6

SAMPLE PAPER

CBSE - Class 10

MATHEMATICS

(STANDARD)

Time Allowed: 3 Hours *Maximum Marks: 80*

General Instructions:

(i) All questions are compulsory.

(ii) The question paper consists of 40 questions divided into four sections A, B, C & D.

(iii) Section A contains **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. Section D comprises **6** questions of **4** marks each.

(iv) There is no overall choice. However internal choices have been provided in **two** questions of **1** marks 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.

(v) Use of calculators is **not** permitted.

CopyMyKitab

SECTION - A

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

1. The product of a non-zero rational number and an irrational number is: **1**

(A) an integer (B) a rational number

(C) an irrational number (D) a rational or an irrational number

2. A quadratic polynomial, whose zeros are –3 and 4, is: **1**

(A) $x^2 - x + 12$ (B) $x^2 + x + 12$ (C) $\frac{x^2}{2} - \frac{x}{2} - 6$ (D) $2x^2 + 2x - 24$

3. $2x^2 + x + 4 = 0$ has: **1**

(A) two equal and real roots (B) two unequal and real roots

(C) no real roots (D) more than two real roots

4. The 11^{th} term of the AP: $\sqrt{2}, 3\sqrt{2}, 5\sqrt{2}, \ldots\ldots\ldots\ldots$ is: **1**

(A) $17\sqrt{2}$ (B) $19\sqrt{2}$ (C) $21\sqrt{2}$ (D) $23\sqrt{2}$

5. If the distance between the points $(4, p)$ and $(1, 0)$ is 5, then the value of p is: **1**

(A) 4 only (B) ± 4 (C) -4 only (D) 0

6. It is given that $\Delta ABC \sim \Delta PQR$ with $\frac{BC}{QR} = \frac{1}{3}$. Then $\frac{ar(\Delta PRQ)}{ar(\Delta ABC)}$ is equal to: **1**

(A) 9 (B) 3 (C) $\frac{1}{3}$ (D) $\frac{1}{9}$

7. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that OQ = 12 cm. Then, length of PQ is: **1**

(A) 12 cm (B) 13 cm (C) 8.5 cm (D) $\sqrt{119}$ cm

8. The radii of two concentric circles are 4 cm and 5 cm. The difference in the areas of these two circles is: **1**

(A) π (B) 7π (C) 9π (D) 13π

9. Three cubes each of side 15 cm are joined end to end. The total surface area of the cuboid is: **1**

(A) 3150 cm^2 (B) 1575 cm^2 (C) 1012.5 cm^2 (D) 576.4 cm^2

10. A number from numbers 1 to 100 was chosen at random. What is the probability that this number is a prime number that lies between 75 and 85? **1**

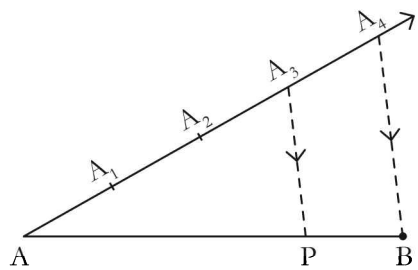
(A) $\frac{1}{10}$ (B) $\frac{1}{50}$ (C) $\frac{1}{25}$ (D) $\frac{7}{100}$

(Q 11 – 15) Fill in the blanks:

11. ..... is calculated using the formula: $\ell + \frac{\frac{N}{2} - cf}{f} \times h$. **1**

12. Number of rounds that a wheel of diamter $\frac{7}{11}$ metre will make in moving a distance of 2 km is **1**

13. In the given figure, P divides the line segment AB in the ratio **1**



14. Second term of the AP if its $S_n = n^2 + 2n$ is **1**

15. The roots of $x + \frac{1}{x} = 2$ are **1**

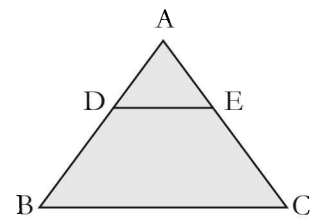
CopyMyKitab

OR

When a whole number is added to twice its square and the sum so obtained is 21, then the number is ……. 1

(Q 16 – 20) Answer the following:

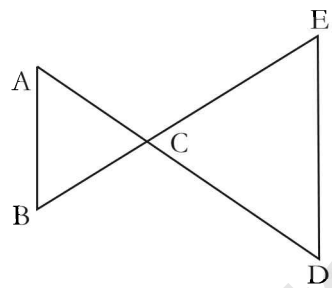
16. In the figure, DE is parallel to BC. AB = 5.6 cm and AD = 1.6 cm. Find AE : EC 1



17. State Pythagoras Theorem. 1

OR

In the figure, AB || ED. Show that ΔABC ~ ΔDEC 1



18. Find the ratio of the volume of a cube to that of the sphere which fits inside the cube. 1

19. If for a given data with 100 observations, the 'less than ogive' and 'more than ogive' intersect at (525, 50). Find the median of data. 1

20. Sarita buys a fish from a shop for her aquarium. The shopkeeper takes out a fish at random from a tank containing 10 male fish and 12 female fish. What is the probability that the fish taken out is a female fish? 1

SECTION - B

Read the following question carefully and answer the questions that follow.

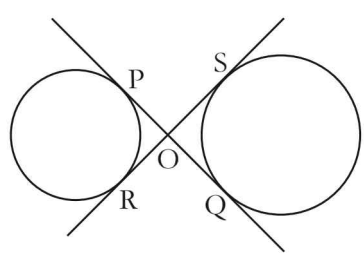
21. Prove that the lengths of tangents drawn from an external point to a circle are equal. 2

OR

In the figure, PQ and RS are the common tangents to two circles intersecting at O. 2

Prove that:

PQ = RS



22. A large IT company assigns a job to a technician, to repair its 200 computers. The following table shows the time taken by him in repairing these computers: 2

Time (t min)	20–30	30–40	40–50	50–60	60–70	70–80
Frequency	24	56	40	35	27	18

(i) Construct a 'less than type' ogive;

(ii) How many computers took more than 55 minutes?

CopyMyKitab

23. Three consecutive vertices of a parallelogram are (–2, 1), (1, 0) and (4, 3). Find the coordinates of the fourth vertex. **2**

24. Find the quotient and the remainder, when: **2**

$p(x) = 2x^2 + 3x + 1$ is divided by $g(x) = x + 2$

OR

If one root of equation $px^2 - 14x + 8 = 0$ is six times the other root, then find the value of p. **2**

25. In ΔABC, ∠A is acute. BD and CE are perpendiculars on AC and AB respectively. Prove that AB × AE = AC × AD **2**

26. Assuming that $\sqrt{2}$ is irrational, show that $5\sqrt{2}$ is an irrational number. **2**

SECTION - C

Read the following question carefully and answer the questions that follow.

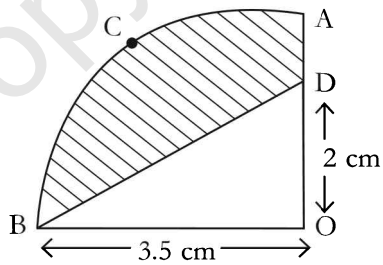
27. Find the volume of the largest right circular cone that can be cut out of a cube whose edge is 7 cm. **3**

OR

The perimeters of the ends of the frustum of a cone are 44 cm and 22 cm. If the height of the frustum be 21 cm, find its radii, slant height, and the volume. **3**

28. From the top of a building 60 m high, the angle of depression of the top and bottom of a vertical lamp-post are observed to be 30° and 60° respectively. Find the height of the lamp-post, and the distance between the top of building and the top of lamp-post. **3**

29. In the figure, OACB is a quadrant of a circle with centre O and radius 3.5 cm. If OD = 2 cm, find the area of the (*i*) quadrant OACB (*ii*) Shaded region **3**



30. If $x = a\cos^3\theta$ and $y = b\sin^3\theta$, then prove that: **3**

$$\left(\frac{x}{a}\right)^{\frac{2}{3}} + \left(\frac{y}{b}\right)^{\frac{2}{3}} = 1$$

31. ` 250 were divided equally among a certain number of children. If there were 25 more children, each would have received 50 paise less. Find the number of children. **3**

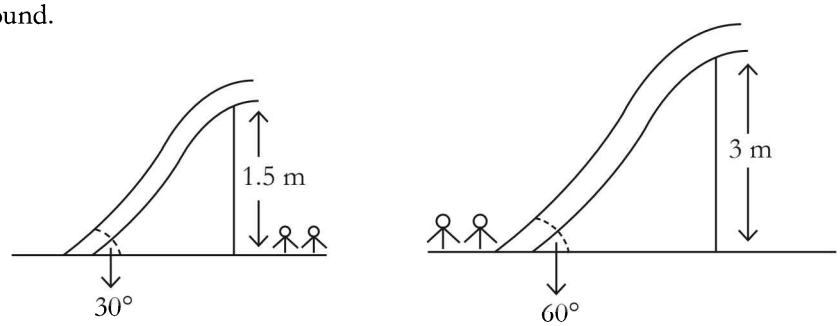
32. Find the greatest number that divides 2623 and 2011 and leaves remainders of 5 and 9 respectively. **3**

OR

Prove that $n^2 - n$ is divisible by 2 for every positive integer n. **3**

Copy My Kitab

33. A Residential Welfare Association (RWA) of a colony plans to install two slides for the children to play in a park. The slides along with the stairs to reach the top of the slide make 2 triangles. For the children below the age of 5 years , it prefers to have a slide whose top is at a height of 1.5 m and is inclined at an angle of 30° to the ground, whereas for elder children, it wants to have a steep slide at a height of 3 m and inclined at angle of 60° to the ground. 3



Find:

(i) The length of the slide for the younger children;

(ii) The base length of triangle formed by the elder children slide;

(iii) Using pythagoras theorem only, calculate the length of the slide for elder children; **1**

34. Solve for x and y: **3**

$$x + \frac{y}{4} = 11 \quad ; \quad \frac{5x}{6} - \frac{y}{3} = 17$$

OR

A 2-digit number is such that the product of the digits is 20. If 9 is subtracted from the number, the digits interchange their places. Find the number. **3**

SECTION - D

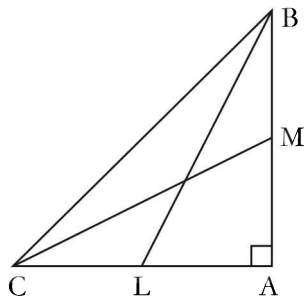
35. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio. Prove it. **4**

OR

BL and CM are medians of ΔABC, right-angled at A. **4**

Prove that:

$$4(BL^2 + CM^2) = 5\ BC^2$$



36. Using quadratic formula, solve for x: **4**

$$\sqrt{3}x^2 + 11x + 6\sqrt{3} = 0$$

CopyMyKitab

37. Obtain all other zeros of $p(x) = 3x^4 + 6x^3 - 2x^2 - 10x - 5$, if two of its zeros are $\sqrt{\frac{5}{3}}$ and $-\sqrt{\frac{5}{3}}$ **4**

OR

How many terms of the AP: 24, 20, 16, ... must be taken so that the sum may be 72? Explain the double answer. **4**

38. A number x is selected from the numbers 1, 2, 3 and then a second number y is selected randomly from the numbers 1, 4, 9. What is the probability that the product xy of the two numbers will be less than 9? **4**

39. Construct a ΔPQR with QR = 6 cm, PQ = 4 cm and $\angle PQR = 60°$. Construct another $\Delta P'QR'$ similar to ΔPQR with side $QR' = \frac{4}{3}$ of QR. **4**

40. Draw "less than type" ogive for the following frequency distribution: **4**

Marks	0-20	20-40	40-60	60-80	80-100
Number of Students	7	12	23	18	10

Also, find the median from the ogive.

OR

Find the mean and mode for the following frequency distribution: **4**

Monthly consumption (in units)	65-85	85-105	105-125	125-145	145-165	165-185	185-205
Number of consumers	4	5	13	20	14	8	4

oyMyKitab