CBSE Board

Class X Mathematics

Sample Paper 6 (Standard)

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

General Instructions:

1. **All** questions are **compulsory**.
2. The question paper consists of **40** questions divided into **four sections** A, B, C, and D. **Section A** comprises of **20** questions of 1 mark each, **Section B** comprises of **6** questions of 2 marks each, **Section C** comprises of **8** questions of 3 marks each and **Section D** comprises of **6** questions of 4 marks each.
3. There is no overall choice. However, an internal choice has been provided in **two questions of 1 mark** each, **two questions of 2 marks** each, **three questions of 3 marks** each, and **three questions of 4 marks** each. You have to attempt only one of the alternatives in all such questions.
4. Use of calculator is **not** permitted.

Section A

(Q 1 to Q 10) are multiple choice questions.
Select the most appropriate answer from the given options

1. If $a = (2^2 \times 3^3 \times 5^4)$ and $b = (2^3 \times 3^2 \times 5)$ then HCF (a, b) = ?
(a) 90
(b) 180
(c) 360
(d) 540

2. While computing the mean of the grouped data, we assume that the frequencies are
(a) evenly distributed over the classes
(b) centered at the class marks of the classes
(c) centered at the lower limits of the classes
(d) centered at the upper limits of the classes

3. What is the largest number that divides 70 and 125, leaving remainders 5 and 8 respectively?
(a) 13
(b) 9
(c) 3
(d) 585

4. If $x - y = 2$ and $\frac{2}{x+y} = \frac{1}{5}$ then

(a) x = 4, y = 2
(b) x = 5, y = 3
(c) x = 6, y = 4
(d) x = 7, y = 5

5. $\frac{\tan 35^\circ}{\cot 55^\circ} + \frac{\cot 78^\circ}{\tan 12^\circ} = ?$

(a) 0
(b) 1
(c) 2
(d) 3

6. tan 10° tan 15° tan 75° tan 80° = ?

(a) $\sqrt{3}$
(b) $\frac{1}{\sqrt{3}}$
(c) -1
(d) 1

7. sin 47° cos 43° + cos 47° sin 43° = ?

(a) sin 4°
(b) cos 4°
(c) 1
(d) 0

8. If the point C(k, 4) divides the join of the points A(2, 6) and B(5, 1) in the ratio 2:3 then the value of k is

(a) 16
(b) $\frac{28}{5}$
(c) $\frac{16}{5}$
(d) $\frac{8}{5}$

9. The perimeter of the triangle with vertices (0, 4), (0, 0) and (3, 0) is

(a) $\left(7+\sqrt{5}\right)$

(b) 5

(c) 10

(d) 12

10. If A(1, 3), B(-1, 2), C(2, 5) and D(x, 4) are the vertices of a ||gm ABCD then the value of x is

(a) 3

(b) 4

(c) 0

(d) $\frac{3}{2}$

(Q 11 to Q 15) Fill in the blanks

11. A rectangular ground 80 m x 50 m has a path 1 m wide outside around it. The area of the path is ____

12. If α and β are the zeroes of $x^2 + 5x + 8$ then the value of $(\alpha + \beta)$ is____

OR

If the sum of the zeros of the quadratic polynomial $kx^2 + 2x + 3k$ is equal to the product of its zeros then k = ____

13. Two poles of height 13 m and 7 m respectively stand vertically on a plane ground at a distance of 8 m from each other. The distance between their tops is ___

14. If 4, x_1, x_2, x_3, 28 are in AP then x_3 = ____

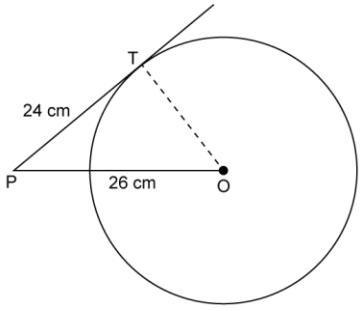
15. The probability that a number selected at random from the numbers 1, 2, 3,....15 is a multiple of 4, is___

(Q 16 to Q 20) Answer the following

16. Examine whether $\frac{17}{30}$ is a terminating decimal.

17. A 10 m long ladder reaches the window of a house 8 m above the ground. Find the distance of the foot of the ladder from the base of the wall.

18. In the given figure, point P is 26 cm away from the centre O of a circle and the length PT of the tangent drawn from P to the circle is 24 cm. Then, the radius of the circle is:



OR

PQ is a tangent to a circle with centre O at the point P. If ΔOPQ is an isosceles triangle, then ∠OQP is equal to:

19. Find the 20^{th} term of the AP 9, 13, 17, 21, ...

20. Solve: $9x^2 - 3x - 2 = 0$

Section B
(Q 21 to Q 26 carry 2 marks each)

21. Prove that $(2 + \sqrt{3})$ is irrational.

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

23. Find the length of the altitude of an equilateral triangle of side 2a cm.

OR

If ΔABC ~ ΔDEF such that 2 AB = DE and BC = 6 cm, find EF.

24. The shadow of a 5 m long stick is 2 m long. At the same time, the length of the shadow of a 12.5 m high tree is:

25. A letter of English alphabet is chosen at random. Determine the probability that the chosen letter is a consonant.

OR

It is known that a box of 200 electric bulbs contains 16 defective bulbs. One bulb is taken out at random from the box. What is the probability that the bulb drawn is
(i) defective (ii) non defective?

26. The radii of the top and bottom of a bucket of slant height 45 cm are 28 cm and 7 cm respectively. Find the curved surface area of the bucket.

Section C
(Q 27 to Q 34 carry 3 marks each)

27. Show that one and only one out of n, (n+2) and (n+4) is divisible by 3, where n is any positive integer.

OR

Show that every positive odd integer is of the form (4q + 1) or (4q + 3) for some integer q.

28. In a school, students decided to plant trees in and 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 double of the class in which they are studying. If there are 1 to 12 classes in the school and each class has two sections, find how many trees were planted by students. Which value is shown in the question?

29. 5 pencils and 7 pens together cost Rs. 195 while 7 pencils and 5 pens together cost Rs. 153. Find the cost of each one of the pencil and the pen.

OR

Find the angles of a cyclic quadrilateral ABCD in which $\angle A = (4x+20)°$, $\angle B = (3x-5)°$, $\angle C = (4y)°$ and $\angle D = (7y+5)°$

30. If one zero of the polynomial $p(x) = x^3 - 6x^2 + 11x - 6$ is 3, find the other two zeros.

31. A(6, 1), B(8, 2) and C(9, 4) are the vertices of a parallelogram ABCD. If E is the midpoint of DC, find the area of ΔADE.

32. If $\angle A$ and $\angle B$ are acute angles such that sin A = sin B then prove that $\angle A = \angle B$.

OR

$$\text{If } \operatorname{cosec}\theta + \cot\theta = p, \text{ prove that } \cos\theta = \frac{\left(p^2 - 1\right)}{\left(p^2 + 1\right)}.$$

33. A racetrack is in the form of a ring whose inner circumference is 352 m and outer circumference is 396 m. Find the width and the area of the track.

34. The maximum bowling speeds (in km/hr) of 33 players at a cricket coaching centre are given below :

Speed in km/hr	85-100	100-115	115-130	130-145
No. of players	10	4	7	9

Calculate the median bowling speed.

Section D
(Q 35 to Q 40 carry 4 marks each)

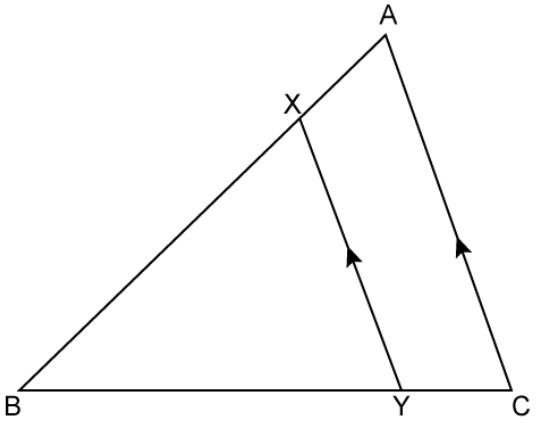
35. Construct ΔPQR, in which PQ = 6 cm, QR = 7 cm and PR = 8cm. Then construct another triangle whose sides are $\frac{4}{5}$ times the corresponding sides of ΔPQR.

OR

Draw a right triangle in which the sides (other than hypotenuse) are of lengths 4 cm and 3 cm. Then, construct another triangle whose sides are $\frac{5}{3}$ times the corresponding sides of the given triangle.

36. In the given figure, XY||AC and XY divides ΔABC into two regions, equal in area.

Show that $\frac{AX}{AB} = \frac{\left(2-\sqrt{2}\right)}{2}$.



37. Two water taps together can fill a tank in 6 hours. The tap of larger diameter takes 9 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

OR

A passenger train takes 2 hours less for a journey of 300 km if its speed is increased by 5 km/hr from its usual speed. Find its usual speed.

38. A hemispherical bowl of internal radius 9 cm is full of water. This water is to be filled in cylindrical bottles of diameter 3 cm and height 4 cm. Find the number of bottles needed to fill the whole water of the bowl.

OR

The surface areas of a sphere and a cube are equal.

Find the ratio of their volumes. [Take π $\frac{22}{7}$.]

39. From the top of a vertical tower, the angles of depression of two cars in the same straight line with the base of the tower, at an instant are found to be 45° and 60°. If the cars are 100 m apart and are on the same side of the tower, find the height of the tower.

40. Find the mean, median and mode of the following data :

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	6	8	10	15	5	4	2