विद्या सर्वार्थ साधिका

ANANDALAYA

PRE – BOARD EXAMINATION

Class: X

Subject : Mathematics – Basic (241) M.M : 80

Date : 29 – 01 – 2024 Time : 3 Hours

General Instructions:

1. This Question Paper has 5 Sections A, B, C, D, and E.
2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.
4. Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.
5. Section D has 4 Long Answer (LA) type questions carrying 5 marks each.
6. Section E has 3 Case Based integrated units of assessment (4 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 questions of 2 marks, 2 questions of 3 marks and 2 questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$, if not stated.

SECTION A

(Multiple Choice Questions) Each question carries 1 mark

1. HCF of $5^2 \times 3^2$ and $3^5 \times 5^3$ is _____ (1)
   (A) $5^3 \times 3^5$ (B) 5×3^3 (C) $5^3 \times 3^2$ (D) $5^2 \times 3^2$

2. If $tanx = \frac{sin60°}{cos30°}$ then $x = ?$ (1)
   (A) 90° (B) 45° (C) 30° (D) 60°

3. The pair of equations $x = -1$ *and* $y = -2$ graphically represents lines which are _____ (1)
   (A) Intersecting at $x = -1, y = -2$ (B) Intersecting at $x = -2, y = -1$
   (C) Coincident. (D) Parallel.

4. The quadratic polynomial whose sum of zeroes is 3 and product of zeroes is -2 is _____ (1)
   (A) $x^2 + 3x - 2$ (B) $x^2 - 3x + 2$ (C) $x^2 - 3x - 2$ (D) $x^2 + 2x - 3$

5. The quadratic equation $4x^2 + 6x + 3 = 0$ has _____ (1)
   (A) two distinct real roots (B) two equal real roots
   (C) no real roots (D) more than 2 real roots

6. The area of the sector of a circle with radius 6 cm, if angle of the sector is 60° is _____cm^2 (1)
   (A) $\frac{130}{7}$ (B) $\frac{132}{7}$ (C) 132 (D) $\frac{142}{7}$

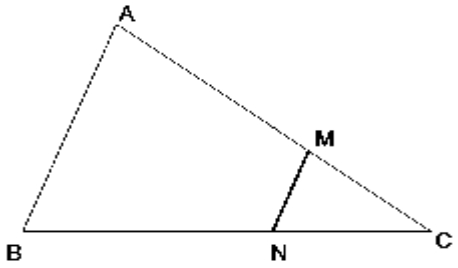
7. If 7th term of an AP is 40. The sum of the first 13 terms is _____. (1)
   (A) 520 (B) 420 (C) 1040 (D) 500

8. If the distance of the point $(4, a)$ from x-axis is half its distance from $y - axis$, then a = ___ (1)
   (A) $\frac{1}{2}$ (B) 4 (C) 8 (D) 2

9. If $sec^2\theta\,(1 + sin\theta)(1 - sin\theta) = k$, then k = _____ (1)
   (A) 2 (B) 1 (C) $\frac{1}{2}$ (D) 0

10. The radii of two cylinders are in the ratio 2 : 3 and their heights are in the ratio 5 : 3. The ratio of their volumes is _____ (1)
    (A) 20 : 9 (B) 9 : 27 (C) 20 : 27 (D) 4 : 9

11. In the given figure, MN || AB, BC = 7.5 cm, AM = 4 cm and MC = 2 cm. Find the length of BN (1)

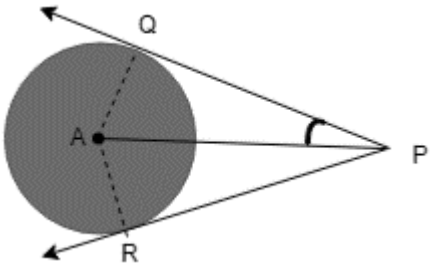


(A) $5\ cm$ (B) $10\ cm$
(C) $2.5\ cm$ (D) $3.5\ cm$

12. In a single throw of two dice, find the probability of getting a doublet of even numbers. (1)

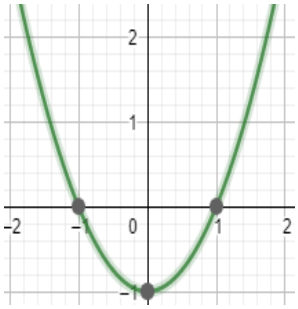
(A) $\frac{1}{6}$ (B) $\frac{1}{12}$ (C) $\frac{1}{36}$ (D) $\frac{1}{18}$

13. In figure, PQ and PR are tangents to circle with centre A. If ∠QPA = 27°, then find ∠QAR (1)

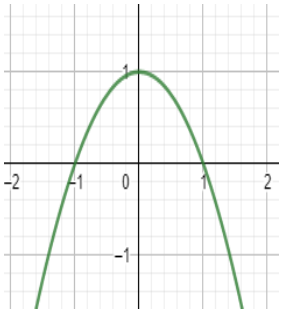


(A) 120° (B) 126°
(C) 63° (D) 54°

14. Which of the following is not the graph of a quadratic polynomial? (1)



(A)



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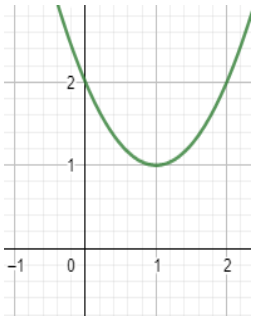
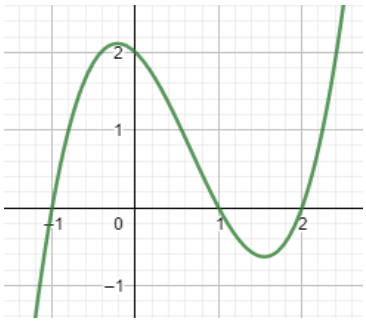


(C)



(D)

15. If in two triangles DEF and PQR, ∠ D = ∠ Q and ∠ R = ∠ E, then which of the following is not true? (1)

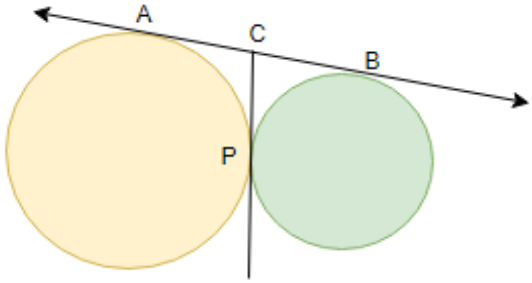
(A) $\frac{EF}{PR} = \frac{DF}{PQ}$ (B) $\frac{DF}{PQ} = \frac{EF}{RP}$ (C) $\frac{DE}{QR} = \frac{DF}{PQ}$ (D) $\frac{EF}{RP} = \frac{DE}{QR}$

16. What is upper limit of modal class of the data given below? (1)

Classes	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Frequency	9	11	10	8	8	3

(A) 10 (B) 20 (C) 30 (D) 40

17. In the figure, if length of AB is 9 cm, then find the length of CP. (1)



(A) 9 cm (B) 4.5 cm
(C) 4 cm (D) 18 cm

18. A die is thrown once. What is the probability of getting a number greater than 4? (1)

(A) $\frac{1}{3}$ (B) $\frac{2}{3}$ (C) $\frac{1}{6}$ (D) $\frac{1}{2}$

ASSERTION – REASON BASED QUESTIONS.

In the following questions, a statement of Assertion ((A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

(A) Both A and R are true and R is the correct explanation of A.

(B) Both A and R are true but R is not the correct explanation of A.

(C) A is true but R is false.

(D) A is false but R is true.

19. **Assertion (A):** The coordinates of a point P which divides the line segment joining the points A (– 2, 3) and B (4, 7) internally in the ratio $\frac{4}{7}$ is $\left(\frac{49}{11}, \frac{2}{11}\right)$. (1)

Reason (R): The coordinates of the point $P(x, y)$ which divides the line segment joining the points $A(x_1, y_1)\ and\ B(x_2, y_2)$ in the ratio : $n\ is\ \ x = \frac{mx_2 + nx_1}{m+n}, y = \frac{my_2 + ny_1}{m+n}$.

20. **Assertion (A):** The graph of the linear equations $x + 3y = 6$, $2x - 3y = 12$ gives a pair of intersecting lines. (1)

Reason (R): A pair of linear equations in two variables in x and y , $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ has a unique solution if $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ gives a pair of intersecting lines.

SECTION B

This section comprises of very short answer type-questions (VSA) of 2 marks each.

21. The LCM of two numbers is 14 times their HCF. The sum of LCM and HCF is 600. If one number is 280, then find the other number. (2)

22. Find a quadratic polynomial whose zeroes are $5 + \sqrt{2}$ and $5 - \sqrt{2}$. (2)

23. Given that $sec\theta = \sqrt{2}$, then find the value of $\frac{1+tan\theta}{sin\theta}$. (2)

OR

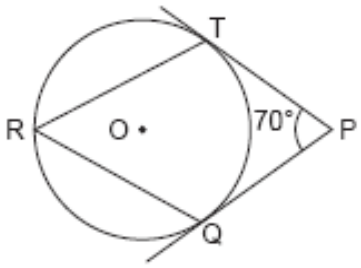
If $3\ cotA = 2$, then find the value of $\frac{4sinA - 3cosA}{2sinA + 6\ cosA}$.

24. Solve for *x* and *y* by the method of elimination: $4x - 3y = 1$; $5x - 7y = -2$ (2)

OR

Find the values of $\alpha\ and\ \beta$ for which the following system of linear equations has infinite solutions $2x + 3y = 7$, $2\alpha x + (\alpha + \beta)\ y = 28$.

25. In figure, O is the centre of a circle. PT and PQ are tangents to the circle from an external point P. If ∠ TPQ = 70°, find ∠ TRQ. (2)



SECTION C

This section comprises of short answer type questions (SA) of 3 marks each)

26. Cards marked with numbers 3, 4, 5, ...,….. 50 are placed in a box and mixed thoroughly. One card is drawn at random from the box. Find the probability that number on the drawn card is; (3)
(i) divisible by 7 (ii) a number which is a perfect square. (iii) a prime number less than 15.

OR

From a pack of 52 playing cards, jacks, queens, kings and aces of red colour are removed. From the remaining a card is drawn at random. Find the probability that the card drawn is
(i) a black queen (ii) a red card (iii) a black jack

27. Find the sum of all multiples of 5 lying between 101 and 999. (3)

28. Prove that: $\frac{sinA-sinB}{cosA+cosB}+\frac{cosA-cosB}{sinA+sinB}=0$. (3)

OR

Evaluate: $tan^2 30° sin30° + \cos 60°\ sin^2 90° tan^2 60° - 2\tan 45° cos^2 0° sin90°$.

29. Given $\sqrt{3}\ is$ irrational, show that $5 - 2\sqrt{3}$ is an irrational number. (3)

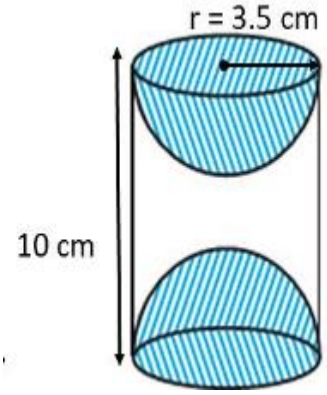
30. Draw the graphs of the equations $4x - y - 8 = 0\ and\ 2x - 3y + 6 = 0$ Also, determine the vertices of the triangle formed by the lines and x-axis. (3)

31. A rectangular piece is 20 m long and 15 m wide. From its four corners, quadrants of radii 3.5 m have been cut. Find the area of the remaining part. (3)

SECTION D

(This section comprises of long answer-type questions (LA) of 5 marks each)

32. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in If the height of the cylinder is 10 cm, and its base is of radius 3.5 cm, find the total surface area of the article. (5)



33. Find the mode of the following distribution: (5)

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
f	5	8	7	12	28	20	10	10

OR

The mean of the following frequency distribution is 50. Find the value of *p*.

Class	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
Frequency	17	p	32	24	19

34. A piece of cloth costs ` 200. If the piece were 5 m longer and each metre of cloth cost ` 2 less, the cost of the piece would have remained unchanged. How long is the piece and what is its original rate per metre? (5)

OR

The numerator of a fraction is one less than its denominator. If three is added to each of the numerator and denominator, the fraction is increased by $\frac{3}{28}$. Find the fraction

35. State and prove Basic Proportinality Theorem. (Thales Theorem) (5)

SECTION E

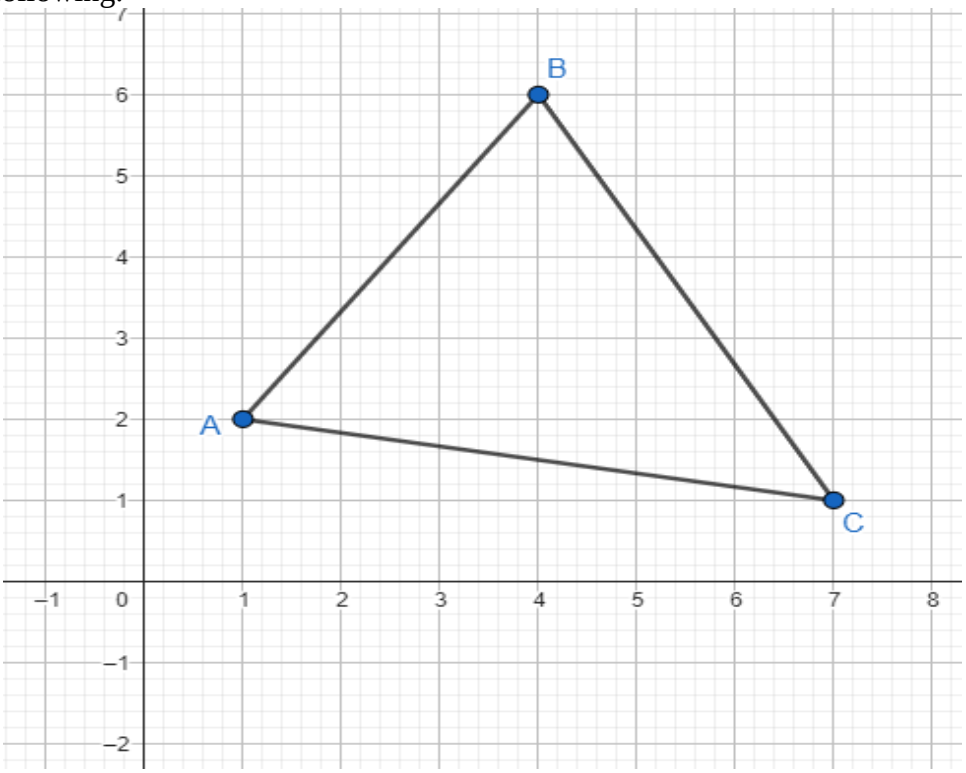
Case study-based questions are compulsory.

36. Raj and Ajay are close friends. Both the families decide to go to Rann of Kutch by their own cars. Raj's car travels at a speed of $x\ km/h$ while Ajay's car travels 5 km/h faster than Raj's car. Raj took 4 hours more than Ajay to complete his journey of 400 km.
(i) What will be the distance covered by Ajay's car in two hours? (1)
(ii) Which of the following quadratic equation describe the speed of Raj's car? (1)
(iii) How much time Ajay took to travel 400 km? (2)

OR

(iii) What is the speed of Raj's car?

37. Students of class X have been allotted a triangular plot ABC for their gardening activity in the school. First they prepared a grassy lawn ABC. Use the concepts of co-ordinate geometry and answer the following.

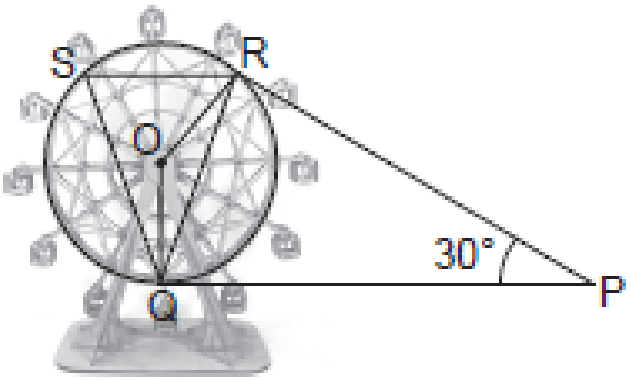


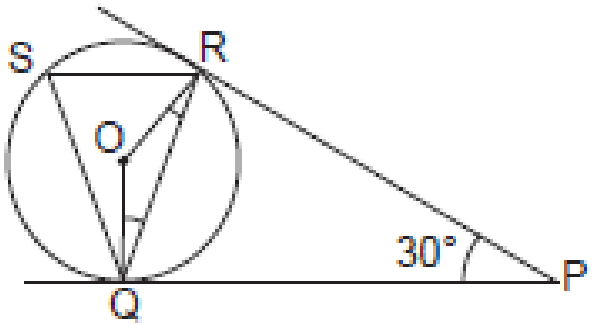
(i) Write the coordinates of A, B and C. (1)
(ii) Triangle ABC is equilateral true or false? (1)
(iii) Distance between B and C is _____ (2)

OR

(iii) Find the co-ordinates of the midpoint of AC.

38. A Ferris wheel (or a big wheel in the United Kingdom) is an amusement ride consisting of a rotating upright wheel with multiple passenger-carrying components (commonly referred to as passenger cars, cabins, tubs, capsules, gondolas, or pods) attached to the rim in such a way that as the wheel turns, they are kept upright, usually by gravity. After taking a ride in Ferris wheel, Aarti came out from the crowd and was observing her friends who were enjoying the ride. She was curious about the different angles and measures that the wheel will form. She forms the figure as given below.





(i) In the given figure find $\angle ROQ$ (1)
(ii) Find $\angle RQP$. (1)
(iii) Find $\angle RSQ$. (2)

OR

(iii) Find $\angle ORP$.