



Delhi Public School, Howrah

Periodic Assessment - II (2025 – 2026)

Class-X

Care must be taken not to write anything on the question paper. All the questions must be attempted at the correct sequence.

Subject: - Mathematics (Code No - 041)

Time: 3 Hours

Maximum Marks: 80

General Instructions:

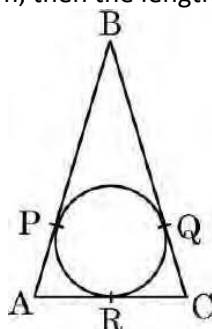
Read the following instructions carefully and follow them:

1. This question paper contains 38 questions. All Questions are compulsory.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Question numbers 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion- Reason based questions of 1 mark each.
4. In Section B, Question numbers 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Question numbers 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Question numbers 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Question numbers 36-38 are case study-based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. There is no overall choice. However, an internal choice in 2 questions of Section B, 2 questions of Section C and 2 questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.
10. Use of calculators is not allowed.

Section A

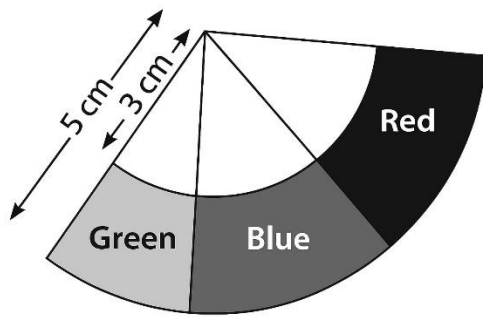
(Section A consists of 20 questions of 1 mark each.)

- 1) If $p = 7^3 \times 5^x$, $q = 7^3 \times 5 \times 2$, $r = 2^2 \times 3 \times 5 \times 7^3$ and $\text{LCM}(p, q, r) = 205800$, then value of the x is
(A) 0 (B) 1 (C) 2 (D) 3
- 2) The point which lies on the perpendicular bisector of the line segment joining the points $A(-2, -5)$ and $B(2, 5)$ is
(A) (0, 0) (B) (0, 2) (C) (2, 0) (D) (-2, 0)
- 3) The value of k , for which the pair of linear equations $kx = y + 2$ and $6x = 2y + 3$ has infinitely many solutions, is
(A) $k = 3$ (B) Does not exist (C) $k = -3$ (D) $k = 4$
- 4) In the given figure, $AB = BC = 10$ cm. If $AC = 7$ cm, then the length of BP is:



- (A) 3.5 cm (B) 7 cm (C) 6.5 cm (D) 5 cm
- 5) If $a \cot \theta + b \operatorname{cosec} \theta = p$ and $b \cot \theta + a \operatorname{cosec} \theta = q$, then $p^2 - q^2 = ?$
(A) $a^2 - b^2$ (B) $b^2 - a^2$ (C) $a^2 + b^2$ (D) $b - a$
- 6) Which of the following equations has two distinct real roots?
(A) $2x^2 - 3\sqrt{2}x + \frac{9}{4} = 0$ (B) $x^2 + x - 5 = 0$ (C) $x^2 - 3x + 2\sqrt{2} = 0$ (D) $5x^2 - 3x + 1 = 0$
- 7) What is the greatest possible speed at which a girl can walk 95 m and 171 m in an exact number of minutes?
(A) 17 m/min (B) 19 m/min (C) 23 m/min (D) 13 m/min
- 8) If $\sin^2 \beta - \cos^2 \beta = 2$, then β is:
(A) 0° (B) 90° (C) 45° (D) 30°

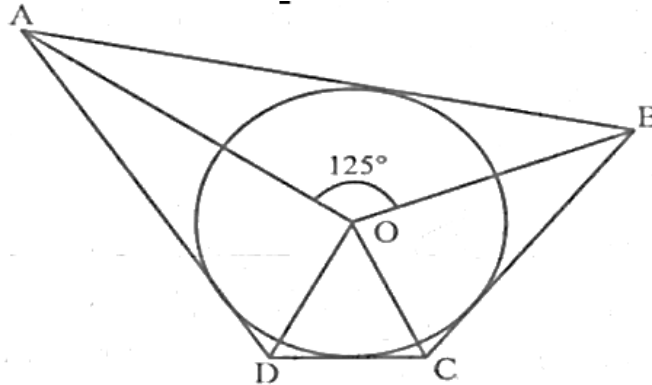
- 9) Sara holds a Japanese folding fan in her hand as shown in the figure. It is shaped like a sector of a circle and made of thin material such as paper or feathers. The inner and outer radii are 3 cm and 5 cm respectively. The fan has three colors i.e., red, blue and green.



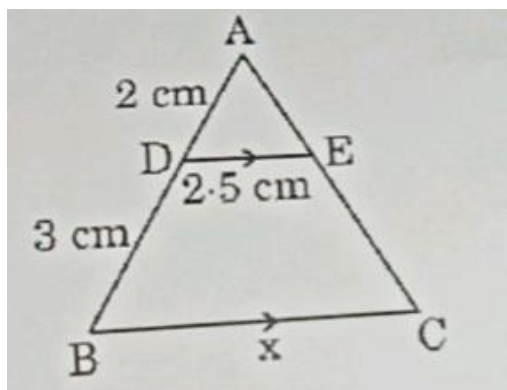
Based on the above information, solve the following question:

If the region containing the green colour makes an angle 60° at the centre, the area of the region having green colour is:

- (A) 6.2 cm^2 (B) 8.38 cm^2 (C) 9.9 cm^2 (D) 11.12 cm^2
- 10) The roots of the equation $5x + \frac{1}{x} = 6, x \neq 0$ are:
- (A) $\frac{1}{3}, 2$ (B) $\frac{1}{4}, 1$ (C) $\frac{1}{5}, 1$ (D) $-1, -\frac{1}{5}$
- 11) In the given figure, if $\angle AOB = 125^\circ$, then $\angle COD$ is equal to:



- (A) 62.5° (B) 45° (C) 35° (D) 55°
- 12) If α and β are the zeros of a polynomial $f(x) = px^2 - 2x + 3p$ and $\alpha + \beta = \alpha\beta$, then p is
- (A) $-\frac{2}{3}$ (B) $\frac{2}{3}$ (C) $\frac{1}{3}$ (D) $-\frac{1}{3}$
- 13) A sector is cut from a circular sheet of radius 100 cm, the angle of the sector being 240° . If another circle of the area same as the sector is formed, then radius of the new circle is:
- (A) 79.5 cm (B) 81.6 cm (C) 83.4 cm (D) 88.5 cm
- 14) In the given figure, $AD=2 \text{ cm}$, $DB=3 \text{ cm}$, $DE=2.5 \text{ cm}$ and $DE \parallel BC$. The value of x is



- (A) 6 cm (B) 3.75 cm (C) 6.25 cm (D) 7.5 cm

- 15) Two AP's have the same common difference. The first term of one of these is -1 and that of the other is -8 . Then the difference between their 4th term is:
 (A) 1 (B) -7 (C) 7 (D) 9
- 16) If the vertices of a parallelogram PQRS taken in order are $P(3, 4)$, $Q(-2, 3)$ and $R(-3, -2)$, then the coordinates of its fourth vertex S are:
 (A) $(-2, -1)$ (B) $(-2, -3)$ (C) $(2, -1)$ (D) $(1, 2)$
- 17) In ΔABC right-angled at B, if $\tan A = \sqrt{3}$, then $\cos A \cos C - \sin A \sin C = ?$
 (A) -1 (B) 0 (C) 1 (D) $\frac{\sqrt{3}}{2}$
- 18) A quadrilateral PQRS is drawn to circumscribe a circle. If $PQ = 12$ cm, $QR = 15$ cm and $RS = 14$ cm, find the length of SP.
 (A) 15 cm (B) 14 cm (C) 12 cm (D) 11 cm

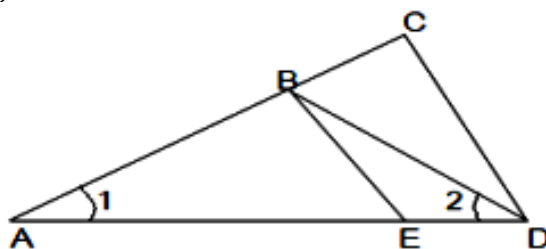
DIRECTION: In question number 10, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**. Choose the correct option.

- 19) **Assertion (A):** The number 20^n ends with the digit 0, where n is a natural number.
Reason (R): A number ends with the digit 0, if its prime factorization contains both 2 and 5.
 (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 and 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.
- 20) **Assertion (A):** For $0^\circ < \theta \leq 90^\circ$, $\operatorname{cosec} \theta - \cot \theta$ and $\operatorname{cosec} \theta + \cot \theta$ are reciprocal of each other.
Reason (R): $\operatorname{cosec}^2 \theta - \cot^2 \theta = 1$
 (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 and 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.

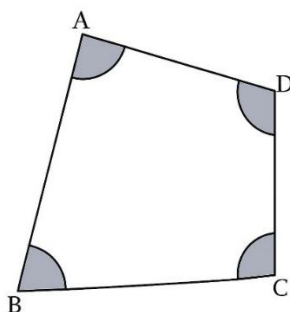
Section B

(Section B consists of 5 questions of 2 marks each.)

- 21) (a) Determine the AP whose third term is 5 and seventh term is 9.
 OR
 (b) Show that the sum of all terms of an AP whose first term is a , the second term is b and the last term is c , is equal to $\frac{(a+c)(b+c-2a)}{2(b-a)}$.
- 22) If $2 \sin(A + B) = \sqrt{3}$ and $\cos(A - B) = 1$, then find the measures of angles A and B . $0 \leq A, B, (A + B) \leq 90^\circ$.
- 23) In the figure given below, $\frac{AD}{AE} = \frac{AC}{BD}$ and $\angle 1 = \angle 2$. Show that $\Delta BAE \sim \Delta CAD$.



- 24) (a) In the given figure, arcs have been drawn of radius 7cm each with vertices A, B, C and D of quadrilateral ABCD as centres. Find the area of the shaded region.



OR

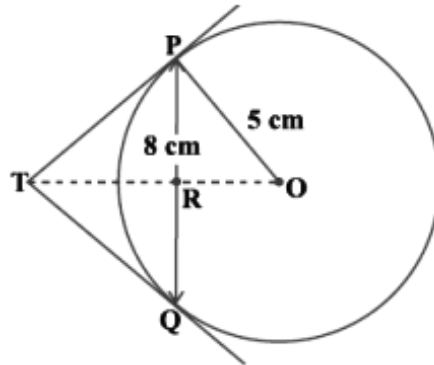
(b) The length of the minute hand of a clock is 6cm. Find the area swept by it when it moves from 7:05 p.m. to 7:40 p.m.

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

Section C

(Section C consists of 6 questions of 3 marks each.)

- 26) In the figure, PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T. Find the length TP.



- 27) Prove that $3 + \sqrt{5}$ is an irrational number.

- 28) (a) If $1 + \sin^2 \theta = 3 \sin \theta \cos \theta$, prove that $\tan \theta = 1$ or $\frac{1}{2}$.

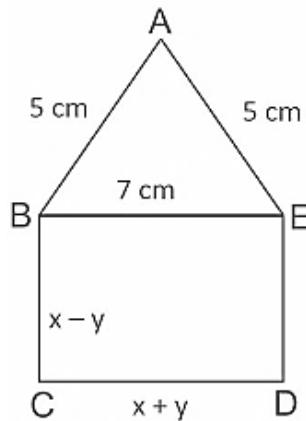
OR

(b) Prove that: $\frac{\tan^3 \theta}{1 + \tan^2 \theta} + \frac{\cot^3 \theta}{1 + \cot^2 \theta} = \sec \theta \operatorname{cosec} \theta - 2 \sin \theta \cos \theta$

- 29) Find the zeroes of the quadratic polynomial $6x^2 - 3 - 7x$ and verify the relationship between the zeroes and the coefficients.

- 30) If S_n denotes the sum of the first n terms of an AP, prove that $S_{30} = 3(S_{20} - S_{10})$.

- 31) (a) In the figure, ABCDE is a pentagon with $BE \parallel CD$ and $BC \parallel DE$. BC is perpendicular to CD. $AB = 5$ cm, $AE = 5$ cm, $BE = 7$ cm, $BC = x - y$ and $CD = x + y$. If the perimeter of ABCDE is 27 cm. find the value of x and y , given $x, y \neq 0$.



OR

(b) Solve: $\frac{x}{a} + \frac{y}{b} = a + b$, $\frac{x}{a^2} + \frac{y}{b^2} = 2$, $a \neq 0$, $b \neq 0$.

Section D

(Section D consists of 4 questions of 5 marks each.)

- 32) (a) Two water taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

OR

(b) A motor boat whose speed in still water is 9 km/h, goes 15 km downstream and comes back to the same spot in a total time of 3 hours 45 minutes. Find the speed of the stream.

- 33) State and prove Basic Proportionality Theorem.

- 34) In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find:

- (i). Length of the arc.
- (ii). Area of the sector formed by the arc.
- (iii). Area of the segment formed by the corresponding chord of the arc. [use $\pi = \frac{22}{7}, \sqrt{3} = 1.732$]

35) (a) Two ships are there in the sea on either side of a light house in such a way that the ships and the light house are in the same straight line. The angles of depression of two ships as observed from the top of the light house are 60° and 45° . If the height of the light house is 200 m, find the distance between the two ships. (Take $\sqrt{3} = 1.73$)

OR

(b) The angles of depression of the top and bottom of a building 50 meters high as observed from the top of a tower are 30° and 60° respectively. Find the height of the tower, and the horizontal distance between the building and the tower.

Section E

(Section E consists of 3 case study-based questions of 4 marks each.)

36) CASE STUDY 1:

Veer is determined to take part in a 200m race. Now, he runs the distance in 51 seconds. Through daily practice, he manages to cut down the time 2 seconds each day. His target is ambitious completing it in 31 seconds. Veer's journey reflects perseverance, discipline, and the power of consistent effort turning aspirations into achievements.



Based on the above information, answer the following questions:

- a) Construct the A.P. based on the given situation. [1]
- b) What is the 7th term of the A.P.? [1]
- c) Find the minimum number of days he needs to practice till his goal is achieved. [2]

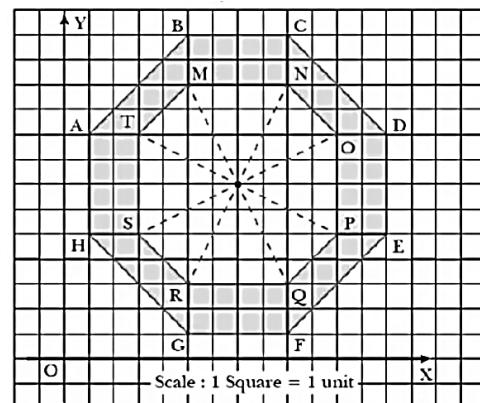
OR

- d) What is total distance covered by him during his practice time to achieve his goal? [2]

37) CASE STUDY 2:

An old wooden table stood in the room. It held books, meals, and memories. Though scratched and worn, it stayed strong, silently witnessing every moment of the family's life.

The top of the table is shown in the figure given below:

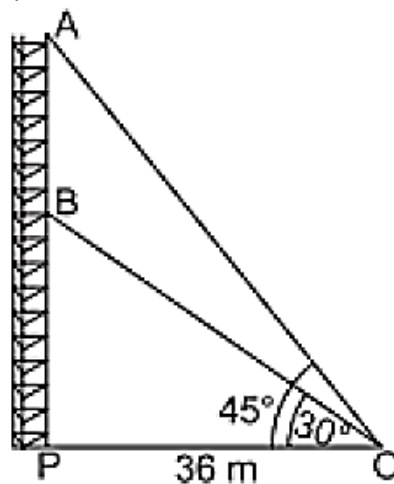


Based on the above information, answer the following questions:

- a) Find the distance between points A and B. [1]
 - b) If G is taken as the origin, and x, y axis put along GF and GB, then find the point denoted by the coordinate (4, 2). [1]
 - c) Write the co-ordinates of the mid-point of line segment joining points M and Q. [2]
- OR
- d) Find the co-ordinates of H, G and find the distance between them. [2]

38) **CASE STUDY 3:**

Radio towers are used for transmitting a range of communication services including radio and television. The tower will either act as an antenna itself or support one or more antennas on its structure. On a similar concept, a radio station tower was built in two Sections A and B. Tower is supported by wires from a point O. Distance between the base of the tower and point O is 36 cm. From point O, the angle of elevation of the top of Section B is 30° and the angle of elevation of the top of Section A is 45° .



Based on the above information, answer the following questions:

- a) Find the length of the wire from point O to the top of Section B. [1]
 - b) Find the height of the Section A from the base of the tower. [1]
 - c) Find the distance AB. [2]
- OR
- d) Find the area of ΔAOB . [2]