PM SHRI KENDRIYA VIDYALAYA GACHIBOWLI,GPRA CAMPUS,HYD-32
SAMPLE PAPER TEST 13 FOR BOARD EXAM 2024

SUBJECT: MATHEMATICS **MAX. MARKS : 80**
CLASS : X **DURATION : 3 HRS**

General Instruction:

1. This Question Paper has 5 Sections A-E.
2. **Section A** has 20 MCQs carrying 1 mark each.
3. **Section B** has 5 questions carrying 02 marks each.
4. **Section C** has 6 questions carrying 03 marks each.
5. **Section D** has 4 questions carrying 05 marks each.
6. **Section E** has 3 case based integrated units of assessment (04 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 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E
8. Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

SECTION – A
Questions 1 to 20 carry 1 mark each.

1. The distance of the point (–1, 7) from x-axis is:
(a) – 1 (b) 7 (c) 6 (d) 50

2. What is the area of a semi-circle of diameter 'd' ?
(a) $\frac{1}{16}\pi d^2$ (b) $\frac{1}{4}\pi d^2$ (c) $\frac{1}{8}\pi d^2$ (d) $\frac{1}{2}\pi d^2$

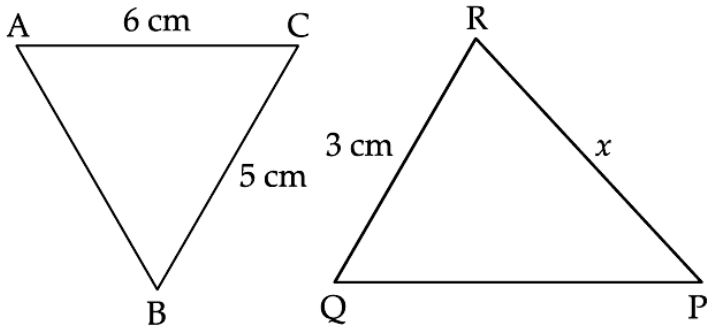
3. If a, b are zeroes of the polynomial $x^2 - 1$, then value of (a + b) is:
(a) 2 (b) 1 (c) – 1 (d) 0

4. sec θ when expressed in terms of cot θ, is equal to:
(a) $\frac{1+\cot^2\theta}{\cot\theta}$ (b) $\sqrt{1+\cot^2\theta}$ (c) $\frac{\sqrt{1+\cot^2\theta}}{\cot\theta}$ (d) $\frac{\sqrt{1-\cot^2\theta}}{\cot\theta}$

5. If $p^2 = \frac{32}{50}$, then p is a/an
(a) whole number (b) integer (c) rational number (d) irrational number

6. The pair of linear equations 2x = 5y + 6 and 15y = 6x – 18 represents two lines which are:
(a) intersecting (b) parallel (c) coincident (d) either intersecting or parallel

7. In the given figure, ΔABC ~ ΔQPR. If AC = 6 cm, BC = 5 cm, QR = 3 cm and PR = x; then the value of x is:

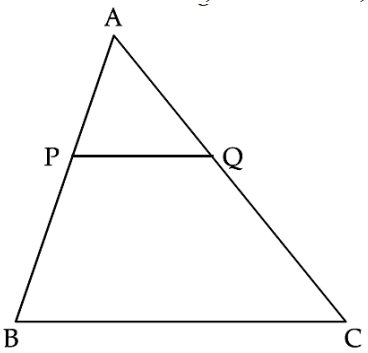


(a) 3.6 cm (b) 2.5 cm (c) 10 cm (d) 3.2 cm

8. The roots of the equation $x^2 + 3x - 10 = 0$ are:
(a) 2, – 5 (b) – 2, 5 (c) 2, 5 (d) –2, – 5

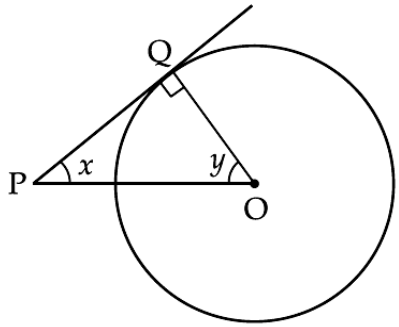
9. The number of quadratic polynomials having zeroes – 5 and – 3 is
(a) 1 (b) 2 (c) 3 (d) more than 3

10. In ΔABC, PQ || BC. If PB = 6 cm, AP = 4 cm, AQ = 8 cm, find the length of AC.



(a) 12 cm (b) 20 cm (c) 6 cm (d) 14 cm

11. In the above right sided figure, PQ is a tangent to the circle with centre O. If ∠OPQ = x, ∠POQ = y, then x + y is:



(a) 45° (b) 90° (c) 60° (d) 180°

12. Two dice are thrown together. The probability of getting the difference of numbers on their upper faces equals to 3 is:
(a) 1/9 (b) 2/9 (c) 1/6 (d) 1/12

13. A card is drawn at random from a well-shuffled pack of 52 cards. The probability that the card drawn is not an ace is:
(a) 1/13 (b) 9/13 (c) 4/13 (d) 12/13

14. If θ is an acute angle of a right angled triangle, then which of the following equation is not true?
(a) $\sin\theta \cot\theta = \cos\theta$ (b) $\cos\theta \tan\theta = \sin\theta$
(c) $\text{cosec}^2\theta - \cot^2\theta = 1$ (d) $\tan^2\theta - \sec^2\theta = 1$

15. If the zeroes of the quadratic polynomial $x^2 + (a + 1)x + b$ are 2 and – 3, then
(a) a = – 7, b = – 1 (b) a = 5, b = – 1 (c) a = 2, b = – 6 (d) a = 0, b = – 6

16. If the sum of the first n terms of an A.P. be $3n^2 + n$ and its common difference is 6, then its first term is
(a) 2 (b) 3 (c) 1 (d) 4

17. The volume of a right circular cone whose area of the base is 156 cm^2 and the vertical height is 8 cm, is:
(a) 2496 cm^3 (b) 1248 cm^3 (c) 1664 cm^3 (d) 416 cm^3

18. 3 chairs and 1 table cost Rs. 900; whereas 5 chairs and 3 tables cost Rs. 2,100. If the cost of 1 chair is Rs. x and the cost of 1 table is Rs. y, then the situation can be represented algebraically as
(a) 3x + y = 900, 3x + 5y = 2100 (b) x + 3y = 900, 3x + 5y = 2100
(c) 3x + y = 900, 5x + 3y = 2100 (d) x + 3y = 900, 5x + 3y = 2100

Direction : In the question number 19 & 20 , A statement of Assertion (A) is followed by a statement of Reason(R) . Choose the correct option

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true but Reason (R) is false.
(d) Assertion (A) is false but Reason (R) is true.

19. Assertion (A): For $0 < \theta \leq 90°$, $\text{cosec}\theta - \cot\theta$ and $\text{cosec}\theta + \cot\theta$ are reciprocal of each other.
Reason (R): $\text{cosec}^2\theta - \cot^2\theta = 1$

20. Assertion (A): If $5 + \sqrt{7}$ is a root of a quadratic equation with rational coefficients, then its other root is $5 - \sqrt{7}$.
Reason (R): Surd roots of quadratic equation with rational coefficients occur in conjugate pairs.

SECTION-B

Questions 21 to 25 carry 2M each

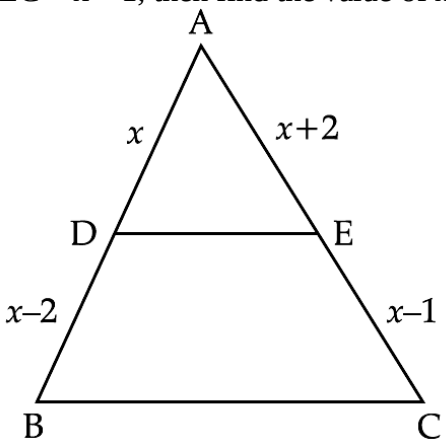
21. Two number are in the ratio 2 : 3 and their LCM is 180. What is the HCF of these numbers?

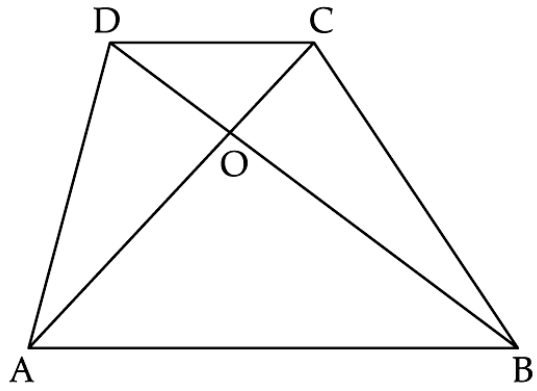
OR

Find the HCF and LCM of 72 and 120.

22. Evaluate: $\dfrac{5\cos^2 60^0 + 4\sec^2 30^0 - \tan^2 45^0}{\sin^2 30^0 + \cos^2 30^0}$

23. In the given below left figure, ABC is a triangle in which DE||BC. If AD = x, DB = x – 2, AE = x + 2 and EC = x – 1, then find the value of x.



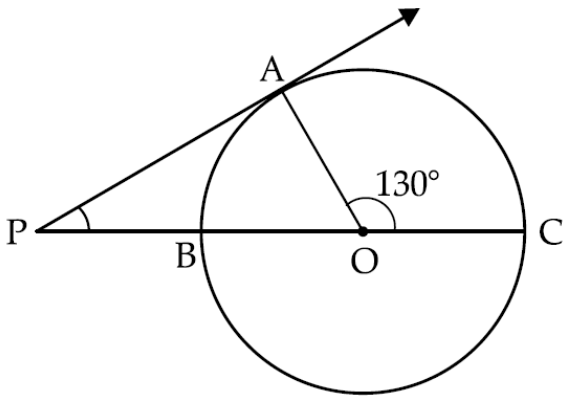


OR

Diagonals AC and BD of trapezium ABCD with AB||DC intersect each other at point O (see above right sided figure). Show that OA/OC = OB/OD.

24. A line intersects y-axis and x-axis at point P and Q, respectively. If R(2, 5) is the mid-point of line segment PQ, then find the coordinates of P and Q.

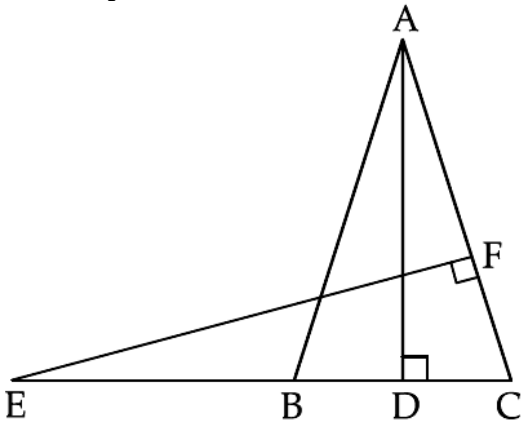
25. In the given figure, PA is a tangent to the circle drawn from the external point P and PBC is the secant to the circle with BC as diameter. If $\angle AOC = 130°$, then find the measure of $\angle APB$, where O is the centre of the circle.



SECTION-C

Questions 26 to 31 carry 3 marks each

26. In the given figure, E is a point on the side CB produced of an isosceles triangle ABC with AB = AC. If AD ⊥ BC and EF ⊥ AC, them prove that ΔABD ~ ΔECF.



27. Find the value of 'p' for which the quadratic equation px(x – 2) + 6 = 0 has two equal real roots.

OR

If α and β are roots of the quadratic equation $x^2 - 7x + 10 = 0$, find the quadratic equation whose roots are α^2 and β^2.

28. Prove that: $\dfrac{\sin A - 2\sin^3 A}{2\cos^3 A - \cos A} = \tan A$

OR

Prove that sec A (1 – sin A) (sec A + tan A) = 1.

29. Find the ratio in which the line segment joining the points A(6, 3) and B(–2, –5) is divided by x-axis.

30. Prove that √5 is and irrational number.

31. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find the area of the sector formed by the arc. Also, find the length of the arc.

SECTION-D

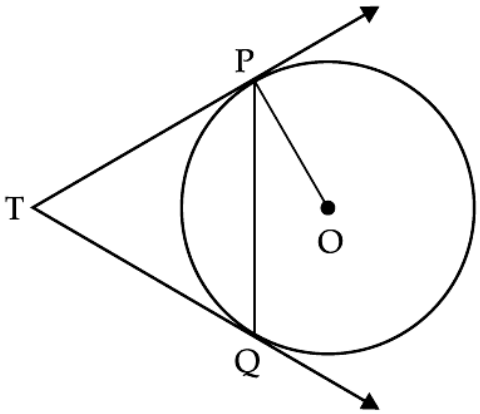
Questions 32 to 35 carry 5M each

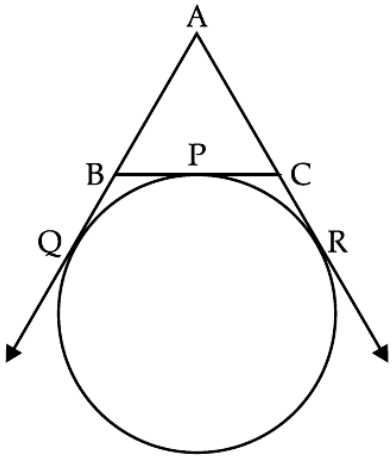
32. The ratio of the 11th term to the 18th term of an A.P. is 2 : 3. Find the ratio of the 5th term to the 21st term. Also, find the ratio of the sum of first 5 terms to the sum of first 21 terms.

OR

If the sum of first 6 terms of an A.P. is 36 and that of the first 16 terms is 256, find the sum of first 10 terms.

33. Two tangents TP and TQ are drawn to a circle with centre O from an external point T (see below left figure). Prove that ∠PTQ = 2 ∠OPQ.





OR

A circle touches the side BC of a ΔABC at a point P and touches AB and AC when produced at Q and R respectively (see above right sided figure). Show that AQ = $\frac{1}{2}$ (Perimeter of ΔABC).

34. The monthly expenditure on milk in 200 families of a Housing Society is given below:

Monthly Expenditure (in Rs.)	1000 – 1500	1500 – 2000	2000 – 2500	2500 – 3000	3000 – 3500	3500 – 4000	4000 – 4500	4500 – 5000
Number of families	24	40	33	*x*	30	22	16	7

Find the value of x and also, find the median and mean expenditure on milk.

35. A student was asked to make a model shaped like a cylinder with two cones attached to its ends by using a thin aluminium sheet. The diameter of the model is 3 cm and its total length is 12 cm. If each cone has a height of 2 cm, find the volume of air contained in the model.

SECTION-E (Case Study Based Questions)
Questions 36 to 38 carry 4M each

36. Two schools 'P' and 'Q' decided to award prizes to their students for two games of Hockey Rs. x per student and Cricket Rs. y per student. School 'P' decided to award a total of Rs. 9,500 for the two games to 5 and 4 students respectively; while school 'Q' decided to award Rs. 7,370 for the two games to 4 and 3 students respectively.

Based on the above information, answer the following questions:

(i) Represent the following information algebraically (in terms of x and y).

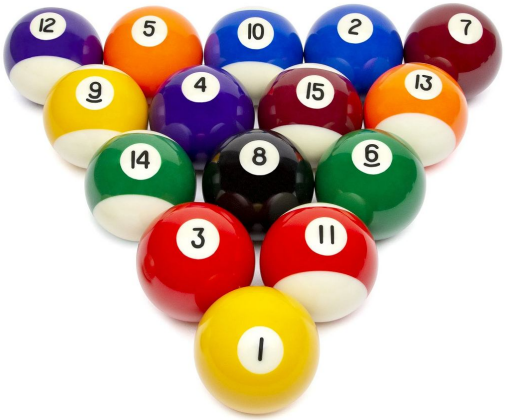
(ii) (a) What is the prize amount for hockey?

(b) Prize amount on which game is more and by how much?

OR

(iii) What will be the total prize amount if there are 2 students each from two games ?

37. "Eight Ball" is a game played on a pool table with 15 balls numbered 1 to 15 and a "cue ball" that is solid and white. Of the 15 numbered balls, eight are solid (non-white) coloured and numbered 1 to 8 and seven are striped balls numbered 9 to 15.



The 15 numbered pool balls (no cue ball) are placed in a large bowl and mixed, then one ball is drawn out at random.

Based on the above information, answer the following question:

(i) What is the probability that the drawn ball bears number 8?

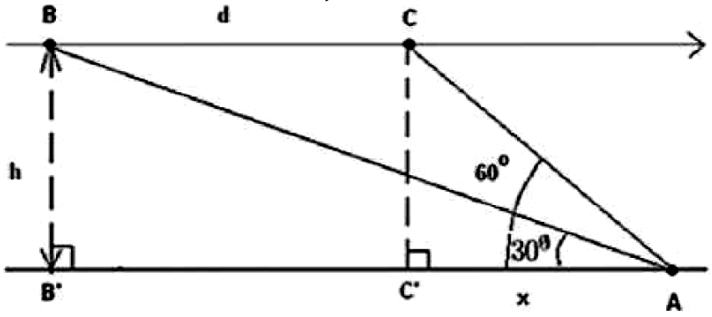
(ii) What is probability that the drawn ball bears an even number?

OR

What is the probability that the drawn ball bears a number, which is a multiple of 3?

(iii) What is the probability that the drawn ball is a solid coloured and bears an even number?

38. Aditya is a pilot in Air India. During the Covid-19 pandemic, many Indian passengers were stuck at Dubai Airport. The government of India sent special aircraft to take them. Mr. Vinod was leading this operation. He is flying from Dubai to New Delhi with these passengers. His airplane is approaching point A along a straight line and at a constant altitude h. At 10:00 am, the angle of elevation of the airplane is 30° and at 10:01 am, it is 60°.



(i) What is the distance d is covered by the airplane from 10:00 am to 10:01 am if the speed of the airplane is constant and equal to 600 miles/hour?

(ii) What is the altitude h of the airplane? (round answer to 2 decimal places)

OR

Find the distance between passenger and airplane when the angle of elevation is 60°.

(iii) Find the distance between passenger and airplane when the angle of elevation is 30°.