

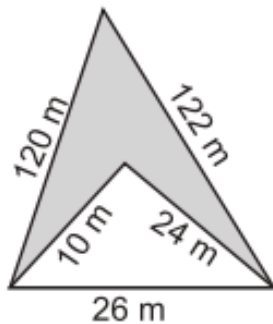
STD 9 Maths [Manjari]
Measuring Spaces: Perimeter and Area

*** Choose the right answer from the given options. [1 Marks Each]**

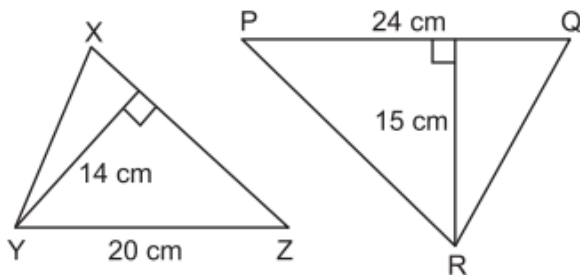
[37]

1. The perimeter of a square with side 9 cm is:
(A) 18 cm (B) 27 cm (C) 36 cm (D) 81 cm
2. The perimeter of a rectangle with length 14 cm and breadth 6 cm is:
(A) 20 cm (B) 40 cm (C) 84 cm (D) 120 cm
3. The circumference of a circle with radius 14 cm is:
(A) 44 cm (B) 66 cm (C) 88 cm (D) 176 cm
4. The circumference of a circle is directly proportional to its:
(A) Area (B) Diameter (C) Radius squared (D) Chord
5. The length of a semicircular arc of radius 21 cm is:
(A) 33 cm (B) 44 cm (C) 66 cm (D) 132 cm
6. The length of a quarter-circle arc of radius 14 cm is:
(A) 11 cm (B) 22 cm (C) 44 cm (D) 88 cm
7. The area of a rectangle with length 18 cm and breadth 7 cm is:
(A) $25cm^2$ (B) $50cm^2$ (C) $126cm^2$ (D) $252cm^2$
8. The area of a parallelogram with base 15 cm and height 8 cm is:
(A) $60cm^2$ (B) $120cm^2$ (C) $240cm^2$ (D) $360cm^2$
9. The area of a triangle with base 20 cm and height 9 cm is:
(A) $90cm^2$ (B) $120cm^2$ (C) $180cm^2$ (D) $360cm^2$
10. A median of a triangle divides it into:
(A) Two congruent triangles (B) Two triangles of equal area
(C) Two right triangles (D) Two similar triangles
11. The semi-perimeter of a triangle with sides 5 cm, 12 cm, and 13 cm is:
(A) 15 cm (B) 20 cm (C) 25 cm (D) 30 cm
12. Using Heron's formula, the area of a triangle with sides 5 cm, 12 cm, and 13 cm is:
(A) $30cm^2$ (B) $60cm^2$ (C) $78cm^2$ (D) $90cm^2$
13. A quadrilateral whose vertices lie on a circle is called:
(A) Rhombus (B) Trapezium
(C) Cyclic quadrilateral (D) Kite

14. Brahmagupta's formula is used to find the area of a:
 (A) Triangle (B) Circle
 (C) Rectangle (D) Cyclic quadrilateral
15. The value of π is approximately equal to:
 (A) 2.14 (B) 3.14 (C) 4.13 (D) 22.7
16. An isosceles right triangle has area 8cm^2 . The length of its hypotenuse is:
 (A) $\sqrt{32}\text{cm}$ (B) $\sqrt{96}\text{cm}$ (C) $\sqrt{112}\text{cm}$ (D) $\sqrt{24}\text{cm}$
17. Area of the shaded region in the given figure is:



- (A) 1400m^2 (B) 1500m^2 (C) 1550m^2 (D) 1440m^2
18. A triangle and a parallelogram have the same base and the same area. If the sides of the triangle are 26cm , 28cm and 30cm and the parallelogram stands on the base 28cm , then height of the parallelogram is:
 (A) 8cm (B) 10cm (C) 12cm (D) 14cm
- 19.

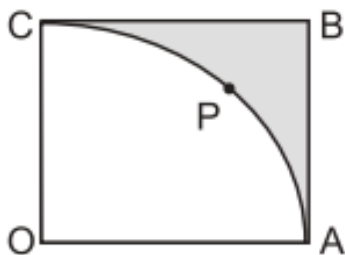


Two triangles are shown below.

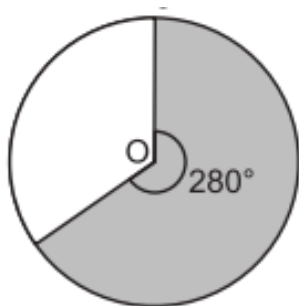
Which of the following is true?

- (A) Area of both the triangles can be calculated, area of $\triangle XYZ = 140\text{cm}^2$ and area of $\triangle PQR = 180\text{cm}^2$.
 (B) Area of only triangle XYZ can be calculated. area of $\triangle XYZ = 140\text{cm}^2$
 (C) Area of only triangle PQR can be calculated, area of $\triangle PQR = 180\text{cm}^2$
 (D) Area of both the triangles cannot be calculated.
20. If a, b and c are the sides of a triangle and s = semi perimeter, then s is equal:
 (A) $\frac{a+b+c}{2}$ (B) $2(a+b+c)$ (C) $2(a-b+c)$ (D) $\frac{a+b-c}{2}$

21. If each side of a triangle is doubled, then its area increased by:
 (A) 100% (B) 200% (C) 300% (D) 350%
22. If the area of a sector of a circle is $\frac{7}{20}$ of the area of the circle, then the angle at the centre is equal to:
 (A) 110° (B) 130° (C) 100° (D) 126°
23. If the difference between the circumference and radius of a circle is 37 cm , then circumference (in cm) of the circle is:
 (A) 155 (B) 44 (C) 10 (D) 14
24. If the length of an arc of a circle of diameter 84 cm , is 88 cm , then the angle subtended by the arc at the centre of the circle is:
 (A) 120° (B) 90° (C) 60° (D) 30°
25. If the sides of a triangular board are 56cm, 60cm and 52 cm long, then its area is:
 (A) $12.24cm^2$ (B) $1344cm^2$ (C) $1444cm^2$ (D) $1554cm^2$
26. In the figure, OABC is a square of side 7 cm . If OAPC is a quadrant of a circle with centre O , then the area of the shaded region is:



- (A) $\frac{17}{2}cm^2$ (B) $\frac{19}{2}cm^2$ (C) $\frac{21}{2}cm^2$ (D) $\frac{23}{2}cm^2$
27. In the figure, there is a circle with centre O . The shaded sector has an angle of 280° and area Acm^2 . Which of these is the area of the unshaded sector?



- (A) $\frac{2}{7}Acm^2$ (B) $\frac{1}{3}Acm^2$ (C) $\frac{2}{3}Acm^2$ (D) $\frac{7}{9}Acm^2$
28. The area of an isosceles triangle having base 2 cm and the length of one of the equal sides 4 cm is:
 (A) $\sqrt{18}cm^2$ (B) $\sqrt{15}cm^2$ (C) $\sqrt{12}cm^2$ (D) $\sqrt{8}cm^2$
29. The area of a quadrant of a circle, where the circumference of circle is 44 cm is:
 (A) $32.5cm^2$ (B) $35.5cm^2$ (C) $36.5cm^2$ (D) $38.5cm^2$

30. The area of a triangle, two sides of which are 8 cm and 11 cm and the perimeter is 32cm =
 (A) $7\sqrt{30}\text{cm}^2$ (B) $8\sqrt{30}\text{cm}^2$ (C) $9\sqrt{30}\text{cm}^2$ (D) $11\sqrt{30}\text{cm}^2$
31. The area of right-angled triangle with sides 17cm , 15cm and 8 cm is:
 (A) 25cm^2 (B) 28cm^2 (C) 60cm^2 (D) 35cm^2
32. The base of an isosceles triangle measures 24 cm and its area is 192cm^2 . The length of one of equal side is:
 (A) 20 cm (B) 22 cm (C) 24 cm (D) 28 cm
33. The base of a right triangle is 16 cm and hypotenuse is 34 cm . Its area will be:
 (A) 240cm^2 (B) 180cm^2 (C) 160cm^2 (D) 150cm^2
34. The perimeter of an equilateral triangle is 60 cm . Its height is:
 (A) $10\sqrt{3}\text{cm}$ (B) $9\sqrt{3}\text{cm}$ (C) $\frac{10}{\sqrt{3}}\text{cm}$ (D) $20\sqrt{3}\text{cm}$
35. The sides of a triangle are 17cm , 25cm and 26 cm . The length of the altitude to the longest side correct upto two places of decimal is:
 (A) 15.69 (B) 13.59 cm (C) 12.23 cm (D) 10.59 cm
36. The sides of a triangle are in the ratio 5 : 12 : 13 and its perimeter is 150 m . The area of the triangle is:
 (A) 700m^2 (B) 720m^2 (C) 750m^2 (D) 800m^2
37. The area of an equilateral triangle with side $2\sqrt{3}\text{cm}$ is:
 (A) $2\sqrt{3}\text{cm}^2$ (B) $12\sqrt{3}\text{cm}^2$ (C) $4\sqrt{3}\text{cm}^2$ (D) $3\sqrt{3}\text{cm}^2$

* A statement of Assertion (A) is followed by a statement of Reason (R). [7]
 Choose the correct option.

Directions: In each question below, there are two statements labelled as Assertion (A) and Reason (R). Choose the correct answer as per the options given below:

- (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

38. **Assertion (A)** : A bicycle wheel makes 5000 revolutions in covering 11 km . Then diameter of the wheel is 35 cm .

Reason (R) : If a wire of length 22 cm is bent in the shape of a circle, then area of the circle so formed is 38.5cm^2 .

39. **Assertion (A)** : A chord of a circle of radius 14 cm makes a right angle at the centre. The area of the minor segment is 56cm^2 .

Reason (R) : Angle described by the minute hand in 5 minutes = 6°

40. **Assertion (A)** : Area of rhombus with each edge 6 cm and one diagonal of length 6 cm is $18\sqrt{3}cm^2$.

Reason (R) : Area of equilateral triangle = $\frac{\sqrt{3}}{4}(\text{side})^2$.

41. **Assertion (A)** : If the circumference of two circles are in the ratio 2 : 3, then ratio of their areas is 4 : 9.

Reason (R) : The circumference of a circle of radius r is $2\pi r$ and its area is πr^2 .

42. **Assertion (A)** : The area of a triangle whose sides are 13cm, 14cm and 15 cm is $84cm^2$.

Reason (R) : Area of triangle = $\frac{1}{2} \times \text{base} \times \text{height}$

43. **Assertion (A)** : The area of a triangle with base 4 cm and height 6 cm is $12cm^2$.

Reason (R) : Area of triangle = $\sqrt{s(s-a)(s-b)(s-c)}$

44. **Assertion (A)** : The semi perimeter of a triangle is 30 cm , with sides 20cm, 25cm and 15 cm.

Reason (R) : Semi perimeter = $\frac{a+b+c}{2}$

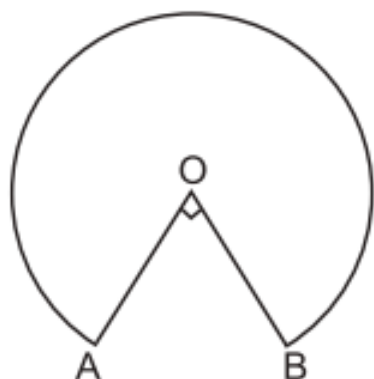
* Answer the following short questions. [2 Marks Each]

[50]

45. The perimeter of a circle is 44 cm. What is its radius?

46. Find the area of a sector of a circle with radius 7 cm if the angle of the sector is 60° .

47. In the given figure, the shape of the top of a table is that of a sector of a circle with centre O and $\angle AOB = 90^\circ$. If $AO = OB = 42cm$, then find the perimeter of the top of the table. [Use $\pi = \frac{22}{7}$].



48. The minute hand of a wallclock is 14 cm . Find the area swept by the minute hand in 1 minute.

49. The circumference of a circle is 132 cm. Find its area.

50. The area of a circle is $154cm^2$. Find its diameter.

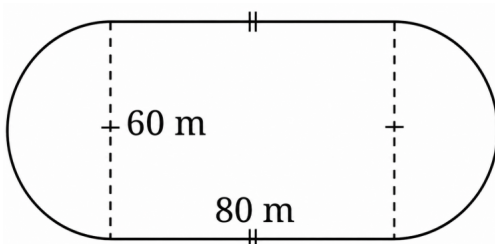
51. How many bangles with radius 2.5 cm can be built from 44 m long golden string?

52. Diameter of a circular park is 105 m. How much time will Akhilesh take cover five rounds of the park, if he walks at a speed of 3 km/hour.
53. The semi-perimeter of a triangle is 132 cm. The product of the differences of semi-perimeter and its respective sides is 13200 cm^3 . Find the area of the triangle.
54. A rectangle $10 \text{ cm} \times 6 \text{ cm}$, find the area by using Brahmagupta's Formula.
55. A square of side 6 cm, find the area of square by using Brahmagupta's Formula.
56. Find the area of the quadrilateral if, sides are 4 cm, 5 cm, 7 cm and 8 cm.
57. Find the area of a cyclic quadrilateral with sides: $a = 5 \text{ cm}$, $b = 6 \text{ cm}$, $c = 7 \text{ cm}$ and $d = 8 \text{ cm}$.
58. The diameter of a circular garden is 220 m . Find the area of the garden. [Take $\pi = 3.14$]
59. Find the radius of a circle whose area is 1386 cm^2 .
60. The circumference of a circle is 110 cm. Find its area.
61. The ratio of radii of the two circles is 3: 5. Find the ratio of their areas.
62. A circle is inscribed in a square of side 28 cm. Find the area of the circle.
63. Find the area of a triangle whose sides are 150 cm, 120 cm and 200 cm long.
64. Find the area of a rectangle of dimensions $10 \text{ cm} \times 6 \text{ cm}$ using Brahmagupta's formula.
65. Find the area of a square of side 15 cm using Brahmagupta's formula.
66. A rectangle is always cyclic. Verify Brahmagupta's formula for a $15 \text{ cm} \times 8 \text{ cm}$ rectangle.
67. A cyclic quadrilateral has sides 10 cm, 12 cm, 8 cm and 6 cm. Find its area.
68. Sides of a cyclic quadrilateral are 5 cm, 5 cm, 8 cm and 8 cm. Find the area.
69. Find the area of a cyclic quadrilateral with sides 6 cm, 8 cm, 9 cm and 7 cm.

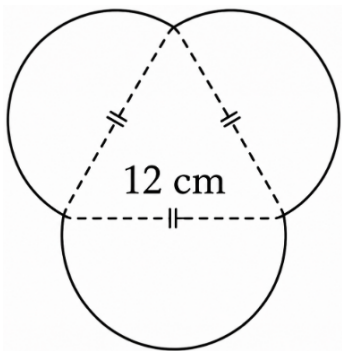
*** Answer the following questions. [3 Marks Each]**

[120]

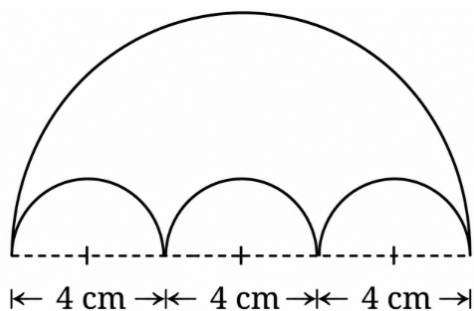
70. Find the perimeters of the following shapes (taking the arcs to be quarter or half or three-quarters of a circle, as appropriate).



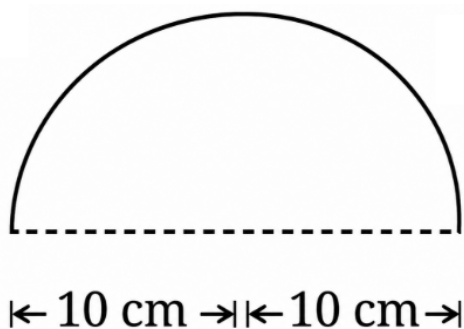
71. Find the perimeters of the following shapes (taking the arcs to be quarter or half or three-quarters of a circle, as appropriate)



72. Find the perimeters of the following shapes (taking the arcs to be quarter or half or three-quarters of a circle, as appropriate).

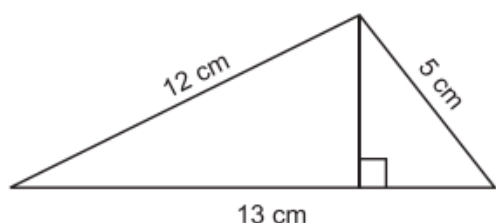


73. Find the perimeters of the following shapes (taking the arcs to be quarter or half or three-quarters of a circle, as appropriate).

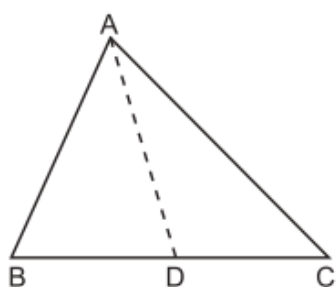


74. The sides of a triangular plot are in the ratio 3 : 5 : 7; its perimeter is 300 m. Find its area.
75. O is any point on the diagonal PR of a parallelogram PQRS. Prove that the areas of triangles PSO and PQO are equal.
76. The sides of a quadrilateral ABCD are 6 cm, 8 cm, 12 cm and 14 cm (taken in order) respectively, and the angle between the first two sides is a right angle. Find its area.
77. A advertising board is in the form of an isosceles triangle with its sides 12m, 10m and 10 m long. Find the cost of painting it at ₹2 per sq. metre.
78. The perimeter of a triangular field is 240 dm . If two of its sides are 50 dm and 78 dm , find the length of the perpendicular on the side of length 50 dm from the opposite vertex. Also calculate the cost of watering it at ₹ 3.50 per 100sqdm..

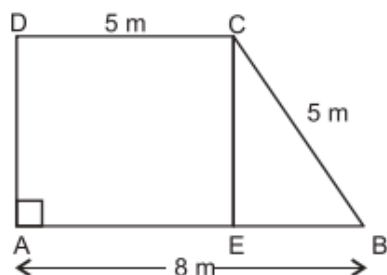
79. One side of an equilateral triangle is 8 cm. Find its area using Heron's formula. Also, find the altitude.
80. Two sides of a triangular field are 85 m and 154 m in length and perimeter is 324 m. Find the area of the triangle.
81. Find the length of hypotenuse of an isosceles right angled triangle, having an area of 200cm^2 (Take $\sqrt{2} = 1.414$)
82. The area of a rhombus is 240cm^2 . If one of the diagonals is 30 cm, find the length of the other diagonal.
83. Show that the sides 5 cm, 12 cm and 13 cm make a right angled triangle. Find the length of the altitude on the longest side.



84. Find the area of a right triangle whose one side is 5 cm and hypotenuse is 13 cm.
85. In the figure, AD is the median of the triangle. If area of $\triangle ADC = 24\text{ cm}^2$ and $BC = 15\text{ cm}$, find the height of the triangle ABC corresponding to the base BC.



86. In the given figure, ABCD is a quadrilateral in which $AB \parallel DC$, and $AD \perp AB$. Also $AB = 8\text{ m}$, $DC = 5\text{ m}$. Find the area of the quadrilateral ABCD in two ways :
- (i) taking ABCD as a trapezium
- (ii) taking quadrilateral ABCD as sum of rectangle AECD and triangle BEC.



87. The perimeter of a sector of a circle of radius 5.6 cm is 27.2 cm. Find the area of the sector.
88. In the figure, find the area of the shaded portion.

89. Shazli took a wire of length 44 cm and bent it into the shape of a circle. Find the radius of that circle. Also, find its area. If the same wire is bent into the shape of a square, what will be the length of each of its sides? Which figure encloses more area, the circle or the square ? (Take $\pi = \frac{22}{7}$)
90. A race track is in the form of a ring whose inner and outer circumferences are 437m and 503m respectively. Find the width of the track.
91. The diameter of a wheel of a car is 63 cm . Find the distance travelled by the car during the period in which the wheel makes 1000 revolutions.
92. Prove that a median divides a triangle into two triangles of equal area.
93. ABCD is a rectangle 8 m long and 4 m broad. P is the mid-point of AB. BA is produced to Q such that AQ = BP. Find the area of DCPQ.
94. The base of an isosceles triangle is 24 cm and its area is 192cm^2 . Find its perimeter.
95. The minute hand of a clock is 14 cm long. Find the area on the face of the clock described by the minute hand in 5 minutes.
96. The length of the minute hand of a clock is 5 cm . Find the area swept by the minute hand during the time period 6.05 am and 6.40 am .
97. A horse is placed for grazing inside a rectangular field 70 m by 52 m. It is tethered to one corner by a rope 21 m long. On how much area can it graze? How much area is left ungrazed?
98. The minute hand of a clock is $\sqrt{21}\text{cm}$ long. Find the area described by the minute hand on the face of the clock between 6 a.m. and 6.05 a.m.
99. A decorative window is made in the shape of a minor segment of a circle. The radius of the circle is 14 cm , and the central angle is 90° .
(i) Find the area of the corresponding sector.
(ii) Find the area of the triangle formed by the two radii.
(iii) Hence, find the area of the minor segment.
100. In a circle of radius 21 cm , an arc subtends an angle of 60° at the centre. Find (i) the length of the arc, (ii) the area of the sector bounded by the arc and (iii) the area of the segment made by this arc.
101. The perimeter of a sector of a circle of radius 7 cm is 25 cm. Find the area of the sector.
102. Semi-circular lawns are attached to both edges along the breadth of a rectangular lawn measuring 56 m by 35 m . Find the total area enclosed.[Hots]
103. Find the area of a ring whose inner and outer radii are 15 cm and 18 cm respectively.[Take $\pi = 3.14$]

104. The length of the minute hand in the clock tower is 28 cm . Calculate the area, it covers in 30 minutes. Take $\pi = \frac{22}{7}$.[Hots]
105. Find the circumference of the circle whose radius is:
 (i) 21 cm
 (ii) 28 cm
 (iii) 56 cm
106. A rectangle and a parallelogram are drawn between the same parallel lines on a common base of 10 cm. If the perimeter of the rectangle is 36 cm. Find the area of the parallelogram.
107. The lengths of the parallel sides of a trapezium are 56 cm, 40 cm and the length of the other sides are 28 cm and 30 cm. Find the area of the trapezium.
108. The parallel sides of a trapezium are 60 cm and 77 cm and the other sides are 25 cm and 26 cm. Find the area of the trapezium.
109. A farmer's field is in the shape of a quadrilateral. The four sides are: 25m, 26m, 27 m and 28 m . a surveyor measures one diagonal as 35 m .
 (i) Find the area of each triangle using Heron's formula.
 (ii) Find the total area of the field.
 (iii) If wheat is sown at ₹ 50 per m^2 , calculate the total cost of sowing.

*** Questions with calculation. [4 Marks Each]**

[228]

110. Calculate, correct to 3 significant figures, the circumference of a circle with: (i) radius 7 cm (ii) radius 10 cm (iii) radius 12 cm.
111. Calculate the length of the arc of a circle if: (i) the radius is 3.5 cm and the angle at the centre is 60° , and (ii) the radius is 6.3 m and the angle at the centre is 120° .
112. Find the perimeter of a sector (i.e., the curved portion as well as the two straight portions) of a circle of radius 14 cm and sector angle 75° .
113. If the diameter of a car tyre is 56 cm, then: (i) How far does the car need to travel for the tyre to complete one revolution? (ii) How many revolutions does the tyre make if the car travels 10 km?
114. The parallel sides of a trapezium are 40 cm and 20 cm. If its non-parallel sides are both equal, each being 26 cm, find the area of the trapezium.
115. In $\triangle ABC$, the midpoint of BC is D (Fig.) Median AD is drawn. P is any point on AD. Show that area $\triangle ABP$ = area $\triangle ACP$.

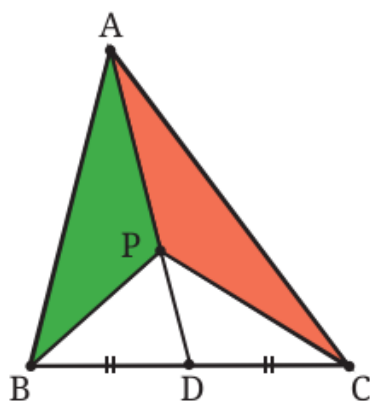
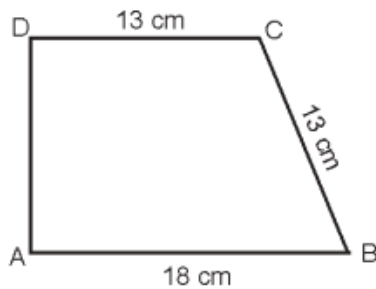


Fig.

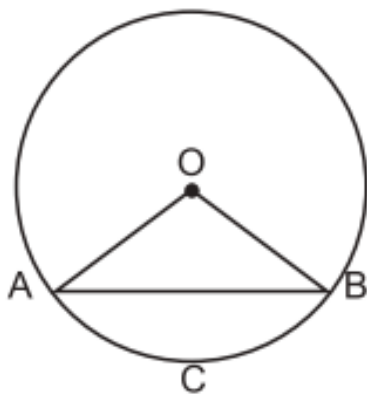
116. A chord of a circle of radius 10 cm subtends 90° at the centre. Find the area of the corresponding: (i) minor sector that subtends 90° at the centre, and (ii) major sector that subtends 270° at the centre. (Use $\pi \approx 3.14$.)
117. A car has two wipers which do not overlap. Each wiper has a blade of length 28 cm and sweeps through an angle of 120° . Find the total area cleaned at each sweep of the blades.
118. A chord of a circle of radius r subtends an angle of 60° at the centre of the circle. Show that the area of the corresponding minor segment of the circle is equal to $r^2(\pi/6 - \sqrt{3}/4)$.
119. A hexagon is inscribed in a circle of radius r . Show that the ratio of the area of the hexagon to the area of the circle is equal to $3\sqrt{3}/2\pi \approx 0.827$. Can you see why the answer is exactly twice the answer to Question 8?
120. A brooch is made with silver wire in the form of a circle with diameter 35 mm . The wire is also used in making 5 diameters which divide the circle into 10 equal sectors as shown in the figure. Find
 - (i) the total length of the silver wire required.
 - (ii) the area of each sector of the brooch.
121. A horse is tied to a peg at one corner of a square shaped grass field of side $15m$ by means of a $5m$ long rope. Find
 - (i) The area of that part of the field in which the horse can graze.
 - (ii) The increase in the grazing area if the rope were 10 m long instead of 5 m .
 [Take $\pi = 3.14$]
122. In a circle of radius 21 cm , an arc subtends an angle of 60° at the centre. Find:
 - (i) the length of the arc. (ii) area of the sector formed by the arc,
 - (iii) area of the segment formed by the corresponding chord.
123. A chord of a circle of radius $10cm$ subtends a right angle at the centre. Find the area of the corresponding:
 - (i) minor segment,
 - (ii) maior sector. (Use $\pi = 3.14$)

124. An umbrella is made by stitching 10 triangular pieces of cloth of two different colour, each piece measuring 20 cm, 50 cm and 50 cm. How much cloth of each colour is required for the umbrella?
125. The base of an isosceles triangle is 16 cm and length of equal sides is 10 cm. Find the area of the triangle using Heron's formula.
126. The sides of a triangle are 8 cm, 15 cm and 17 cm. Find its area.
127. Diagonals of a rhombus are 8 m and 6 m. Find the side of the rhombus and its area also.
- 128.

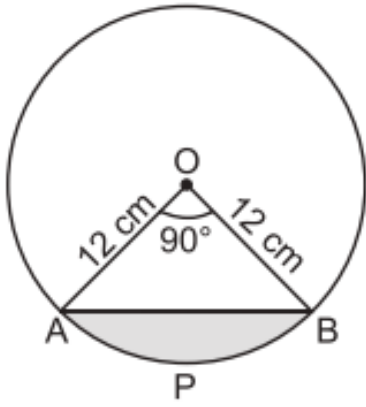


In the figure, ABCD is a trapezium in which $AB \parallel DC$. If $DA \perp AB$, $AB = 18$ cm, $BC = 13$ cm and $CD = 13$ cm, find the area of the trapezium.

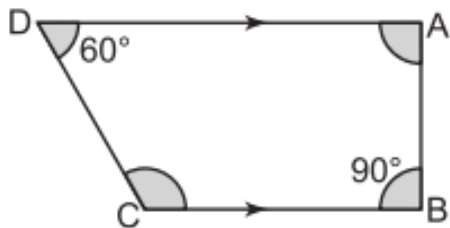
129. An isosceles right triangle has area 8cm^2 . Find the length of its hypotenuse.
130. The perimeter of sector OACB of the circle centered at O and of radius 24 cm is 73.12 cm .
- (i) Find the central angle $\angle AOB$.
- (ii) Find the area of the minor segment ACB . (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$)



131. In a circle with centre O, AB is a chord of the circle. $AO = 12\text{cm}$ and angle $AOB = 90^\circ$. Find the area of the shaded region.(Use $\pi = 3.14$).



132. The minute hand of a clock is 10 cm long. Find the area on the face of the clock described by the minute hand between 8 am and 8.25 am.
133. A circular park has a radius of 21 m . A 60° sector is converted into a flower garden.
 (i) Find the area of the flower garden (sector).
 (ii) Find the remaining area of the park.
134. A pizza has a radius of 14 cm . It is cut into 8 equal slices.
 (i) Find the area of one slice.
 (ii) If each slice is sold at ₹120, find the price per cm^2 of pizza.
135. ABCD is a field in the shape of a trapezium in which $AD \parallel BC$, $\angle ABC = 90^\circ$ and $\angle ADC = 60^\circ$. Four sectors are formed with centres A, B, C and D as shown in figure. The radius of each sector is 14 m . Find the total area of four sectors.



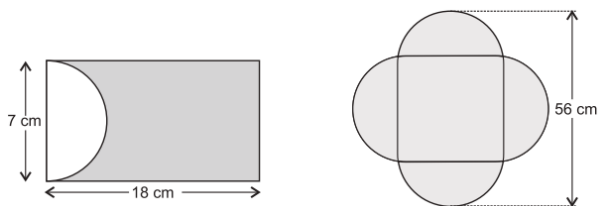
136. The outer circumference of a circular track is 194.68 m and the track is everywhere 6 m wide. Find the cost of levelling the track at the rate of 25 paise per m^2 . [Take $\pi = 3.14$]
137. A circular garden has a radius of 21 m . Around it, a circular walking path of width 3 m is constructed.
 (i) Find the area of the walking path.
 (ii) If paving costs ₹120 per m^2 , calculate the total cost of paving the path.
138. A circular flower bed has a radius of 7 m . A gardener wants to spread manure over it.
 (i) Find the area of the flower bed.
 (ii) If manure costs ₹35 per m^2 , find the total expense.

139. A circular pond has a radius of 3.5 m . A protective net is placed over its surface.

(i) Find the area of the pond

(ii) If the net costs ₹120 per m^2 , find the total cost.

140. Find the area of the shaded portion in each of the following figures :



141. A wire is in a circular shape of radius 49 cm. It is bent into the shape of a square. Find the area of the square so formed.

142. Find the circumference of a circle with radius 56 cm and the perimeter of two semicircles with the same radius.

143. Find the ratio between the circumferences of two circles whose radii are in the ratio 2: 3.

144. How many revolutions will a wheel make to cover a distance of 132 m, if its radius is 60 cm?

145. Measure the diameters of one rupee coin and five rupee coin and find their circumferences.

146. A wheel covers 110 m in one revolution. What is its radius?

147. The radius of a bicycle wheel is 35 cm.

(i) Find the distance covered in one revolution.

(ii) Find the distance covered in 200 revolutions.

148. A circular stage has a radius of 3.5 m. Decorative ribbon is fixed around its boundary.

(i) Find the length of ribbon required.

(ii) If ribbon costs 40 per metre, find the total cost.

149. Find the difference between the perimeters of two circular plates, if one has a radius of 14 cm and the other has a diameter of 14 cm.

150. A circular stadium has a diameter of 70 m.

(i) Find the length of one round.

(ii) How many rounds must an athlete run to complete 1.1 km?

151. A circular garden has a radius of 14 m. The owner wants to put fencing around it.

(i) Find the circumference of the garden.

(ii) If fencing costs ₹250 per metre, find the total cost.

152. An ancient king ordered a circular garden with radius 21 m .

(a) Archimedes used $\pi = \frac{22}{7}$

(b) Aryabhata used $\pi = 3.1416$

(c) Zu Chongzhi used $\pi = \frac{355}{113}$

(i) Calculate the circumference using all three values.

(ii) Arrange the results in increasing order.

153. A circular road has a diameter of 70 m . Engineers use $\pi = \frac{22}{7}$ for planning.

(i) Find the length of the road.

(ii) If the actual value of π is 3.1416, estimate the difference in total length.

(iii) Discuss whether this difference would matter in large-scale construction.

154. A student calculates the circumference of a circular track with radius 5 m and gets: $C = 10\pi$

(i) Explain why the exact value of circumference cannot be written as a terminating or repeating decimal.

(ii) Why do we still use approximations in practical life?

155. A circular fountain has a diameter of 14 m .

(i) Find its circumference using:(a) $\pi = \frac{22}{7}$ (b) $\pi = 3.14$

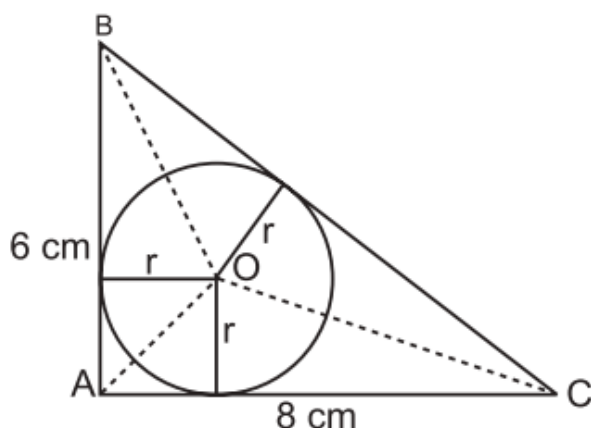
(ii) Which approximation gives a larger value?

(iii) In real life construction, which value would you prefer and why?

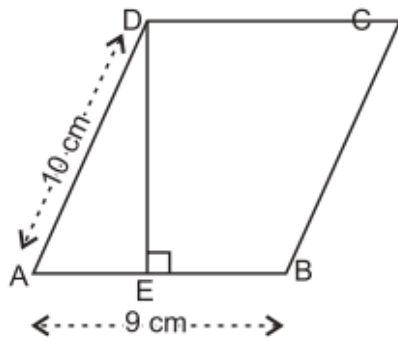
156. A bicycle wheel makes 5000 revolutions in moving 11 km. Find the diameter of the wheel.

157. The inner circumference of a circular track is 220 m. The track is 7 m wide everywhere. Calculate the cost of putting up a fence along the outer circle at the rate of 2 per metre.(Use $\pi = \frac{22}{7}$)

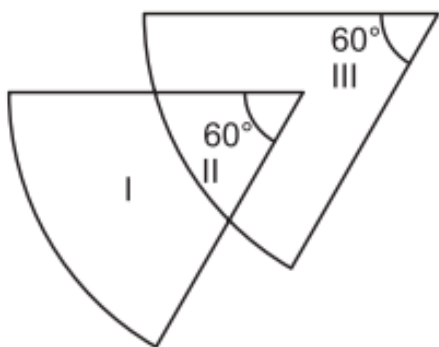
158. In the figure, ABC is a right triangular with AB 6 cm and AC = 8 cm. A circle with centre O is inscribed in the triangle. Calculate the value of r, the radius of the inscribed circle.



159. One side AB of a parallelogram is 9 cm and its area is $54m^2$. $DE \perp AB$. If the second side of the parallelogram is 10 cm, find AE.



160. The ratio of the parallel sides of a trapezium is 2 : 3. The distance between them is 15 cm. If the area of the trapezium is 600cm^2 , find the lengths of parallel sides.
161. Area of a trapezium is 400cm^2 . One of its parallel sides is 20 m longer than the other and height is 10 m. Find its two parallel sides.
162. One of the parallel sides of a trapezium is double the other and its height is 24 cm. If area of the trapezium is 360cm^2 , find the length of the parallel sides.
163. The perimeter of an isosceles triangle is 39 cm. The ratio of the equal side to its base is 4 : 5. Find the area of the triangle.
164. Find the area of an isosceles triangle each of whose equal sides measures 13 cm and whose base measures 20 cm.
165. Find the area of an isosceles triangle, each of whose equal sides is 13 cm and base 24 cm.
166. In the figure, there are two overlapping sectors of a circle. The radii of the sectors are 6 cm and 8 cm. The figure is divided into three regions- I, II and III.



Find the difference in the areas of regions I and III.

*** Answer the following questions. [5 Marks Each]**

[125]

167. Which term of the AP: $-2, -7, -12, \dots$ will be -77 ? Find the sum of this AP up to the term -77 .
168. Divya deposited ₹1000 at compound interest at the rate of 10% per annum. The amounts at the end of first year, second year, third year, form an AP. Justify your answer.

169. Which of the following are APs? If they form an AP, find the common difference d and write three more terms.
- (i) $3, 3 + \sqrt{2}, 3 + 2\sqrt{2}, 3 + 3\sqrt{2}, \dots$
 - (ii) $0, -4, -8, -12$
 - (iii) $-\frac{1}{2}, -\frac{1}{2}, -\frac{1}{2}, -\frac{1}{2}, \dots$
170. The sum of first n terms of an AP is represented by $S_n = 6n - n^2$. Find the common difference.
171. If $S_n = 3n^2 - 4n$, then find the n th terms.
172. If $S_n = \frac{1}{2}(3n^2 + 7n)$, find n th term and 20th term.
173. In an AP, the sum of first n terms is $\left(\frac{3n^2}{2} + \frac{5n}{2}\right)$. Find its 25th term.
174. In a school, students thought of planting trees in and around the school to reduce air pollution. It was decided that the number of trees that each section of each class will plant, will be the same as the class in which they are studying, e.g., a section of class I will plant 1 tree, a section of class II will plant 2 trees and so on till class XII. There are three sections of each class. How many trees will be planted by the students?
175. The sequence 2, 9, 16, is given.
- (i) Identify if the given sequence is an AP.
 - (ii) Find the 20th term of the sequence.
 - (iii) Find the difference between the sum of its first 22 and 25 terms.
 - (iv) Is the term 102 belong to this sequence?
 - (v) If k is added to each of the above terms, will the new sequence be in AP?
176. If the mid-points of the sides of a 4-gon are joined in order, prove that the area of the parallelogram thus formed will be half of the area of the given 4-gon. (You may wonder whether the 4-gon thus formed is always a parallelogram, and if so, why? These questions will be tackled and answered in the chapter on quadrilaterals.)
177. Given a square ABCD, let P be a point within it. Join PA, PB, PC, PD (Fig). What is the ratio of the areas of the red region ($\triangle PAB$ and $\triangle PCD$) and the green

region ($\triangle PBC$ and $\triangle PDA$) ?

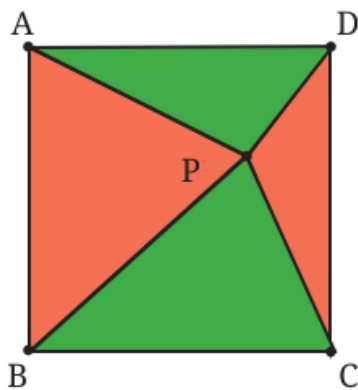


Fig.

178. In $\triangle ABC$, D is the midpoint of AB . P is any point on BC , and Q is a point on AB such that $CQ \parallel PD$. PQ is joined (Fig). Prove that $\text{Area } \triangle BPQ = \frac{1}{2} \text{Area}(\triangle ABC)$.

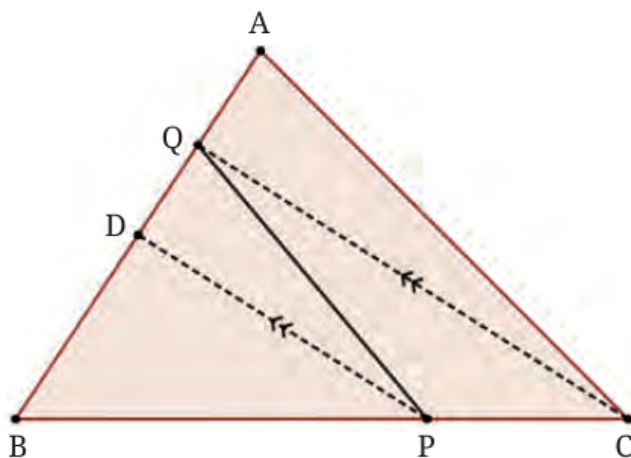
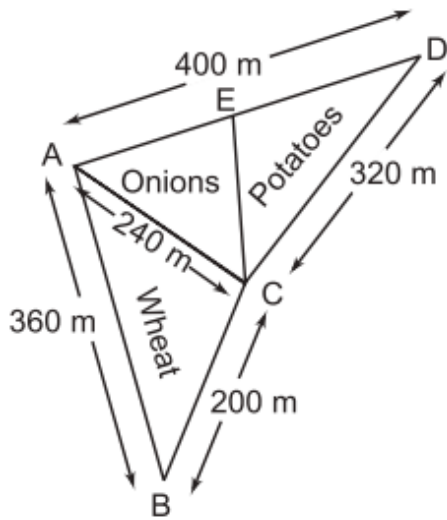


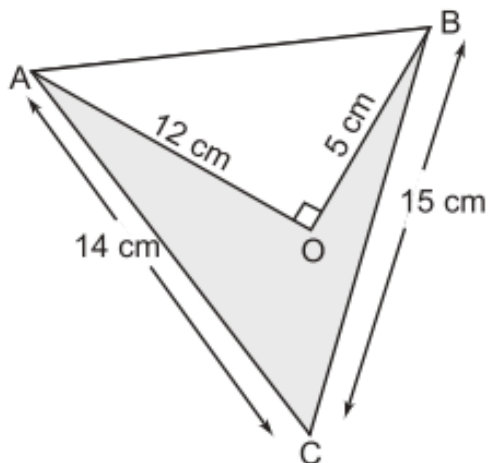
Fig.

179. A chord of a circle of radius 15 cm subtends an angle of 60° at the centre of the circle. Find the areas of the corresponding minor and major segments of the circle. (Use $\pi \approx 3.14$ and $\sqrt{3} \approx 1.73$.)
180. If $a_n = 3 - 4n$, show that $a_1, a_2, a_3, \dots$ form an AP. Also, find S_{20} .
181. Kamla has a triangular field with sides $240m, 200m, 360m$, where she grew wheat. In another triangular field with sides $240m, 320m, 400m$ adjacent to the previous field, she wanted to grow potatoes and onions (see figure). She divided the field in two parts by joining the mid-point of the longest side to the opposite vertex and grew potatoes in one part and onions in the other part. How much area (in

hectares) has been used for wheat, potatoes and onions? (1 hectare = $10000m^2$).



182. Find the area of a quadrilateral $ABCD$ in which $AB = 16cm$, $BC = CD = 26cm$, $AD = 12cm$ and the diagonal $BD = 20cm$.
183. Find the perimeter and area of a quadrilateral $PQRS$ in which $PQ = 17cm$, $QR = 8cm$, $RS = 13cm$ and $PS = 14cm$ and $\angle PRQ = 90^\circ$.
184. The lengths of the sides of a triangle are in the ratio $5 : 4 : 3$ and its perimeter is 96 cm . Find
 (i) the area of the triangle
 (ii) the height of the triangle corresponding to the longest side.
185. Find the percentage decrease in the area of a triangle, if each of its side is halved.
186. Calculate the area of the following shaded region.



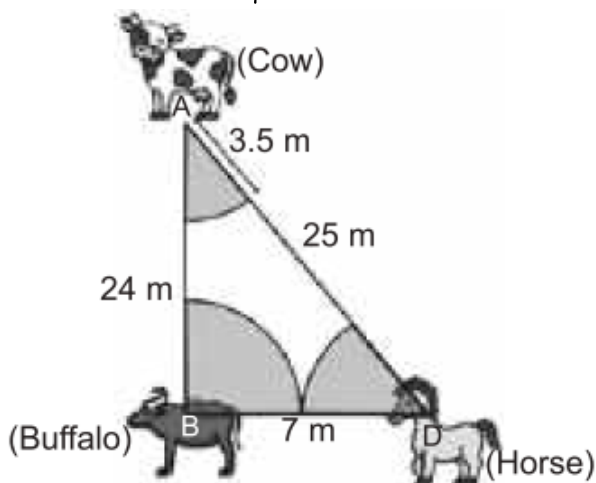
187. The lengths of the sides of a triangle are 5 cm , 12 cm and 13 cm . Find the length of perpendicular from the opposite vertex to the side whose length is 13 cm . Use Heron's formula
188. Find the area of the ground having sides $51m$, $37m$ and $20m$. Also find the cost of levelling the ground, if $1m^2$ costs ₹3.

189. Find the area of an isosceles triangle whose one side is 10 cm greater than its equal side and its perimeter is 100 cm.
190. A race track is in the form of a ring whose inner circumference is 528 m and the outer circumference is 616 m. Find the width of the track.
191. One circle has a radius of 98 cm and a second concentric circle has a radius of 1 m 26 cm. How much longer is the circumference of the second circle than that of first?

*** Case study based questions.**

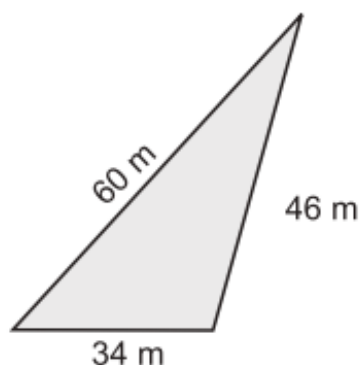
[12]

192. A buffalo, a cow and a horse are tied to pegs at the corners of a right triangular field of sides 24m , 7m and 25m by means of a 3.5m long rope as shown in the figure. Use $\pi = \frac{22}{7}$.



Based on the above information, answer the following questions:

- What is the area of right triangular grass field?
 - Find the combined angle made by the grazing area of horse and cow.
 - Find the area of that part of field in which buffalo can graze.
 - Calculate the decrease in the grazing area, if the ropes were 3 m instead of 3.5 m.
193. A playground is made in the shape of a triangle. The dimensions of the triangular playground are $34\text{m} \times 46\text{m} \times 60\text{m}$. The city municipal corporation decided to level the ground. The cost of leveling the ground is ₹1000 per sq. m.



Based on this information, answer the following questions:

- (i) If the playground is to be fenced with the wire, find the length of the wire.
- (ii) Find the cost of leveling the ground. (Take $\sqrt{42} = 6.48$)
- (iii) If the playground is an equilateral triangle with side 60 m , then find its area.
- (iv) In Heron's formula, what does s stand for?

194. Many buildings feature a double pitched roof. When viewed from one end, the roof edges meet at a common point to form a triangle. In many instances, these edges are equal in length. The roof trusses form an isosceles triangle. In the given figure there is a roof truss with two sides equal and unequal side as 12 m and its perimeter is 42 m.



Based on this information answer, the following questions:

- (i) Find the dimensions of equal sides.
- (ii) Find the semi-perimeter and values of $(s-a)$, $(s-b)$ and $(s-c)$.
- (iii) Find the area of triangle.
- (iv) Area of a triangle having sides $2x$, $2y$ and $2z$ is given by $\sqrt{(x+y+z)(x+y-z)(y+z-x)(x+z-y)}$. It is true?
