

**CBSE Board**  
**Class X Mathematics**  
**Sample Paper 8**

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

1. All questions are **compulsory**.
2. The question paper consists of **30** questions divided into **four sections** A, B, C, and D. **Section A** comprises of **6** questions of 1 mark each, **Section B** comprises of **6** questions of 2 marks each, **Section C** comprises of **10** questions of 3 marks each and **Section D** comprises of **8** questions of 4 marks each.

**Section A**  
**(Questions 1 to 6 carry 1 mark each)**

1. The probability of occurrence of event A is denoted by  $P(A)$ . What will be the range of  $P(A)$ ?
2. A tree is broken by the wind. The top struck the ground at an angle of  $30^\circ$  and at a distance of 30 metres from the foot of the tree. Find the height of the tree in metre.
3. Find the distance between two parallel tangents of a circle of radius 5 cm.
4. The first and last terms of an A.P. are 1 and 11. If the sum of all its terms is 36, then find the number of terms in the A.P.

**OR**

If  $4/5$ ,  $a$ ,  $2$  are three consecutive terms of an AP then find the value of  $a$ .

5. If the perimeter and area of a circle are numerically equal, then find the radius of the circle.
6. Is  $0.101100101010$  an irrational number? Justify your answer.

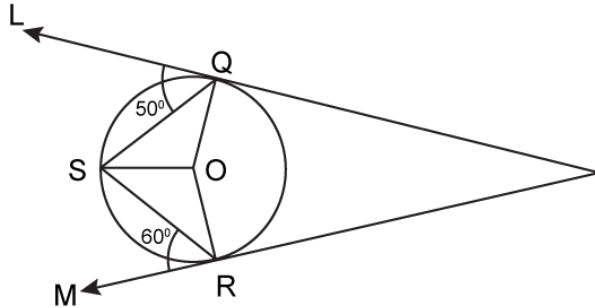
**OR**

Without actually performing the long division, state whether  $\frac{17}{8}$  is a terminating decimal expansion or a non-terminating repeating decimal expansion.

**Section B**  
**(Questions 7 to 12 carry 2 marks each)**

7. Find the value of  $k$  for which  $x = 1$  is a root of the equation  $x^2 + kx + 3 = 0$ .
8. Find the H.C.F of 455 and 84 using the division algorithm.

9. In given figure, PQL and PRM are tangents to the circle with centre O at the points Q and R respectively. S is a point on the circle such that  $m\angle SQL = 50^\circ$  and  $\angle SRM = 60^\circ$ . Find the value of  $\angle QSR$ .



10. In a circle of radius 10 cm, an arc subtends an angle of  $90^\circ$  at the centre. Find the area of the major sector.
11. If  $\sqrt{3} \tan \theta = 3 \sin \theta$ , prove that  $\sin^2 \theta - \cos^2 \theta = \frac{1}{3}$ .

**OR**

Find the value of  $(1 - \sin^2 x) \sec^2 x$ .

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

### Section C

**(Questions 13 to 22 carry 3 marks each)**

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

**OR**

Prove that  $\tan 1^\circ \tan 2^\circ \tan 3^\circ \dots \tan 89^\circ = 1$

14. If the points A(7, -2), B(5, 1) and C(3, k) are collinear, then find the value of k.
15. Find the values of k for which the given equation has real and equal roots:  
 $2x^2 - 10x + k = 0$ .
16. Find three terms of an A.P. whose sum is 3 and product is -8.

**OR**

Which term of series 3, 8, 13, 18, ... Is 498?

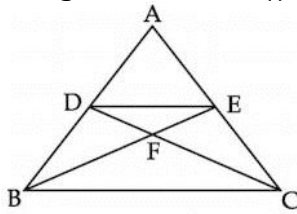
17. Prove that  $\frac{3}{2\sqrt{5}}$  is an irrational number.

18. Solve for x and y:

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

19. If the mid-point of the line segment joining the points A (3, 4) and B (k, 6) is P(x, y), and  $x + y - 10 = 0$ , then find the value of k.
20. What is the probability of having 53 Thursdays in a non-leap year?

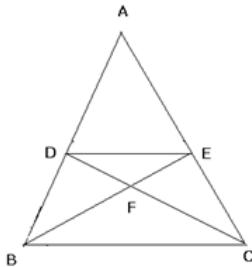
21. In figure below,  $DE \parallel BC$  and  $AD : DB = 5 : 4$ . Find:  $\frac{\text{ar}(\triangle DFE)}{\text{ar}(\triangle CFB)}$



**OR**

In the given figure,  $ABC$  is a triangle,  $DE \parallel BC$  and  $\frac{AD}{BD} = \frac{3}{2}$

- Find out  $\frac{AD}{AB}$ .
- Prove that the  $\triangle ADE$  is similar to  $\triangle ABC$  and write down the ratio  $\frac{DE}{BC}$ .
- Prove that  $\triangle DEF$  is similar to  $\triangle CFB$



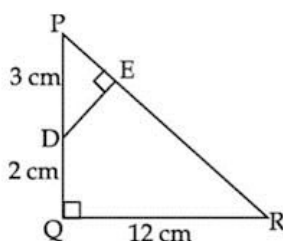
22. Find the median for the following frequency distribution:

Class Interval	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70 - 79
Frequency	2	4	8	9	4	2	1

### Section D

**(Questions 23 to 30 carry 4 marks each)**

- Prove that the lengths of tangents drawn from an external point to a circle are equal.
- A two digit number is such that the product of its digits is 18. When 63 is subtracted from the number, the digits interchange their places. Find the number.
- In the given figure,  $\triangle PQR$  is right-angled triangle right-angled at  $Q$ .  $DE \perp PR$ . Prove  $\triangle PQR \sim \triangle PED$  and find the lengths of  $PE$  and  $DE$  if  $PD = 3$  cm,  $QD = 2$  cm and  $QR = 12$  cm.



26. Find all zeroes of polynomial  $4x^4 - 20x^3 + 23x^2 + 5x - 6$  if two of its zeroes are 2 and 3.

**OR**

Determine the value of 'm' if  $(x - m)$  is a factor of the polynomial,  $(x^3 - (m^2 - 1)x + 2)$ .  
Hence find the value of k if  $3m + 6 = k$ .

27. Find the value of 
$$\frac{\sec(90^\circ - \theta) \cdot \operatorname{cosec} \theta - \tan(90^\circ - \theta) \cot \theta + \cos^2 25^\circ + \cos^2 65^\circ}{3 \tan 27^\circ \tan 63^\circ}$$

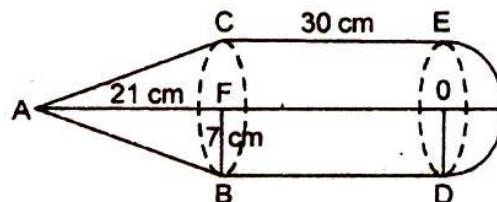
**OR**

Prove that 
$$\frac{\sin A - 2\sin^3 A}{2\cos^3 A - \cos A} = \tan A$$

28. A bucket is in the form of a frustum of a cone of height 30 cm with radii of its lower and upper ends as 10 cm and 20 cm respectively. Find the capacity and surface area of the bucket. Also, find the cost of the milk required to completely fill the bucket, at the rate of Rs. 25 per litre (use  $\pi = 3.14$ ).
29. A copper wire of 4 mm diameter is evenly wound around a cylinder whose length is 24 cm and diameter 20 cm so as to cover whole surface. Find the length and weight of the wire assuming the density to be  $8.68 \text{ gm/cm}^3$ .

**OR**

In the diagram given below if  $AF = 21 \text{ cm}$ ,  $CE = 20 \text{ cm}$  and  $FB = 7 \text{ cm}$ . Find the volume of the figure. [3]



30. Due to some default in the engine of a helicopter, a pilot has to make an emergency landing in an area as shown in the given figure.
- What is the probability of safe landing?
  - What is the probability of landing in the jungle?
  - As it has a larger area, the pilot decided to land on Safe Land A rather than Safe Land B. Which value does the pilot show?

