Meghalaya Board
Class X
Mathematics
Sample Paper – 2

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

General Instructions:
1. The figures in the margin indicate full marks for the questions.
2. The Question paper consists of 30 questions divided into five Sections, A, B, C, D, and E.
3. In Question Nos. 1 to 8 of Section – A, there are four answers marked (A), (B), (C) and (D). Only one of these answers is correct. The letter indicating the correct answer should be written in capital in the answer book.
4. In question on construction, the drawing should be neat and exactly as per the given measurements.
5. Use of Calculator/Mobile Phone is not permitted in the Examination Hall.

Section A
(Questions 1 to 10 carry 1 mark each)

1. If a die is thrown once the probability of getting a prime number is
   (i) $\dfrac{1}{2}$
   (ii) $\dfrac{1}{3}$
   (iii) $\dfrac{1}{4}$
   (iv) $\dfrac{1}{5}$

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
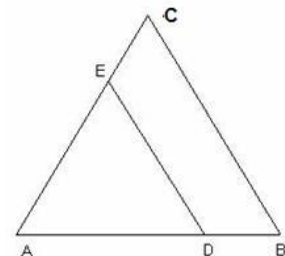
4. If α and β are the zeroes of the quadratic polynomial f (x) = x^2 + 2x + 1, then $\dfrac{1}{\alpha}+\dfrac{1}{\beta}$ is
- (i) -2
- (ii) -1
- (iii) 0
- (iv) 2

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) $\dfrac{1}{2}$

(ii) $\dfrac{-1}{2}$

(iii) $\dfrac{\pm 5}{2}$

(iv) $\dfrac{\pm 3}{2}$

Section B
(Questions 11 to 16 carry 2 marks each)

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

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

13. 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.
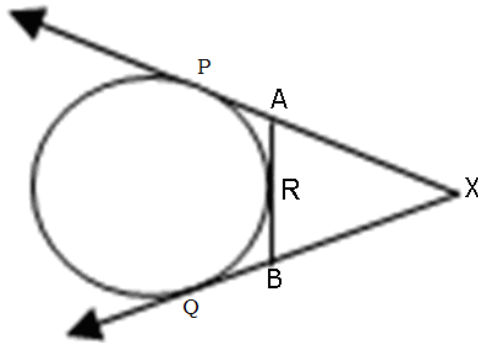
14. A bicycle wheel makes 5000 revolutions in moving 11 km. Find the diameter of the wheel.

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

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

Or

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

Section C
(Questions 17 to 22 carry 3 marks each)

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

18. Solve : $\dfrac{1}{a} + \dfrac{1}{b} + \dfrac{1}{x} = \dfrac{1}{a+b+x}$

19. Solve for x and y:

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

20. Prove that $\dfrac{3}{2\sqrt{5}}$ is an irrational number.

21. 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?

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

Section D
(Questions 23 to 26 carry 4 marks each)

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

24. 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?

25. In the given figure, Δ PQR is right-angled triangle right-angled at Q. DE $\perp$ PR. Prove ΔPQR ∼ ΔPED and find the lengths of PE and DE if PD = 3 cm, QD = 2 cm and QR = 12 cm.
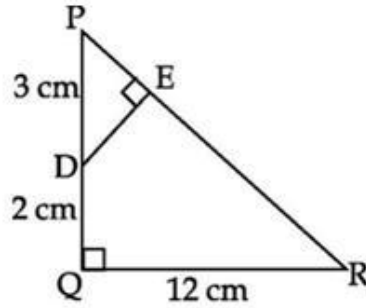
26. Form a pair of linear equations for the following problem, and find the solution graphically.

"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.

### Section E
(Questions 23 to 26 carry 4 marks each)

27. 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.

28. 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. $\left[\text{Take } \pi = \dfrac{22}{7}\right]$
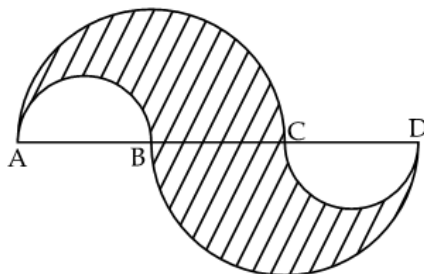
29. Find the mean of following distribution by the step deviation method.

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

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