y- 4 =0

(i) Infinite solutions

(ii) No solution

(iii) One solution

(iv) More than one solution

14. If $ax^2 + bx + c$, $a \neq 0$ is factorizable into product of two linear factors, then roots of $ax^2 + bx + c = 0$ can be found by equating each factor to

(i) 0
(ii) 1
(iii) -1
(iv) 2

15. What is the sum of the first 50 multiples of 3?

(i) 3255
(ii) 3825
(iii) 4325
(iv) 4455

16. If the ratios of areas of two similar triangles are 169: 225 the ratios of their corresponding angle-bisector segments is:

(i) 5:4
(ii) 13:15
(iii) 13:5
(iv) 15:13

17. The ratio in which the centroid divides each median is

(i) 1:2
(ii) 2:1
(iii) 1:3
(iv) 3:1

18. Sides of two similar triangles are in the ratio 4: 9. What is the ratio of the area of these triangles?

(i) 2:3
(ii) 4:9
(iii) 81:16
(iv) 16:81

19. What is the sum of the first 50 multiples of 3?

(i) 3255
(ii) 3825
(iii) 4325
(iv) 4455

20. If $ax^2 + bx + c$, $a \neq 0$ is factorizable into product of two linear factors, then roots of $ax^2 + bx + c = 0$ can be found by equating each factor to

(i) 0
(ii) 1
(iii) -1
(iv) 2

21. Which of the following coordinates lies on the line $2x - 3y = 12$?

(i) (1,2)
(ii) (1,3)
(iii) (3,-2)
(iv) (3,2)

22. How many coins 1.75 cm in diameter and 2 mm thick must be melted to form a cuboid 11 cm x 10 cm x 7 cm?

(i) 16
(ii) 1600
(iii) 160
(iv) 8

23. Which of the following measures of central tendency takes into account all the observations?

(i) Mean
(ii) Median
(iii) Mode
(iv) Arithmetic Progression

24. If an unbiased coin is tossed, then the event of getting a 'head' or 'tail' is called

(i) impossible event
(ii) elementary event
(iii) complementary event
(iv) certain event

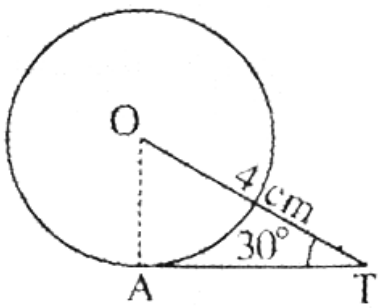
Section B
(Questions 25 to 34 carry 2 marks each)

25. α, β are the roots of the quadratic polynomial p (x) = x^2 - (k + 6)x + 2 (2k -1).

Find the value of k, if $\alpha+\beta=\frac{1}{2}\alpha\beta$.

26. Use Euclid's division algorithm to find H.C.F. of 870 and 225.

27. In the given figure, AT is a tangent to the circle with centre O. Find the length of AT.



28. An umbrella has 10 ribs which are equally spaced. Assuming the umbrella to be a flat circle of radius 40 cm, find the area between two consecutive ribs of the umbrella.

29. The angle of depression of a car parked on the road from the top of a 150 m high tower is 30°. Find the distance of the car from the tower (in metres).

30. Prove that: $\sqrt{\frac{\sec\theta-1}{\sec\theta+1}}+\sqrt{\frac{\sec\theta+1}{\sec\theta-1}}=2\operatorname{cosec}\theta$

Or

Find the value of $\frac{5\sin^2 30°+\cos^2 45°-4\tan^2 30°}{2\sin 30°\cos^2 30°+\tan 45°}$

31. A park with flower plants is to be developed within a quadrilateral with points A (0, −1), B (6, 7), C (−2, 3) and D (8, 3) as vertices and AB and CD as diagonals. Show that AB and CD bisect each other and $AD^2 + DB^2 = AB^2$. Find the area of the park. (All distances are in km)

32. Check whether the equation $6x^2 - 7x + 2 = 0$ has real roots, if yes; find them by completing the squares method.

Or

If one of the zero of the quadratic polynomial $2x^2 - 3x + p$ is 3, then find its other zero. Also find the value of p.

33. For what values of a and b does the following pairs of linear equations have an infinite number of solutions:

$2x + 3y = 7$; $a(x + y) - b(x - y) = 3a + b - 2$

34. In a seminar, the number of participants in Hindi, English and Mathematics are 60, 84 and 108 respectively. Find the minimum number of rooms required if in each room the same number of participants are to be seated and all of them being in the same subject.

Section C
(Questions 35 to 41 carry 3 marks each)

35. A leading library has a fixed charge for the first three days and an additional charge for each day thereafter. Bhavya paid Rs. 27 for a book kept for seven days, while Vrinda paid Rs. 21 for a book kept for five days. Find the fixed charge and charge for each extra day.

36. Find the ratio in which the line segment joining the points A(3,- 3) and B(-2, 7) is divided by x-axis. Also find the coordinates of the point of division.

37. Draw a triangle ABC with side BC = 6 cm, $\angle C = 30^\circ$ and $\angle A = 105^\circ$. Then construct another triangle whose sides are $\frac{2}{3}$ times the corresponding sides of ΔABC.

Or

For the data given below draw less than ogive curve.

Marks	0 - 10	10 - 20	20 – 30	30 - 40	40 - 50	50 – 60
Number of students	7	10	23	51	6	3

38. The interior angles of a polygon are in A.P. The smallest angle is 52° and the common difference is 8°. Find the number of sides of the polygon.

39. In triangle ABC, D is the mid-point of BC and AE $\perp$ BC. If AC > AB, then show that: $AB^2 = AD^2 - BC \times DE + \frac{BC^2}{4}$.

40. Solve the equations $2x - y + 6 = 0$ and $4x + 5y - 16 = 0$ graphically. Also determine the coordinate of the vertices of the triangle formed by these lines and the x-axis.

41. The angle of elevation of a cloud from a point 60 metres above a lake is 30° and the angle of depression of the reflection of the cloud in the lake is 60°. Find the height of the cloud.

Section D
(Questions 42 to 44 carry 5 marks each)

42. A lead pencil consists of a wood cylinder with a solid cylinder of graphite fitted into it. The diameter of the pencil is 7 mm. The diameter of the graphite is 1 mm and length of the pencil is 10 cm. Calculate the weight of whole pencil in grams if the density of the wood is 0.6 gm/ cm^3 and of graphite 2.3 gm/ cm^3.

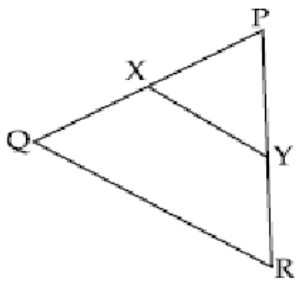
Or

The area enclosed by the circumferences of two concentric circles is 346.5 cm^2. If the circumference of the inner circle is 88 cm, calculate the radius of the outer circle.

43. If mean of the following data is 86, then what is the value of p?

Wages (in Rs.)	50-60	60-70	70-80	80-90	90-100	100-110
Number of worker	5	3	*4*	p	2	13

44. In the figure, XY || QR, $\frac{PQ}{XQ}=\frac{7}{3}$ and PR = 6.3 cm. Find YR.



Or

Prove that the area of an equilateral triangle described on one side of a square is equal to half the area of the equilateral triangle described on one of its diagonals.