Mizoram Board
Class X
Mathematics
Sample Paper – 2

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. If a die is thrown once the probability of getting a prime number is

(i) $\frac{1}{2}$

(ii) $\frac{1}{3}$

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

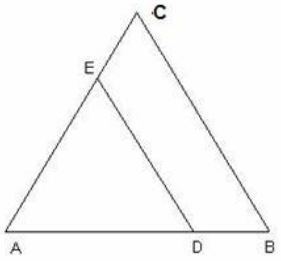
(iv) $\frac{1}{5}$

2. The ratio of the length of a pole and its shadow is $\sqrt{3}:1$. The angle of elevation of the Sun is

(i) 30°
(ii) 45°
(iii) 90°
(iv) 60°

3. In the adjoining figure, DE is parallel to BC if AD = x, DB = x - 2, AE = x +2 and EC = x - 1. The value of x is:

A. 6
B. 2
C. 5
D. 4



4. If α and β are the zeroes of the quadratic polynomial f (x) = $x^2 + 2x + 1$, then $\frac{1}{\alpha}+\frac{1}{\beta}$ is

(i) -2

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

5. Which of the following numbers is irrational?
(i) 2.454545…
(ii) 0.11111…
(iii) 0.101100101010…
(iv) 0.23232323

6. To draw a pair of tangents to a circle which are inclined to each other at an angle of 35°, it is required to draw tangents at the end points of those two radii of the circle, the angle between which is
A. 105°
B. 70°
C. 140°
D. 145°

7. The centroid of the triangle whose vertices are (3, −5), (−7, 4), and (10, −2) is
(i) (2,1)
(ii) (2,-1)
(iii) (3, 1)
(iv) (2, 3)

8. Which of the following cannot be the probability of an event?
(i) 0.3
(ii) -1.5
(iii) 0.5
(iv) 0.7

9. The co-ordinates of a point A, where AB is diameter of a circle whose centre is (2, −3) and B is (1, 4), are:
(i) (3, 0)
(ii) (0, -10)
(iii) (3, 4)
(iv) (3, -10)

10. For what value(s) of k will the equation $kx^2 - 5x + k=0$ have a repeated root?
(i) $\frac{1}{2}$
(ii) $\frac{-1}{2}$
(iii) $\frac{\pm 5}{2}$
(iv) $\frac{\pm 3}{2}$

11. The probability of happening of an event is **p.** The maximum and minimum values of **p** are
(i) max(p) = 4, min(p) = 1
(ii) max(p) = 2, min(p) = 3
(iii) max(p) =3, min(p) = 2
(iv) max(p)=1, min(p) = 0

12. The mean of a data set with 12 observations is calculated as 19.25. If one more value is included in the data, then for the new data with 13 observations mean become 20. Value of this 13th observation is:
(i) 29
(ii) 28
(iii) 30
(iv) 31

13. A shuttle cock used for playing badminton has the shape of the combination of
(i) A cylinder and a sphere
(ii) A sphere and a cone
(iii) A cylinder and a hemisphere
(iv) A hemisphere and frustum cone

14. If the diameter of semicircular protractor is 14 cm, then its perimeter will be
(i) 30 cm
(ii) 36 cm
(iii) 40 cm
(iv) 44 cm

15. A line that intersects a circle in two distinct points is called
(i) diameter
(ii) secant
(iii) tangent
(iv) radius

16. A ladder leaning against a wall makes an angle of 60^0 with the wall. If its foot is 6.2 m away from the wall, its length is
(i) 14.2m
(ii) 12.4m
(iii) 8m
(iv) 10.2m

17. The value of cos θ cos(90° - θ) - sin θ sin (90° - θ) is
(i) 1
(ii) 0
(iii) 2
(iv) -1

18. The ordinate of a point is twice its abscissa. If its distance from the point (4,3) is $\sqrt{10}$, then the coordinates of the point are
(i) (1,2) or (3,5)
(ii) (1,2) or (3,6)
(iii) (2,1) or (6,3)
(iv) (2,1) or (3,6)

19. "A line from midpoint of one side of a triangle, parallel to second side bisects the third side" is the statement of
(i) converse of midpoint theorem
(ii) converse of basic proportionality theorem
(iii) midpoint theorem
(iv) basic proportionality theorem

20. In the given AP, 210 is which term of AP, 2,6,10.....?
(i) 50th
(ii) 52nd
(iii) 53rd
(iv) 54th

21. The sum of the ages of two friends is 20 years. Four years ago, the product of their ages in years was 48. Their present ages are
(i) 2 and 18
(ii) 6 and 14
(iii) 10 and 10
(iv) The situation is not possible

22. A lending library has a fixed charge for the first two days and an additional charge for each day thereafter. Sunil paid Rs. 28 for a book kept for five days, while Sohail paid Rs. 32 for the book he kept for seven days. Find the charge for each extra day.
(i) Rs 18
(ii) Rs 2
(iii) Rs 20
(iv) Rs 3

23. Given a polynomial p(x) of degree 'n', the graph of y = p(x) intersects the X-axis
(i) at most 'n' points
(ii) at most 'n+1'points
(iii) at most 0 points
(iv) at most 'n-1' points

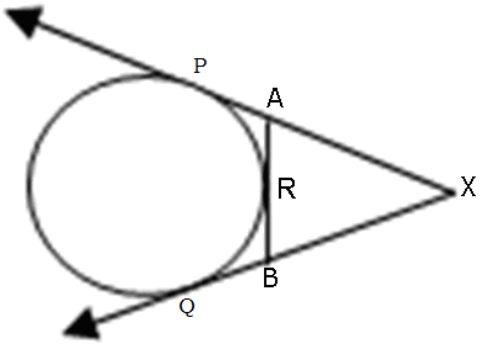
24. Largest number that divides 679 and 599 leaving remainder 4 is
(i) 35
(ii) 15
(iii) 25
(iv) 5

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

25. If the zeros of the polynomial $f(x) = x^3 - 3x^2 + x + 1$ are a – b, a, a+ b, find a and b.

26. Find the H.C.F of 455 and 84 using the division algorithm.

27. In the given figure, XP and XQ are tangents from X to the circle. R is a point on the circle. Prove that XA + AR = XB + BR.



28. A bicycle wheel makes 5000 revolutions in moving 11 km. Find the diameter of the wheel.

29. A bridge across a river makes an angle of 45° e across the river is 150 m, what is the width of the river?

30. Prove that: $\frac{\sec A+\tan A}{\sec A-\tan A}=\left(\frac{1+\sin A}{\cos A}\right)^2$

Or

If $7\sin^2\theta + 3\cos^2\theta = 4$, then find θ and hence prove that $\sec\theta + \operatorname{cosec}\theta = 2 + \frac{2}{\sqrt{3}}$

31. Find the area of the quadrilateral ABCD whose vertices are A(1, 1), B(7, −3), C(12, 2) and D(7, 21) respectively.

32. Solve : $\frac{1}{a}+\frac{1}{b}+\frac{1}{x}=\frac{1}{a+b+x}$

33. Solve for x and y:

$\frac{x}{a}+\frac{y}{b} = 2$; $ax - by = a^2 - b^2$

34. Prove that $\frac{3}{2\sqrt{5}}$ is an irrational number.

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

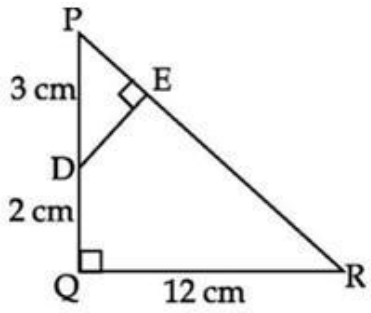
35. Prema invests a certain sum at the rate of 10% per annum of interest and another sum at the rate of 8% per annum to get a yield of Rs. 1640 in one year's time. Next year she interchanges the rates and gets a yield of Rs. 40 less than the previous year. How much did she invest in each type in the first year?

36. If the point (x, y) is equidistant from the points (a + b, b − a) and (a − b, a + b), then prove that bx = ay.

37. Construct a triangle similar to ΔABC in which AB = 4.6 cm, BC = 5.1 cm, m$\angle$A = 60° with scale factor 4: 5.

38. In a school, students thought of planting trees in an around the school to reduce air pollution. It was decided that the number of trees, that each section of each class will plant, will be the same as the class in which they are studying, e.g., a section of class-I will plant 1 tree, a section of class II will plant 2 trees and so on till class XII. There are three sections of each class. How many trees will be planted by the students? What value can you infer from the planting the trees?

39. In the given figure, Δ PQR is right-angled triangle right-angled at Q. DE ⊥ PR. Prove ΔPQR ~ ΔPED and find the lengths of PE and DE if PD = 3 cm, QD = 2 cm and QR = 12 cm.



40. Form a pair of linear equations for the following problem, and find the solution graphically.

"10 students of Class X took part in a Mathematics quiz. If the number of girls is 4 more than the number of boys, find the number of boys and girls who took part in the quiz."

Or

The following table gives production yield per hectare of wheat of 100 farms of a village.

Production yield	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80
Number of farms	2	8	12	24	38	16

Change the distribution to a 'more than' type distribution and draw ogive.

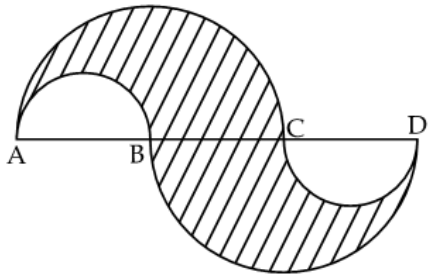
41. From a window of a house in a street, h metres above the ground, the angles of elevation and depression of the top and the foot of another house on the opposite side of the street are α and β respectively. Show that the height of the opposite house is h(1+ tan α . cot β) metres.

Section D
(Questions 42 to 44 carry 4 marks each)

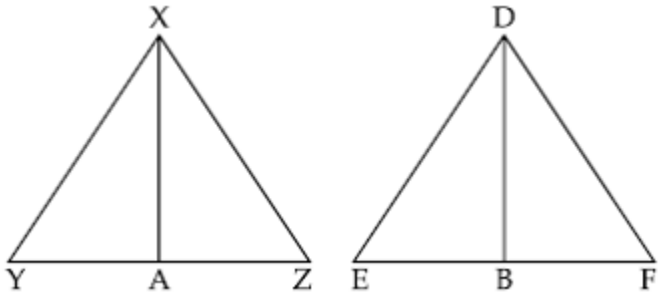
42. A tent is of the shape of a right circular cylinder upto a height of 3 metres and conical above it. The total height of the tent is 13.5 metres above the ground. Calculate the cost of painting the inner side of the tent at the rate of Rs. 2 per square metre, if the radius of the base is 14 metres.

Or

In the given figure, AC = BD = 7 cm and AB = CD = 1.75 cm. Semicircles are drawn as shown in the figure. Find the area of the shaded region. $\left[\text{Take } \pi = \frac{22}{7}\right]$



43. Find the mean of following distribution by the step deviation method.

Daily Expenditure:	100 - 150	150 - 200	200- 250	250 - 300	300- 350
No. of householders:	4	5	12	2	2

44. In the figure, sides XY and YZ and median XA of a triangle XYZ are proportional to sides DE, EF and median DB of ΔDEF. Show that $\Delta XYZ \sim \Delta DEF$.