GRADE X

Question Bank (MATHEMATICS)

Chapter-11 AREA RELATED TO CIRCLES

1 marks:

1. Perimeter of a sector of a circle whose central angle is 90° and radius 7 cm is **[BOARD 2024]**

   a) 35 cm b) 11 cm c) 22 cm d) 25 cm

2. The perimeter of the sector of a circle of radius 21 cm which subtends an angle of 60° at the centre of circle is **[BOARD 2024]**

   a) 22 cm b) 43 cm c) 64 cm d) 462 cm

3. If the area of the sector of a circle is $\frac{7}{20}$ of the area of the circle, then the angle at the centre is equal to **[BOARD 2024]**

   a) 110° b) 130° c) 100° d) 126°

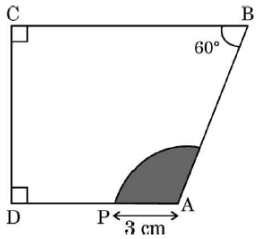
4. The area of the sector of a circle of radius 12 cm is $60\pi\ cm^2$. The central angle of this sector is **[BOARD 2024]**

   a) 120° b) 6° c) 75° d)150°

5. The length of an arc of a circle with radius 12 cm is $10\pi\ cm$. The angle subtended by the arc at the centre of the circle is **[BOARD 2024]**

   a) 120° b) 6° c) 75° d)150°

6. In the given figure, $\angle C = \angle D = 90°, \angle B = 60°$ and $AP = 3\ cm$ then the area of the shaded region is **[BOARD 2024]**



   a) $3\pi\ cm^2$ b) $6\pi\ cm^2$ c) $7\pi\ cm^2$ d) $9\pi\ cm^2$

7. What is the length of the arc of the sector of a circle with radius 14 cm and of central angle 90°? **[BOARD 2023]**

   a) 22 cm b) 44 cm c) 88 cm d) 11 cm

8. The hour hand of a clock is 6 cm long. The angle swept by it between 7:20 a.m and 7:55 a.m is **[BOARD 2023]**

   a) $\left(\frac{35}{4}\right)°$ b) $\left(\frac{35}{2}\right)°$ c) 35° d) 70°

9. The circumferences of two circles are in the ratio 4:5. What is the ratio of their radii? **[BOARD 2023]**

   a) $16:25$ b) $25:16$ c) $2:\sqrt{5}$ d) $4:5$

10. 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 the radius of the new circle is

    a) 79.5 cm b) 81.5 cm c) 83.4 cm d) 88.5 cm

11. The area of the circle that can be inscribed in a square of side 6 cm is

    a) $36\pi\ cm^2$ b) $18\pi\ cm^2$ c) $12\pi\ cm^2$ d) $9\pi\ cm^2$

Options for Assertion and Reasoning Questions:

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

12. ***Assertion (A):*** If the circumference of a circle is 176 cm, then its radius is 28 cm.
    Reason (R): Circumference $= 2\pi \times$ radius of a circle. **[BOARD 2024]**

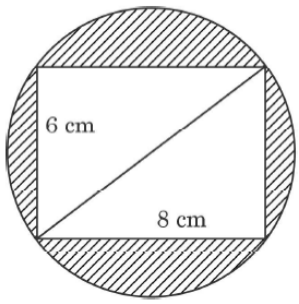
2 marks:

1. The minute hand of a clock is 14 cm long. Find the area on the face of the clock described by the minute hand is 5 minutes. **[BOARD 2024]**
2. Find the length of the arc of a circle which subtends an angle of 60° at the centre of the circle of radius 42 cm. **[BOARD 2024]**

3 marks:

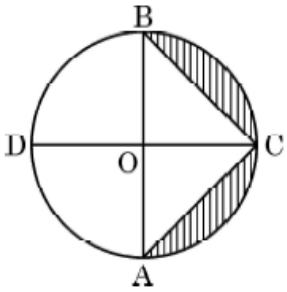
1. An arc of a circle of radius 10 cm subtends a right angle at the centre of the circle. Find the area of the corresponding major sector. (Use $\pi = 3.14$) **[BOARD 2024]**
2. A sector is cut from a circle of radius 21 cm. The central angle of the sector is 150°. Find the length of the arc of this sector and the area of the sector. **[BOARD 2024]**
3. 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. **[BOARD 2023]**

4. A car has two wipers which do not overlap. Each wiper has a blade of length 21 cm sweeping through an angle of 120°. Find the total area cleaned at each sweep of the two blades. **[BOARD 2023]**
5. Reeti prepares a Rakhi for her brother Ronit. The Rakhi consists of a rectangle of length 8 cm and breadth 6 cm inscribed in a circle as shown in the figure. Find the area of the shaded region. (Use $\pi = 3.14$) **[BOARD 2023]**

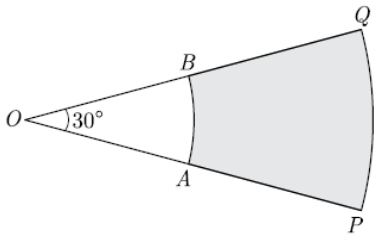


6. In the given figure, AB and CD are diameters of a circle with centre O perpendicular to each other. If $OA = 7\ cm$ find the area of shaded region.

[BOARD 2023]

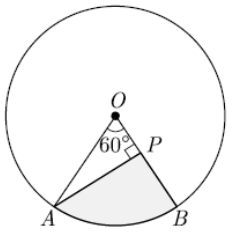


7. In the given figure, PQ and AB are two arcs of concentric circles of radii 7 cm and 3.5 cm respectively, with centre O. If $\angle POQ = 30°$ then the area of shaded region.

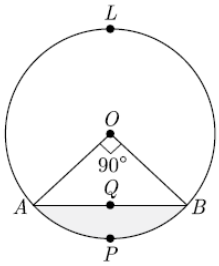


8. Three horses are tied each with 7 cm long rope at three corners of a triangular field having sides 20 m, 34 m and 42 m. Find the area of the plot which can be grazed by the horses.

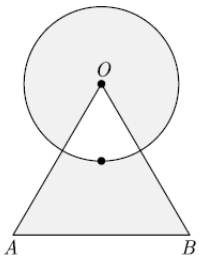
9. In the given figure, AOB is a sector of angle 60° of a circle with centre O and radius 17 cm. If $AP \perp OB$ and $AP = 15\,cm$ find the area of the shaded region.



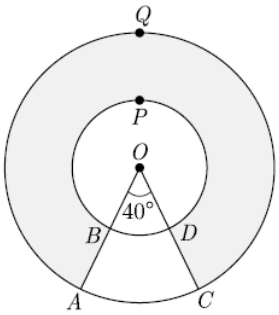
10. In the given figure, a chord AB of the circle with centre O and radius 10 cm, that subtends a right angle at the centre of the circle. Find the area of the minor segment AQBP. Hence find the area of major segment ALBQA. (Use π = 3.14).



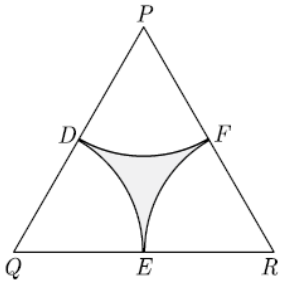
11. Find the area of shaded region shown in the figure, where a circular arc of radius 6 cm has been drawn with vertex O of an equilateral triangle OAB of side 12 cm as centre.



12. In the given figure, find the area of shaded region enclosed between two concentric circles of radii 7 cm and 14 cm where $\angle AOC = 40°$.

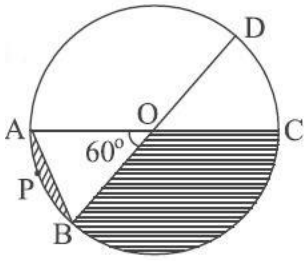


13. In the given figure, ΔPQR is an equilateral triangle of side 8 cm and D, E, F are centres of circular arcs each of radius 4 cm. Find the area of shaded region. $\left(\text{Use } \pi = 3.14 \text{ and } \sqrt{3} = 1.732\right)$



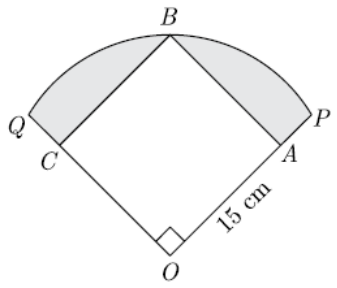
5 marks:

1. An arc of circle of radius 21 cm subtends an angle of 60° at the centre. Find the length of an arc and the area of the minor segment of the circle made by the corresponding chord. **[BOARD 2024]**
2. A chord of circle of radius 14 cm subtends an angle of 60° at the centre. Find the area of the corresponding minor segment of the circle. Also find the area of major segment of the circle. **[BOARD 2023]**
3. In the given figure, diameters AC and BD of the circle intersect at O. If $\angle AOB = 60°$ and $OA = 10\,cm$ then find the length of the chord AB and find the area of the shaded region. $\left(\text{Use } \pi = 3.14 \text{ and } \sqrt{3} = 1.73\right)$ **[BOARD 2024]**



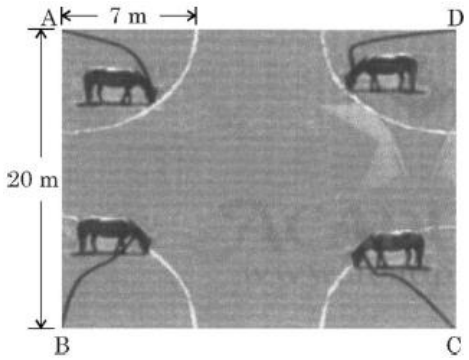
4. The perimeter of a certain sector of a circle of radius 5.6 m is 20 m. Find the area of the sector. **[BOARD 2024]**
5. A horse is tied to a beg at one corner of a square shaped grass field of side 15 m by means of a 5 m long rope. Find the area of that part of the field in which the horse can graze. Also, find the increase in grazing area if length of the rope is increased to 10 m. (Use $\pi = 3.14$) **[BOARD 2023]**

6. In the given figure, a square OABC is inscribed in a quadrant OPBQ. If $OA = 15\ cm$ find the area of the shaded region. (Use $\pi = 3.14$).



Case Based Questions:

1. A stable owner has four horses. He usually tie these horses with 7 m long rope to pegs at each corner of a square shaped grass field of 20 m length, to graze in his farm. But tying with rope sometimes results in injuries to his horses, so he decided to build fence around the area so that each horse can graze. **[BOARD 2024]**



Based on the above information, answer the following questions:

(i) Find the area of the square shaped grass field. **1**

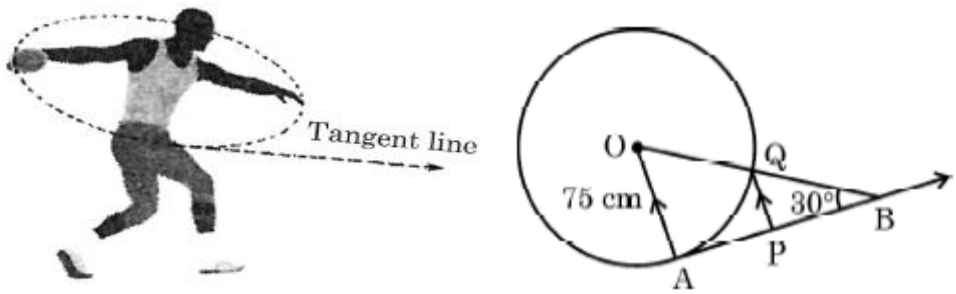
(ii) (a) Find the area of the total field in which these horses can graze. **2**

OR

(b) If the length of the rope of each horse is increased from 7 m to 10 m, find the area grazed by one horse. (Use $\pi = 3.14$) **2**

(iii) What is the area of the field that is left un grazed, if the length of the rope of each horse is 7 m? **1**

2. The discus throw is an event in which an athlete attempts to throw a discus. The athlete spins anti clockwise around one and a half times through a circle, then releases the throw. When released, the discus travels along tangent to the circular spin orbit. **[BOARD 2023]**



In the given figure, AB is one such tangent to a circle of radius 75 cm. Point O is centre of the circle and $\angle ABO = 30°$. PQ is parallel to OA.

Based on the above information:

(i) Find the length of AB. **1**

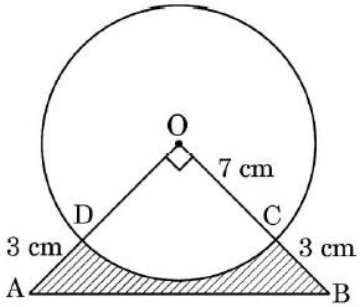
(ii) (a) Find the length of AP. **2**

OR

(b) Find the length of PQ. **2**

(iii) Find the length of OB. **1**

3. In an annual day function of a school, the organizers wanted to give a cash prize along with a memento to their best students. Each memento is made as shown in the figure and its base ABCD is shown from the front side. The rate of silver plating is Rs 20 per cm^2. **[BOARD 2023]**



Based on the above, answer the following questions:

(i) What is the area of the quadrant ODCO? **1**

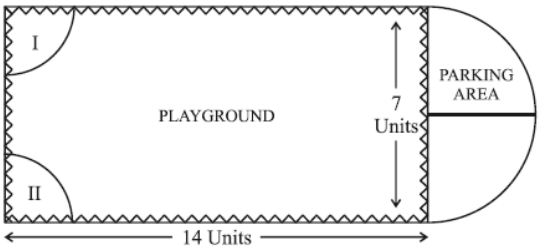
(ii) (a) What is the total cost of silver plating the shaded part ABCD? **2**

OR

(b) What is the length of arc CD? **2**

(iii) Find the area of ΔAOB. **1**

4. Governing council of a local public development authority of Dehradun decided to build an adventurous playground on the top of a hill, which will have adequate space for parking.



After survey, it was decided to build rectangular playground, with a semi-circular area allotted for parking at one end of the playground. The length and breadth of the rectangular playground are 14 units and 7 units, respectively. There are two quadrants of radius 2 units on one side for special seats.

Based on the above, answer the following questions:

(i) What is the total perimeter of the parking area? **1**

(ii) (a) What is the total area of parking and the two quadrants? **2**

(OR)

(b) What is the ratio of area of playground to the area of parking area? **2**

(iii) Find the cost of fencing the playground and parking area at the rate of Rs 2 per unit. **1**