MATHS

BOOKS - ICSE

AREA AND PERIMETER OF PLANE FIGURES

Question

1. Find the area of a triangle :

whose height is 6 cm and base is 10 cm.

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2. Find the area of a triangle :

whose three sides are 17 cm, 8 cm and 15 cm long.

Also, in part (ii) of the question, calculate the length of the altitude corresponding to the largest side of the triangle.

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3. The area of an equilateral triangle is numerically equal to its perimeter.

Find a side of the triangle [Take $\sqrt{3} = 1.73$].

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4. Calculate the area of an equilateral triangle, whose height is 20 cm.

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5. Find the area of an isosceles triangle whose equal sides are 5 cm each and base is 6 cm.

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6. The sides of a triangle containing the right angle are 5x cm and $(3x - 1)$ cm. If the area of the triangle is 60 cm^2, calculate the lengths of the sides of the triangle.

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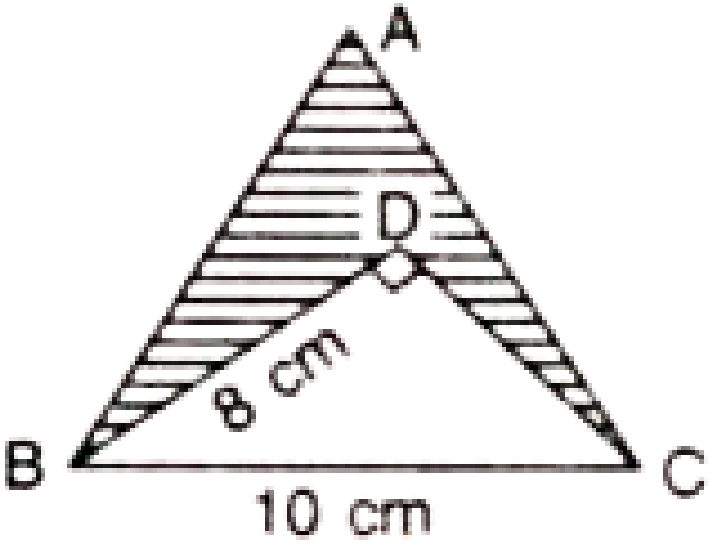
7. The given figure shows an equilateral triangle ABC whose each side is 10 cm and a right-angled triangle BDC whose side BD = 8 cm and $\angle D = 90^\circ$. Find the area of the shaded portion.



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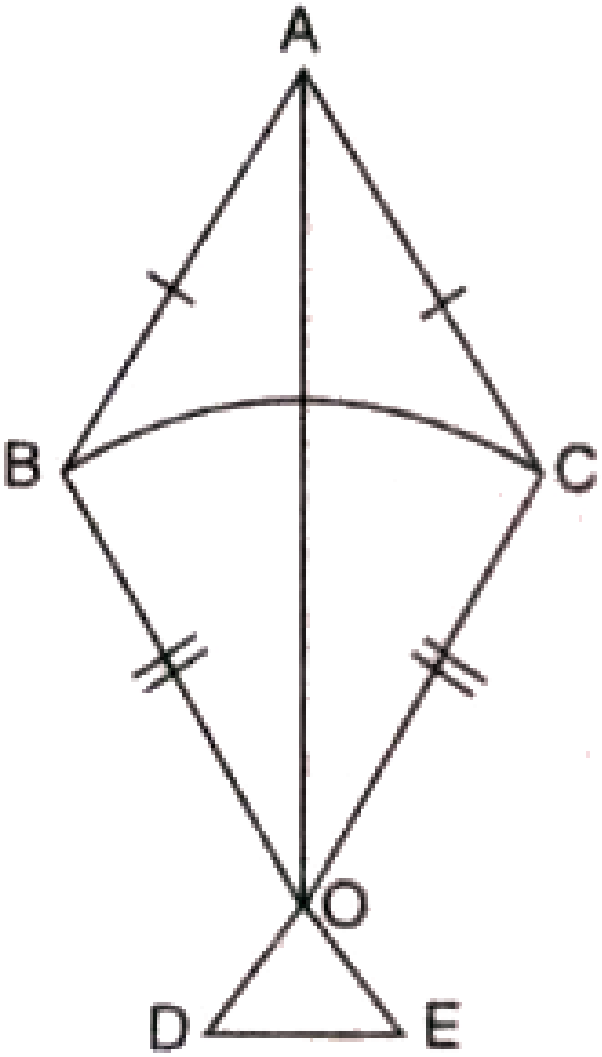
8. A kite is made as shown alongside in which ABC is an equilateral triangle with side 20 cm, BOC is an isosceles triangle with OB = OC = 26 cm and ODE is an isosceles triangle with base DE = 8 cm and height 6 cm. Find the whole

area of the kite.



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9. The area of an isosceles triangle is $60cm^2$ and the length of each one of its equal sides is 13 cm. Find its base.

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10. The perimeter of a rectangle is 25.5 m. Its length is 9.5 m. Calculate its area in sq. m (m^2).

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11. A room is 8 m long and 5 m broad. Find the cost of covering the floor of the room with 80 cm wide carpet at the rate of Rs 225 per metre.

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12. The area of a square field is 484 m^2. Find :

the length of its one side,

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13. The area of a square field is 484 m^2. Find : the length of its diagonal, correct to two places of decimal.

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14. Two adjacent sides of a parallelogram are 15 cm and 10 cm. If the distance between 15 cm sides is 8 cm, find the distance between 10 cm sides.

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15. PQRS is a rhombus.

If it is given that PQ = 3 cm, calculate the perimeter of PQRS.

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16. PQRS is a rhombus.

If it is given that PQ=3cm and if the height of the rhombus is 2.5 cm, calculate the area.

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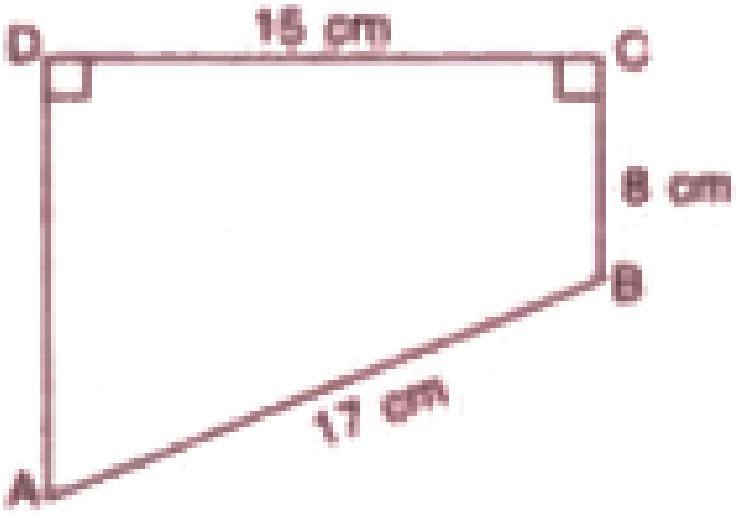
17. The given figure shows a trapezium ABCD in which AB = 17 cm, BC = 8 cm and CD = 15 cm. Find the area and perimeter of the trapezium.



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18. Find the area of the trapezium whose parallel sides are 15 cm amd 23 cm, whereas the non-parallel sides are 10 cm and 8 cm.

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19. A footpath of uniform width runs all around the inside of a rectangular field 38 m long and 32 m wide. If the path occupies 600 m^2, find its width.

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20. A wire is bent in the form of an equilateral triangle of largest area. If it encloses an area of $49\sqrt{3}\ cm^2$, find the largest area enclosed by the same wire when bent to form :

a square

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21. A wire is bent in the form of an equilateral triangle of largest area. If it encloses an area of $49\sqrt{3}\ cm^2$, find the largest area enclosed by

the same wire when bent to form :

a rectangle of length 12 cm.

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22. The distance between parallel sides of a trapezium is 20 cm and the length of the line segment joining the mid-points of its non-parallel sides is 53 cm. Find the area of the trapezium.

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23. Area of a square is same as that of a rectangle. The length and the breadth of the rectangle are respectively 5 cm more and 4 cm less than the side of the square. Find the side of the square.

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24. The circumference of a circle exceeds its diameter by 270 cm. Find its diameter.

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25. Find the diameter of the circle whose circumference is equal to the sum of the circumference of circles with radii 5 cm, 8 cm and 10 cm.

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26. The area of a circle is numerically equal to its circumference. Find its area (Take $\pi = 3.14$).

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27. A rectangular sheet of paper is 35 cm long and 28 cm wide. Find the area of the largest circle that can be cut from this sheet.

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28. Find the perimeter of a cirlce whose area is equal to sum of areas of the circles with diameters 10 cm and 24 cm. Give your answer correct to two decimal places.

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29. The radii of two circles are in the ratio $5:8$. If the difference between their areas is 351π sq. cm, find the area of the bigger circle. Take $\pi = 3.14$.

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30. A uniform circular track is the area bounded by two concentric circles. If the ares

of the track is 1144 m^2 and its width is 14 m, find the diameters of the two circles.

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31. The radii of the wheel of a car is 28 cm. Find the number of rotations made by the wheel in order to cover a distance of 4.4 km ?

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32. A circular wheel if radius 28 cm makes 300 revolutions per minute. Find the speed of the wheel in kilometre per hour.

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33. In the given figure, find the area of the unshaded portion within the rectangle. (Take

$\pi = 3.14$).

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Exercise 20 A

1. Find the area of a triangle whose sides are 18 cm, 24 cm and 30 cm.

Also, find the length of altitude corresponding to the larger side of the triangle.

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2. The length of the sides of a triangle are in the ratio $3:4:5$. Find the area of the triangle if its perimeter is 144 cm.

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3. ABC is a triangle in which AB = AC = 4 cm and $\angle A = 90^\circ$. Calculate:

the area of ΔABC,

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4. ABC is a triangle in which AB = AC = 4 cm and $\angle A = 90^\circ$. Calculate:

the length of perpendicular from A to BC.

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5. The area of an equilateral triangle is $36\sqrt{3}$ sq. cm. Find its perimeter.

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6. Find the area of an isosceles triangle with perimeter 36 cm and base 16 cm.

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7. The base of an isosceles triangle is 24 cm and its area is 192 sq. cm. Find its perimeter.

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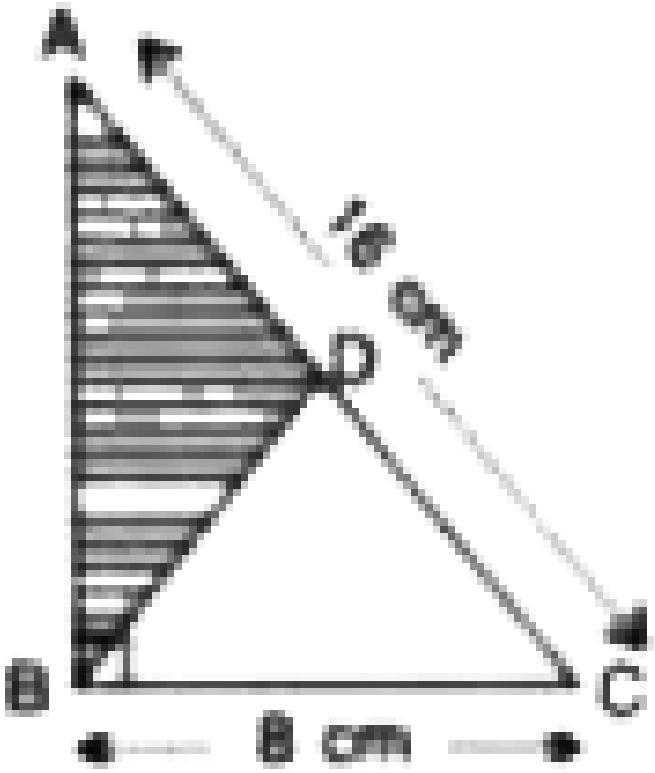
8. The given figure shows a right angled triangle ABC and an equilateral triangle BCD.

Find the area of the shaded portion.



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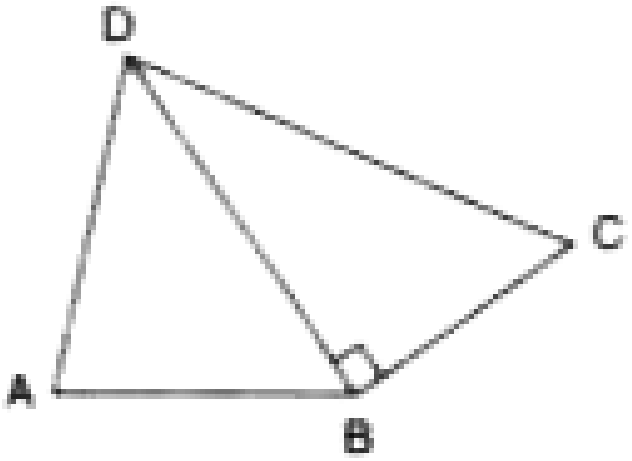
9. Find the area and the perimeter of quadrilateral ABCD, given below, if, AB = 8 cm, AD = 10 cm, BD = 12 cm, DC 13 cm and $\angle DBC = 90^\circ$.



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10. The base of a triangular field is three times its height. If the cost of cultivating the field at Rs 36.72 per 100 m^2 is Rs 49,572, find its base and height.

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11. The sides of a triangle field are in the ratio $5:3:4$ and its perimeter is 180 m. Find :

its area

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12. The sides of a triangle field are in the ratio $5:3:4$ and its perimeter is 180 m. Find :

altitude of the traingle corresponding to its largest side.

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13. The sides of a triangle field are in the ratio $5:3:4$ and its perimeter is 180 m. Find :

the cost of levelling the field at the rate of Rs 10 per square metre.

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14. Each of equal sides of an isosceles triangle is 4 cm greater than its height. If the base of the triangle is 24 cm, calculate the perimeter and the area of the triangle.

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15. Calculate the area and the height of an equilateral triangle whose perimeter is 60 cm.

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16. In ΔABC, angle $A = 90^\circ$, side AB = x cm, AC = $(x + 5)$ cm and area = 150 cm^2. Find the sides of triangle.

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17. If the difference between the sides of a right angled triangle is 3 cm and its area is 54 cm^2, find its perimeter.

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18. AD is altitude of an isosceles triangle ABC in which AB = AC = 30 cm and BC = 36 cm. A point O is marked on AD in such a way that $\angle BOC = 90^\circ$. Find the area of quadrilateral ABOC.

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Exercise 20 B

1. Find the area of a quadrilateral one of whose diagonals is 30 cm long and the perpendiculars from the other two vertices are 19 cm and 11 cm respectively.

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2. The diagonals of a quadrilateral are 16 cm and 13 cm. If they intersect each other at right angles, find the area of the quadrilateral.

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3. Calculate the area of quadrilateral ABCD, in which $\angle ABD = 90^\circ$, triangle BCD is an equilateral triangle of side 24 cm and AD = 26 cm.

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4. Calculate the area of quadrilateral ABCD in which AB = 32 cm, AD = 24 cm, $\angle A = 90^\circ$ and BC = CD= 52 cm.

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5. The perimeter of a rectangular field is $\frac{3}{5}$ km. If the length of the field is twice its width, find the area of the rectangle in sq. metres.

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6. A rectangular plot 85 m long and 60 m broad is to be covered with grass leaving 5 m all around. Find the area to be laid with grass.

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7. The length and the breadth of a rectangle are 6 cm and 4 cm respectively. Find the height of a triangle whose base is 6 cm and area is 3 times that of the rectangle.

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8. How many tiles, each of area 400 cm^2, will be needed to pave a footpath which is 2 m wide and surrounds a grass plot 25 m long and 13 m wide ?

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9. The cost of enclosing a rectangular garden with a fence all round, at the rate of 75 paise per metre, is Rs 300. If the length of the garden is 120 metres, find the area of the field in square metres.

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10. The width of a rectangular room is $\frac{4}{7}$ of its length, x, and its perimeter is y. Write an equation connecting x and y. Find the length of the room when the perimeter is 4400 cm.

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11. The length of a rectangular varandah is 3 m more than its breadth. The numerical value of its area is equal to the numerical value of its perimeter.

Taking x as the breadth of the varandah, write an equation in x that represents the above statement.

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12. The length of a rectangular varandah is 3 m more than its breadth. The numerical value of its area is equal to the numerical value of its perimeter.

find the dimensions of the varandah.

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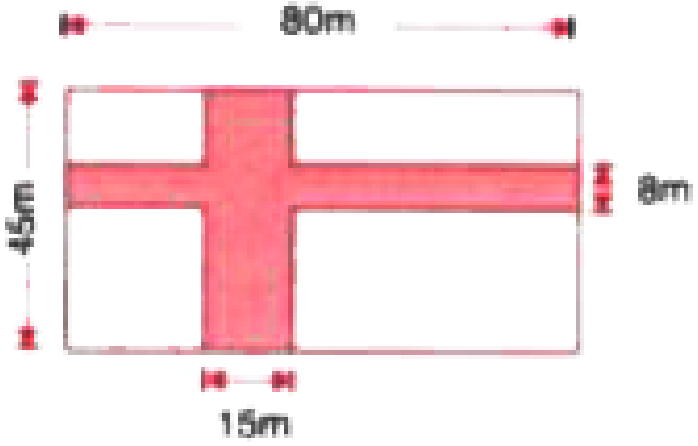
13. The diagram, given below, shows two paths drawn inside a rectangular fields 80 m long and 45 m wide. The widths of the two paths are 8 m and 15 m as shown. Find the area of the shaded portion.



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14. The rate for a 1.20 m wide carpet is Rs 40 per metre, find the cost of covering a hall 45 m long and 32 m wide with this carpet. Also, find the cost of carpeting the same hall if the carpet, 80 cm wide, is at Rs 25 per metre.

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15. Find the area and the perimeter of a square plot of land, the length of whose diagonal is 15

metres. Give your answer correct to 2 places of decimals.

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16. The shaded region of the given diagram represents the lawn in the form of a house. On the three sides of the lawn there are flower-beds having a uniform width of 2 m.

Find the length and the breadth of the lawn.

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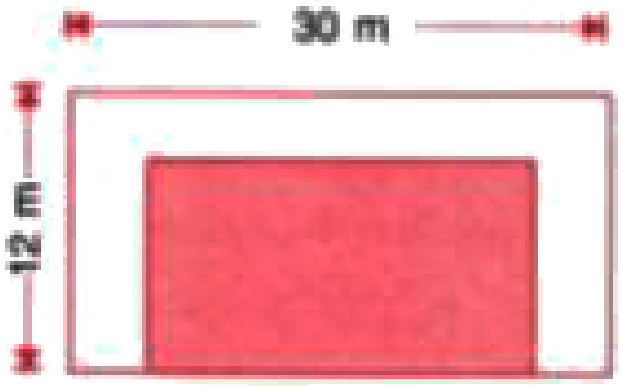
17. The shaded region of the given diagram represents the lawn in the form of a house. On the three sides of the lawn there are flower-beds having a uniform width of 2 m.



Hence, or otherwise, find the area of the flower- beds.

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18. A floor which measures $15m \times 8m$ is to be laid with tiles measuring $50cm \times 25cm$. Find the number of tiles required.

Further, if a carpet is laid on the floor so that a space of 1 m exists between its edges and the edges of the floor, what fraction of the floor is left uncovered.

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19. Two adjacent sides of parallelogram are 24 cm and 18 cm. If the distance between the longer sides is 12 cm, find the distance between shorter sides.

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20. Two adjacent sides of a parallelogram are 28 cm and 26 cm. If one diagonal of it is 30 cm long, Find the area of the parallelogram. Also, find the distance between shorter sides.

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21. The area of a rhombus is 216 sq. cm. If its one diagonal is 24 cm, find :

length of its other diagonal,

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22. The area of a rhombus is 216 sq. cm. If its one diagonal is 24 cm, find :

length of its side,

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23. The area of a rhombus is 216 sq. cm. If its one diagonal is 24 cm, find :

perimeter of the rhombus.

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24. The perimeter of a rhombus is 52 cm. If one diagonal is 24 cm, find :

the length of its other diagonal,

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25. The perimeter of a rhombus is 52 cm. If one diagonal is 24 cm, find :

its area.

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26. The perimeter of a rhombus is 46 cm. If the height of rhombus is 8 cm, find its area.

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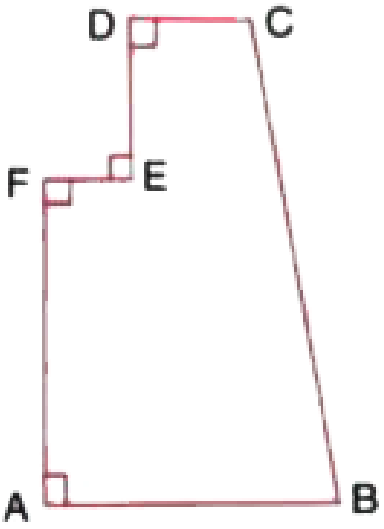
27. The figure given below shows the cross-section of a concrete structure. Calculate the area of cross-section if AB = 1.8 m, CD = 0.6 m,

DE = 0.8 m, EF = 0.3 m and AF = 1.2 m.



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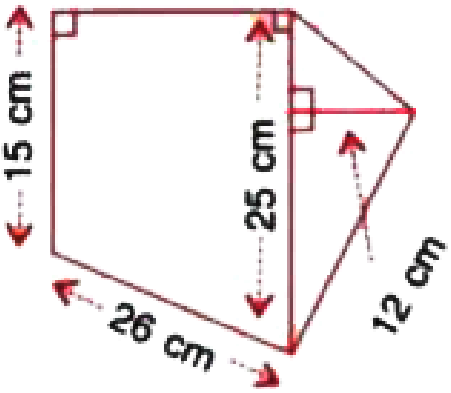
28. Calculate the area of the figure given below

: which is not drwn to scale.



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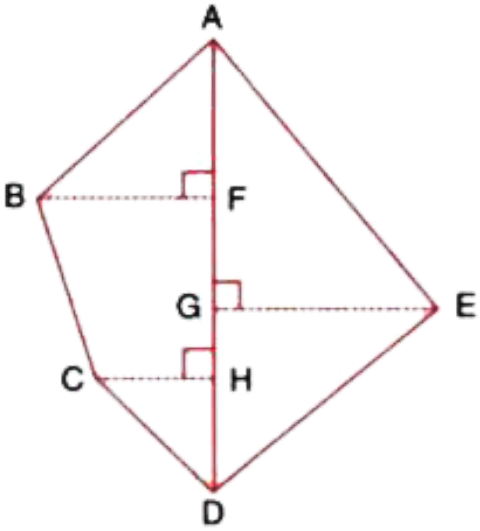
29. The following diagram shows a pentagonal field ABCDE in whhich the lengths of AF, FG, GH and HD are 50 m, 40 m, 15 m and 25 m respectively, and the lengths of perpendiculars BF, CH and EG are 50 m, 25 m and 60 m

respectively. Determine the area of the field.



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30. A footpath of uniform width runs all around the outside of a rectangular field 30 m

long and 24 m wide. If the path occupies an area of 360 m^2, find its width.

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31. A wire when bent in the form of a square encloses an area of 484 m^2. Find the largest area enclosed by the same wire when bent to form :

an equilateral triangle.

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32. A wire when bent in the form of a square encloses an area of 484 m^2. Find the largest area enclosed by the same wire when bent to form :

a rectangle of breadth 16 m.

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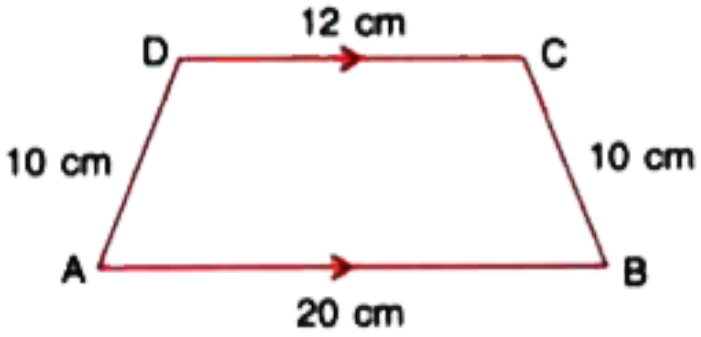
33. For each terapezium given below, find its area.



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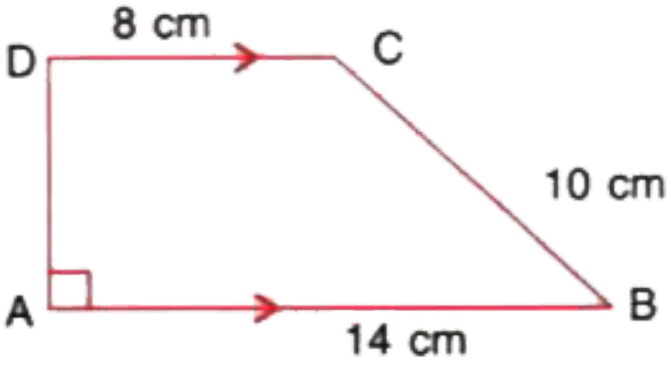
34. For each trapezium given below, find its area.



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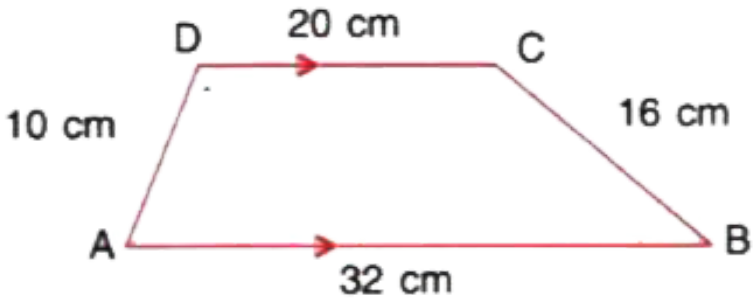
35. For each trapezium given below, find its area.



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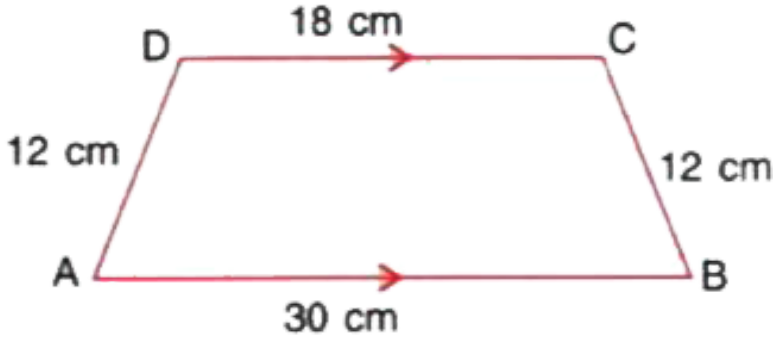
36. For each trapezium given below, find its area.



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37. The perimeter of a rectangular board is 70 cm. Taking its length as x cm, find its width in terms of x.

If the area of the rectangular board is 300 cm^2 , find its dimensions.

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38. The area of a rectangle is 640 m^2. Taking its length as x m, find, in term of x, the width of the rectangle. If the perimeter of the rectangle is 104 m, find its dimensions.

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39. The length of a rectangle is twice the side of a square and its width is 6 cm greater than the side of the square. If area of the rectangle is three times the area of the square, find the dimensions of each.

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40. ABCD is a square with each side 12 cm. P is a point on BC such that area of ΔABP : area

of trapezium APCD = $1:5$. Find the length of CP.

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41. A rectangular plot of land measures $45m \times 30m$. A boundary wall of height 2.4 m is built all around the plot at a distance of 1 m from the plot. Find the area of the inner surface of the boundary wall.

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42. A wire when bent in the form of a square encloses an area = 576 cm^2. Find the largest area enclosed by the same wire when bent to form:

an equilateral triangle

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43. A wire when bent in the form of a square encloses an area = 576 cm^2. Find the largest area enclosed by the same wire when bent to form:

a rectangle whose adjacent sides differ by 4 cm.

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44. The area of a parallelogram is y cm^2 and its height is h cm. The base of another parallelogram is x cm more than the base of the first parallelogram and its area is twice the area of the first. Find, in terms of y, h and x, the expression for the height of the second parallelogram.

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45. The distance between parallel sides of a trapezium is 15 cm and the length of the line segment joining the mid-points of its non-parallel sides is 26 cm. Find the area of the trapezium.

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46. The diagonal of a rectangular plot is 34 m and its perimeter is 92 m. Find its area.

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Exercise 20 C

1. The diameter of a circle is 28 cm. Find its :

circumference

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2. The diameter of a circle is 28 cm. Find its :

area

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3. The circumference of a circular field is 308 m. Find its :

radius

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4. The circumference of a circular field is 308 m. Find its :

area

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5. The sum of the circumference and daimeter of a circle is 116 cm. Find its radius.

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6. The radii of two circle are 25 cm and 18 cm. Find the radius of the circle which has circumference equal to the sum of curcumferences of these two circles.

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7. The radii of two circle are 48 cm and 13 cm. Find the area of the circle which has circumference equal to the difference of the curcumferences of the given two circles.

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8. The diameter of two circles are 32 cm and 24 cm. Find the radius of the circle having its area

equal to sum of the areas of the two given circle.

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9. The radius of a circle is 5 m. Find the circumference of the circle whose area is 49 times the area of the given cirlce.

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10. The circle of largest area is cut from a rectangular piece of card-board with dimensions 55 cm and 42 cm. Find the ratio between the area of the circle cut and the area of the remaining card-board.

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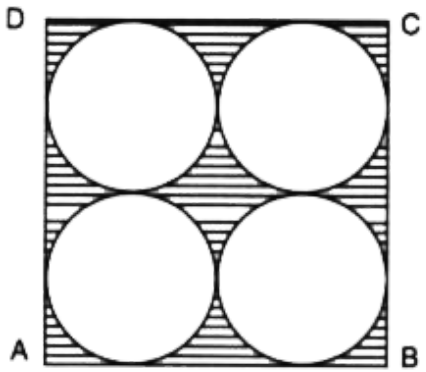
11. The following figure shows a square card-board ABCD of side 28 cm. Four identical circle of largest possible size are cut from this card

as shown below.



Find the area of the remaining card-board.

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12. The radii of two cirlces are in the ratio $3:8$. If the difference between their areas is $2695\pi cm^2$, find the area of the smaller circle.

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13. The diameters of three circles are in the ratio $3:5:6$. If the sum of the circumferences of these circles be 308 cm, find the difference between the areas of the largest and the smallest of these circles.

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14. Find the area of a ring shaped region enclosed between two concentric circles of

radii 20 cm and 15 cm.

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15. The circumference of a given circular park is 55 m. It is surrounded by a path of uniform width 3.5 m. Find the area of the path.

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16. There are two circular gardens A and B. The circumference of garden A is 1.760 km and the

area of garden B is 25 times the area of garden A. Find the circumference of garden B.

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17. A wheel had diameter 84 cm. Find how many complete revolutions must it make to cover 3.168 km.

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18. The wheels of a car are of diameter 80 cm each. How many complete revolutions does each wheel make in 10 minutes when the car is travelling at a speed of 66 km per hour?

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19. An express train is running between two stations with a uniform speed. If the diameter of each wheel of the train is 42 cm and each

wheel makes 1200 revolutions per minutes, find the speed of the train.

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20. The minute hand of a clock is 8 cm long. Find the area swept by the minute hand between 8.30 a.m. and 9.05 a.m.

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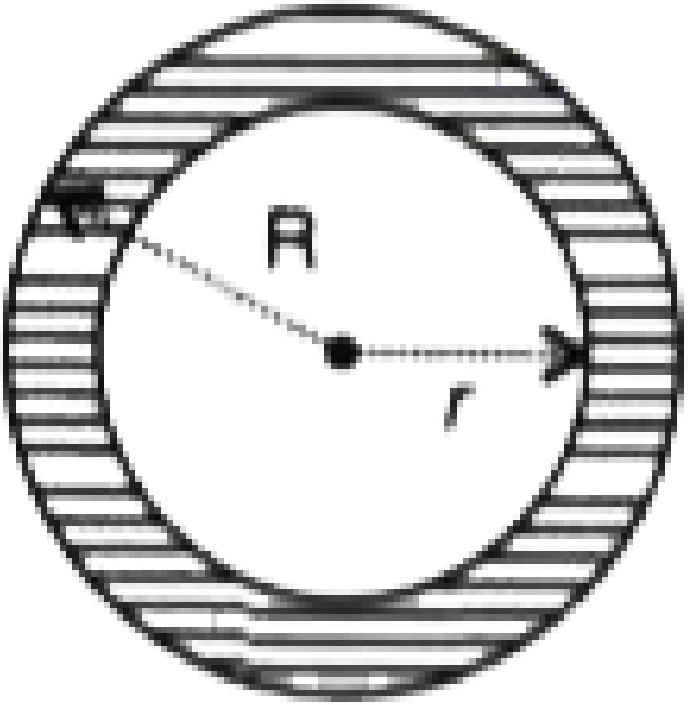
21. The shaded portion of the figure, given alongside, shows two concentric circles.

If the circumference of the two circles be 396 cm and 374 cm, find the area of the shaded

portion.



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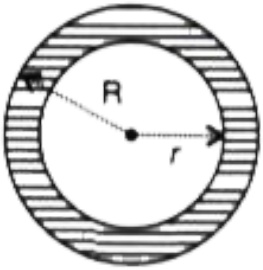
22. In the figure, the area of the shaded portion is 770 cm^2. If the circumference of the outer circle is 132 cm, find the width of the shaded part



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23. The cost of fencing a circular field at the rate of Rs 240 per metre is Rs 52,800. The field is to be ploughed at the rate of Rs 12.50 per m^2. Find the cost of ploughing the field.

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24. Two circles touch each other externally. The sum of their areas is $58\pi cm^2$ and the distance between their centres is 10 cm. Find the radii of the two circles.

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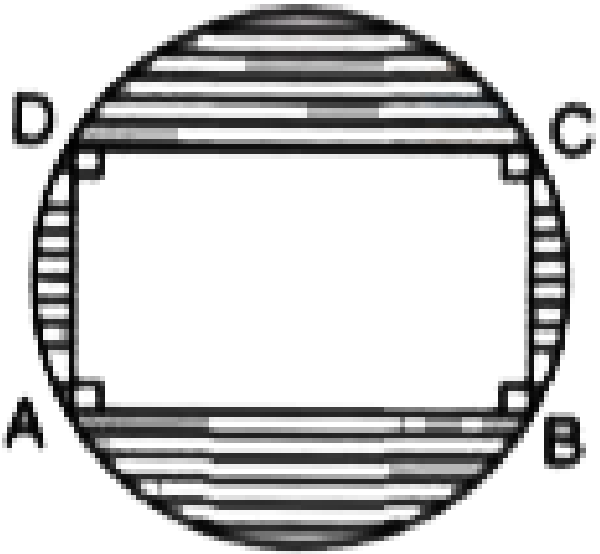
25. The given figure shows a rectangle ABCD inscribed in a circle as shown alongside.

If AB = 28 cm and BC = 21 cm, find the area of the shaded portion of the given figure.



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26. A square is inscribed in a circle of radius 7 cm. Find the area of the square.

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27. A metal wire, when bent in the form of an equilateral triangle of largest area, encloses an area of $484\sqrt{3}cm^2$. If the same wire is bent

into the form of a circle of largest area, find the area of this circle.

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Exercise 20 D

1. The perimeter of a triangle is 450 m and its sides are in the ratio $12:5:13$. Find the area of the triangle.

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2. A triangle and a parallelogram have the same base and the same area. If the sides of the triangle are 26 cm, 28 cm and 30 cm, and the parallelogram stands on the base 28 cm, find the height of the parallelogram.

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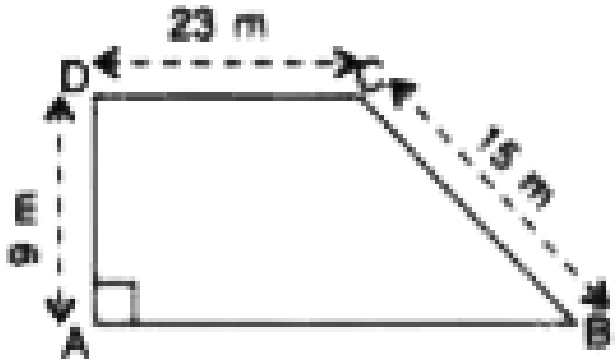
3. Using the information in the following figure, find its area.



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4. Sum of the areas of two squares is 400 cm. If the difference of their perimeters is 16 cm, find the sides of the two squares.

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5. Find the area and the perimeter of a square with diagonal 24 cm.

[Take $\sqrt{2} = 1.41$].

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6. A steel wire when bent in the form of a square encloses an area of 121 cm^2 . If the same wire is bent in the form of a circle, find the area of the circle.

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7. The perimeter of a semicircular plate is 108 cm, find its area.

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8. Two circles touch externally. The sum of their areas is 130π sq. cm and the distance between their centres is 14 cm. Find the radii of the two circles.

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9. The diameter of the front and the rear wheels of a tractor are 63 cm and 1.54 m respectively. The rear wheel is rotating at $24\frac{6}{11}$ revolutions per minute. Find :

the revolutions per minute made by the front wheel.

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10. The diameter of the front and the rear wheels of a tractor are 63 cm and 1.54 m respectively. The rear wheel is rotating at

$24\frac{6}{11}$ revolutions per minute. Find :

the distance travelled by the tractor in 40 minutes.

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11. Two circles touch each other externally. The sum of their areas is $74\pi cm^2$ and the distance between their centres is 12 cm. Find the diameters of the circle.

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12. If a square is inscribed in a circle, what is the ratio of the areas of the circle and the square?

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