

No. of Printed Pages : 10

Set-A

Roll No.

PRE BOARD-II, 2024-25

MG-140

MATHEMATICS

Time : 3 hrs.]

Class X

[M.M. : 80

General Instructions—

- (i) This question paper has 5 sections A-E.
- (ii) Section A has 20 MCQs carrying 1 mark each.
- (iii) Section B has 5 questions carrying 2 marks each.
- (iv) Section C has 6 questions carrying 3 marks each.
- (v) Section D has 4 questions carrying 5 marks each.
- (vi) 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.
- (vii) All questions are compulsory. However, an internal choice in 2 questions of 5 marks, 2 questions of 3 marks and 2 questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions if Section E.
- (viii) Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.

SECTION-A

Section A consists of 20 questions of 1 mark each.

1. Find value of p, q such that prime factorisation of 2520 is expressed as $2^3 \times 3^p \times q \times 7$:
(A) 2, 3 (B) 3, 5
(C) 2, 5 (D) 5, 7
2. On solving pair of linear equation common solution is (-3, 2).
One line is $x - y = -5$, find second line :
(A) $2x + 5y = -4$ (B) $2x - 5y = -4$
(C) $-2x + 5y = -4$ (D) $2x + 5y = 4$
3. If $x(x+1)+8 = (x+2)(x-2) + x$ is :

P.T.O.

(A) Linear equation

(C) Cubic equation

(B) Quadratic equation

(D) Not possible equation

4. If $(a, 0)$, $(0, b)$ and (x, y) are collinear then :

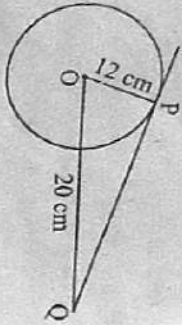
(A) $ay - bx = 1$

(C) $ay + bx = ab$

(B) $ax + by = 1$

(D) $ax - by = ab$

5. A tangent PQ at a point P to a circle of radius 12 cm meets the line through centre O to a point Q such that $OQ = 20$ cm, length of tangent PQ is :



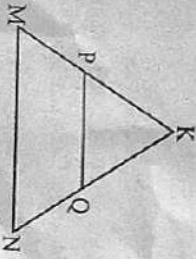
(A) 15 cm

(B) 12 cm

(C) 13 cm

(D) 16 cm

6. In the figure PQ is parallel to MN. If $\frac{KP}{PM} = \frac{4}{13}$ and $KN = 20.4$ cm, then find KQ.



(A) 4.8 cm

(B) 4.6 cm

(C) 4.4 cm

(D) 4.2 cm

7. Given the value of $\sec \theta + \tan \theta + 1 = 0$. Find value of $\sec \theta - \tan \theta$:

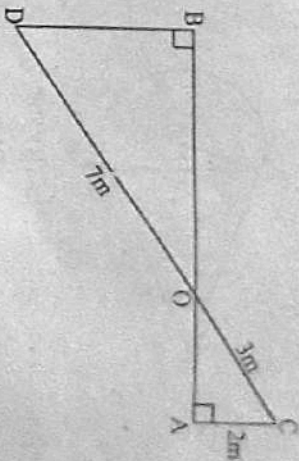
(A) 1

(B) 0

(C) -1

(D) None

8. In the figure if $AC = 2m$, $OC = 3m$, $OD = 7m$. Find BD.



(A) 14 m

(B) 3 m

(C) 12 m

(D) $\frac{14}{3}$ m

9. LCM of 2 prime numbers p and q ($p > q$) is 247. Find $3p - q$:

(A) 28

(B) 44

(C) 38

(D) 4

10. If a, b, c are in AP with common difference d then the value of $a - 2b + c$ is equal to :

(A) 0

(B) $2a + 4d$

(C) $-2a - 4d$

(D) $a - d$

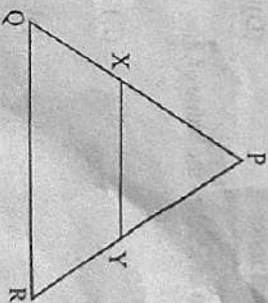
11. In the given figure $XY \parallel QR$ and $\frac{PX}{XQ} = \frac{PY}{YR} = \frac{1}{2}$ then :

(A) $XY = QR$

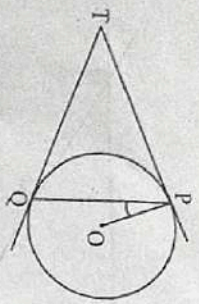
(B) $XY = \frac{1}{3} QR$

(C) $XY^2 = QR^2$

(D) $XY = \frac{1}{2} QR$



12. TP and TQ are 2 tangents from external point T. PQ is a chord if $\angle PTQ = 80^\circ$. Find $\angle OPQ$.



- (A) 160°
 - (B) 80°
 - (C) 40°
 - (D) None
13. If $2(\sin^2\theta - \cos^2\theta) + 1 = 0$ then $\tan \theta$ is equal to : ($0^\circ < \theta < 90^\circ$)

- (A) 1
- (B) $\frac{1}{\sqrt{3}}$
- (C) $\sqrt{3}$
- (D) 0

14. A cylinder, hemisphere and a cone stand on equal bases and have same height. Find ratio of their volumes.

- (A) 1 : 2 : 3
- (B) 3 : 2 : 1
- (C) 1 : 1 : 1
- (D) 1 : 2 : 5

15. From digits 1 to 9, find the probability of odd prime number :

- (A) $\frac{1}{3}$
- (B) $\frac{1}{9}$
- (C) $\frac{2}{3}$
- (D) None

16. What is the nature of roots of the quadratic equation $6x^2 - 9x - 2 = 0$:

- (A) No real roots
- (B) 2 equal real roots
- (C) 2 distinct real roots
- (D) No roots

17. If \bar{x} is the mean of x 's then the value of $\sum_{i=1}^n x_i$ is :

- (A) $\frac{\bar{x}}{2}$
- (B) $2\bar{x}$
- (C) $n\bar{x}$
- (D) $\frac{\bar{x}}{n}$

Select the equation that has roots $(\sqrt{2}+1)$ and $(\sqrt{2}-1)$:

- (A) $x^2 - 2\sqrt{2}x + 1 = 0$
- (B) $x^2 + 2\sqrt{2}x + 2 = 0$
- (C) $x^2 - 2\sqrt{2}x - 1 = 0$
- (D) $x^2 + 2\sqrt{2}x + 1 = 0$

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

- (A) Both A and R are true and R is the correct explanation of A.
- (B) Both A and R are true and 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 tenth term of the AP 4, -1, -6, -11 is -41.

Reason (R) : S_n is sum of n terms then n^{th} term is given by $a_n = S_n - S_{n-1}$

20. Assertion (A) : If there exist two prime numbers a and b then HCF (a, b) = 1. Reason (R) : 1 is smallest factor of every number.

SECTION-B

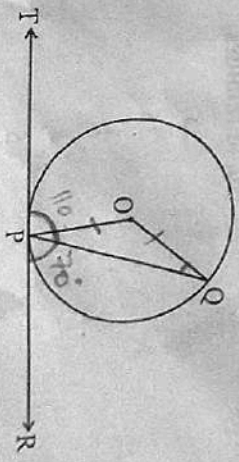
Section B consists of 5 questions of 2 marks each.

21. State the type of quadrilateral formed by the following points A(-1, -2), B(1, 0), C(-1, 2) and D(-3, 0).

OR

If the point P(k-1, 2) is equidistant from the points A(3, k) and B(k, 5). Find the value of k.

22. In the figure PQ is a chord of a circle with centre O, if $\angle TPQ = 110^\circ$. Find $\angle POQ$.



$180 - 110 = 70$

$90 - 70 = \angle OPQ$
 $20 = \angle OPQ$
 $40 + \angle POQ = 160$
 $\angle POQ = 140$

1351

23. Which term of AP 121, 117, 113, is its first negative term.

OR

Find the next term of AP sequence $\frac{1}{1+\sqrt{x}}, \frac{1}{1-x}, \frac{1}{1-\sqrt{x}}$ $x \neq 1$

24. Find x if : $\frac{x \sin^2 30^\circ \cos^2 60^\circ}{4 \cos^2 45^\circ} = \frac{3 \sin^2 45^\circ + 2 \cos^2 45^\circ}{\sin^2 90^\circ - 4 \cos^2 45^\circ}$

25. Find mean of the following data :

x_i	11	13	15	17	
y_i	7	12	18	13	$\Sigma y_i = 50$

SECTION-C

Section C consists of 6 questions of 3 marks each.

26. Prove that $2 + 5\sqrt{3}$ is an irrational number given that $\sqrt{3}$ is an irrational number.
 27. Find the ratio in which y axis divides the line segment joining the points A(6, -4) and B(-2, -7). Also find point on intersection.

OR

Point P and Q trisect the line segment joining the points A(-2, 0) and B(0, 8) such that P is nearer to A. Find the coordinates of P and Q.

28. Prove that : $(\operatorname{cosec} A - \sin A)(\sec A - \cos A) = \frac{1}{\tan A + \cot A}$

29. The daily expenditure of 100 families are given below. Find f_1 and f_2 if mean daily expenditure is Rs. 188.

Expenditure (In Rs.)	No. of families
140-160	5
160-180	25
180-200	f_1
200-220	f_2
220-240	5

30. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

OR

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

31. The sum of a two digit number and the number obtained by reversing the order of its digits is 99. If ten's digit is 3 more than the unit's digit, then find the number.

SECTION-D

Section D consists of 4 questions of 5 marks each.
 32. The sum of areas of two squares is 640 m^2 . If the difference of their perimeter is 64 m. Find the sides of squares.

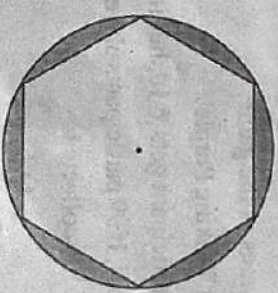
OR

Amit buys some books for Rs. 1920. If he had bought 4 more books for the same amount each book would cost him Rs. 24 less. How many books did he buy? What was the initial price of one book?

33. CD and GH are respectively the bisectors of $\angle ACB$ and $\angle EGF$ such that D and H lie on sides AB and FE of $\triangle ABC$ and $\triangle FEG$. If $\triangle ABC \sim \triangle FEG$, show that : $(3+2)$

(i) $\frac{CD}{GH} = \frac{AC}{FG}$ (ii) $\triangle DCB \sim \triangle HGE$

34. A round table cover has six equal designers. If radius of cover is 28 cm. Find the area of designed portion. (Use $\sqrt{3} = 1.7$)



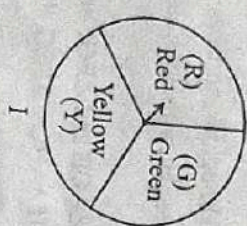
OR

The angle of elevation of an aeroplane from a point on the ground is 60° . After a flight of 15 seconds the angle of elevation changes to 30° . If aeroplane is flying at a constant height of $1500\sqrt{3}$ m. Find the speed of the plane.

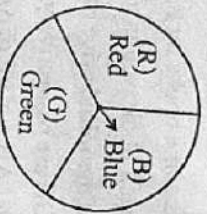
SECTION-E

Section E consists of 3 questions of 4 marks each.

36. A middle school decided to run the following spinner game as fund-raiser on Christmas Carnival.



I



II

Making Purple : Spin each spinner once. Blue and red make purple. So, if one spinner shows Red (R) and another Blue (B), then you win. One such outcome is written as RB.

Based on the above, answer the following questions :

- (i) List all possible outcomes of the game. 1
- (ii) Find the probability of 'Making Purple'. 1
- (iii) (a) For each win, a participant gets ₹ 10, but if he/she loses, he/she has to pay ₹ 5 to the school. If 99 participants played, calculate how much fund could the school have collected. 2

OR

(iii) (b) If the same amount of ₹ 5 has been decided for winning or losing the game, then how much fund had been collected by school? (Number of participants = 99)

37. Shruti's father gave him some money to buy Kiwi from the market for ropes $p(x) = x^2 - 28x + 160$. Where, are zeroes of $p(x)$.

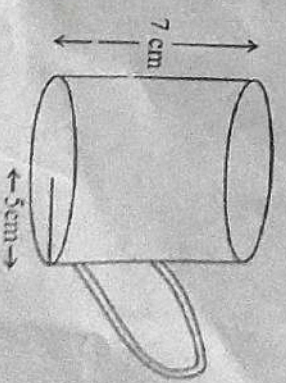
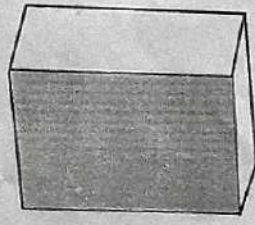


- (i) Find the value of where α and β where $\alpha < \beta$. 2
- (ii) (a) If sum of zeroes of $q(x) = kx^2 + 2x + 3k$ is equal to their product, then what is the value of k ? 1

OR

- (ii) (b) Write the polynomial whose zeroes are $(3 + \sqrt{2})$ and $(3 - \sqrt{2})$. 1
- (iii) Find a quadratic polynomial, whose zeroes are $\frac{1}{4}$ and -1 . 1

38. Tamper-proof tetra-packed milk guarantees both freshness and security. This milk ensures uncompromised quality, preserving the nutritional values within and making it a reliable choice for health-conscious individuals.



[10]

500 mL milk is packed in a cuboidal container of dimensions $15 \text{ cm} \times 8 \text{ cm} \times 5 \text{ cm}$. These milk packets are then packed in cuboidal cartons of dimensions $30 \text{ cm} \times 32 \text{ cm} \times 15 \text{ cm}$.

Based on the above-given information, answer the following questions :

- (i) Find the volume of the cuboidal carton.
- (ii) (a) Find the total surface area of the milk packet.

OR

- (b) How many milk packets can be filled in a carton?
- (iii) How much milk can the cup (as shown in the figure) hold?