

CLASS X (2019-20)
MATHEMATICS BASIC(241)
SAMPLE PAPER-12

Time : 3 Hours**Maximum Marks : 80****General Instructions :**

- (i) All questions are compulsory.
- (ii) The questions paper consists of 40 questions divided into four sections A, B, C and D.
- (iii) 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. Section D comprises of 6 questions of 4 marks each.
- (iv) There is no overall choice. However, an internal choices have 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.
- (v) Use of calculators is not permitted.

SECTION A

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

- Q1. The product and the sum of the zeroes of the polynomial $2x^2 - 2\sqrt{2}x + 1$ are respectively [1]
- (a) $\frac{1}{2}$ and $-\sqrt{2}$ (b) $-\frac{1}{2}$ and $\sqrt{2}$
(c) $\frac{1}{2}$ and $\sqrt{2}$ (d) $\sqrt{2}$ and $\frac{1}{2}$
- Q2. If $k + 2, 4k - 6$ and $3k - 2$ are three consecutive terms of an *A.P.*, then the value of k is [1]
- (a) 3 (b) -3
(c) 4 (d) -4
- Q3. The fourth vertex D of a parallelogram $ABCD$ whose three vertices are $A(-2, 3)$, $B(6, 7)$ and $C(8, 3)$ is [1]
- (a) (0, 1) (b) (0, -1)
(c) (-1, 0) (d) (1, 0)
- Q4. The point on the x -axis which is equidistant from the points $A(-2, 3)$ and $B(5, 4)$ is [1]
- (a) (0, 2) (b) (2, 0)
(c) (3, 0) (d) (-2, 0)
- Q5. If $A = 30^\circ$, then the value of $2 \sin A \cos A$ is [1]
- (a) $\frac{1}{\sqrt{2}}$ (b) $\frac{\sqrt{3}}{2}$
(c) $\frac{1}{2}$ (d) 1
- Q6. $\sin(45^\circ + \theta) - \cos(45^\circ - \theta)$ is equal to [1]
- (a) $2 \cos \theta$ (b) 0
(c) $2 \sin \theta$ (d) 1
- Q7. The diameter of a circle whose area is equal to the sum of the areas of the two circles of radii 24 cm and 7 cm is [1]
- (a) 31 cm (b) 25 cm
(c) 62 cm (d) 50 cm
- Q8. If two solid hemispheres of same base radius r joined together along their bases, then the curved surface of this new solid is [1]
- (a) $4\pi r^2$ (b) $6\pi r^2$
(c) $3\pi r^2$ (d) $8\pi r^2$

- Q9. The Empirical relation for measuring the mode is [1]
 (a) Mode = 3 median – 2 mean (b) Mode = 3 mean – 2 median
 (c) Mode = 2 median – mean (d) Mode = 2 mean – median
- Q10. If a fair coin is tossed twice, then the probability of getting two heads is [1]
 (a) $\frac{1}{4}$ (b) $\frac{1}{2}$
 (c) $\frac{3}{4}$ (d) 0

(Q.11-Q.15) Fill in the blanks.

- Q11. The sum of the probabilities of all the elementary events of an experiment is [1]
- Q12. If the volume and the surface area of a solid sphere are numerically equal, then its radius is [1]
- Q13. The perimeter of a sector of a circle of radius r cm and of central angle θ (in degrees) is [1]
- Q14. If $\sin \alpha = \frac{3}{5}$ and $\alpha + \beta = 90^\circ$, then the value of $\cos \beta$ is [1]

OR

The value of $\sec^2 18^\circ - \cot^2 72^\circ$ is

- Q15. 9th term of the A.P. $\frac{3}{4}, \frac{5}{4}, \frac{7}{4}, \frac{9}{4}$ is [1]

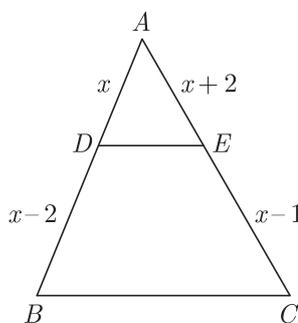
(Q.16-Q.20) Answer the following

- Q16. Find the value of k for which the following pair of linear equations has a unique solution:
 $2x + 3y = 7; (k - 1)x + (k + 2)y = 3k$. [1]
- Q17. Find the nature of the roots of quadratic equation $2x^2 - \sqrt{5}x + 1 = 0$. [1]
- Q18. What is the probability that a non-leap year has 53 Monday? [1]

OR

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

- Q19. Find the mode of the data, whose mean and median are given by 10.5 and 11.5 respectively. [1]
- Q20. In the given figure, $DE \parallel BC$, If $AD = x$, $DB = x - 2$, $AE = x + 2$ and $EC = x - 1$, find the value of x . [1]



SECTION B

- Q21. Find HCF and LCM of 90 and 144 by method of prime factorisation. [2]
- Q22. Find the values of a and b for which the following pair of linear equations has infinitely many solutions [2]

$$3x - (a + 1)y = 2b - 1; 5x + (1 - 2a)y = 3b.$$

OR

Solve:

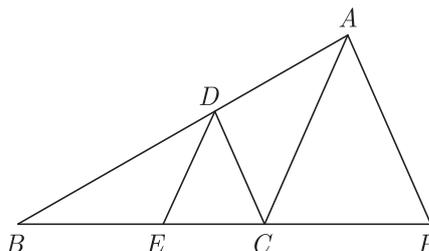
$$\frac{2}{x} + \frac{3}{y} = 13$$

$$\frac{5}{x} - \frac{4}{y} = -2$$

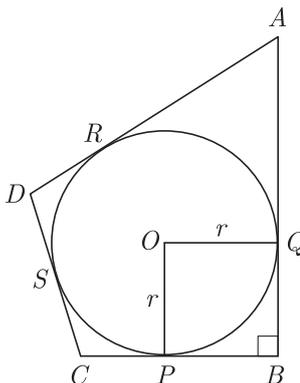
- Q23. Without using trigonometric tables, evaluate the following: [2]

$$(\cos^2 25^\circ + \cos^2 65^\circ) + \operatorname{cosec} \theta \cdot \sec(90^\circ - \theta) - \cot \theta \tan(90^\circ - \theta)$$

- Q24. In the given figure: $DE \parallel AC$ and $\frac{BE}{EC} = \frac{BC}{CP}$. Prove that $DC \parallel AP$. [2]



- Q25. In the given figure, a circle is inscribed in a quadrilateral $ABCD$ in which $\angle B = 90^\circ$. If $AD = 23$ cm, $AB = 29$ cm and $DS = 5$ cm, find the radius (r) of the circle. [2]



- Q26. A card is drawn at random from a well-shuffled deck of 52 cards. Find the probability of getting neither a red card nor a queen. [2]

OR

Two dice are thrown at the same time and the product of numbers appearing on them is noted. Find the probability that the product is a prime number.

SECTION C

- Q27. If two zeroes of the polynomial $x^4 + 3x^3 - 20x^2 - 6x + 36$ are $\sqrt{2}$ and $-\sqrt{2}$, find the other zeroes of the polynomial. [2]

- Q28. How many terms of the A.P. $-6, \frac{11}{2}, -5, \dots$ are needed to give the sum -25 ? Explain the double answer. [3]

OR

The 19th term of an AP is equal to three times its 6th term. If its 9th term is 19, find the AP.

- Q29. The father's present age is six times his son's ages. Four years hence the age of the father will be four times his son's age. Find the present ages of the father and son. [3]

OR

The ratio of incomes of two persons is 9 : 7 and the ratio of their expenditures is 4 : 3. If each of them manages to save ₹2000 per month, find their monthly incomes.

- Q30. ABC is a right triangle, right angled at C . If P is the length of perpendicular from C to AB and a, b, c have usual meanings, then prove that $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$. [3]

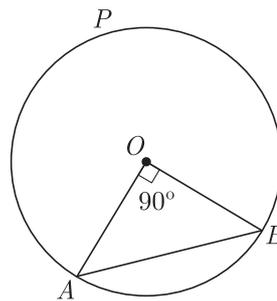
OR

If the diagonals of a quadrilateral divide each other proportionally, prove that it is a trapezium.

- Q31. PQ is a tangent to a circle with centre O at the point Q . A chord QA is drawn parallel to PO . If AOB is a diameter of the circle, prove that PB is tangent to the circle at the point B . [3]

- Q32. The radii of the circular ends of a bucket of height 15 cm are 14 cm and r cm ($r < 14$ cm). If the volume of bucket is 5390 cm^3 , then find the value of r . [Use $\pi = \frac{22}{7}$] [3]

- Q33. Find the area of the major segment APB in adjoining figure, of a circle of radius 35 cm and $\angle AOB = 90^\circ$. [Use $\pi = \frac{22}{7}$]. [3]



- Q34. Prove that: $\frac{\tan A + \sec A - 1}{\tan A - \sec A + 1} = \frac{1 + \sin A}{\cos A}$ [3]

SECTION D

- Q35. Prove that $\sqrt{5}$ is an irrational number and hence show that $2 + \sqrt{5}$ is also an irrational number. [4]

- Q36. If two vertices of an equilateral triangle are $(3, 0)$ and $(6, 0)$, find the third vertex. [4]

OR

The mid-points D, E and F of the sides AB, BC and CA of a triangle are $(3, 4), (8, 9)$ and $(6, 7)$ respectively. Find the coordinates of the vertices of the triangle.

- Q37. While boarding an aeroplane, a passenger got hurt. The pilot showing promptness and concern, made arrangements to hospitalise the injured and so the plane started late by 30 minutes. To reach the destination, 1500 km away in time, the pilot increased the speed by 100 km/h. Find the original speed/hour of the plane. [4]

- Q38. Draw a pair of tangents to a circle of radius 3 cm which are inclined at an angle of 60° . If the tower is 50 m high, find the height of the building. [4]

- Q39. The angle of elevation of the top of a building from the foot of a tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60° . If the tower is 50m high, find the height of the building [4]

OR

The angles of depression of two ships from the top of a lighthouse and on the same side of it are found to be 45° and 30° . If the ships are 200 m apart, find the height of the lighthouse.

- Q40. The mean of the following frequency distribution is 62.8 and the sum of all the frequencies is 50. Compute the missing frequencies f_1 and f_2 : [4]

Class	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	5	f_1	10	f_2	7	8

OR

The following frequency distribution gives the monthly consumption of electricity of 68 consumers of a locality. Find the median, mode and mean of the data:

Monthly consumption (in units)	65-85	85-105	105-125	125-145	145-165	165-185	185-205
No. of consumers	4	5	13	20	14	8	4

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