MATHS

BOOKS - MODERN PUBLICATION

HERON'S FORMULA

EXAMPLE

1. Find the area of a triangle whose sides are 9 cm, 12 cm and 15 cm.

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2. Sides of a triangle are in the ratio 13:14:15 its perimeter is 84 cm. Find its area.

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3. an equilateral triangle?

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4. The lengths of the sides of a triangle are 4 cm, 12 cm and 13 cm. Find the length of the perpendicular form the opposite vertex to the side whose length is 13 cm

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5. Find the perecentage increase in the area of the triangle if each of its sides is doubled.

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6. The unequal side of an isosceles triangle is 6 cm nad its perimeter is 24 cm. Find the length of other side.

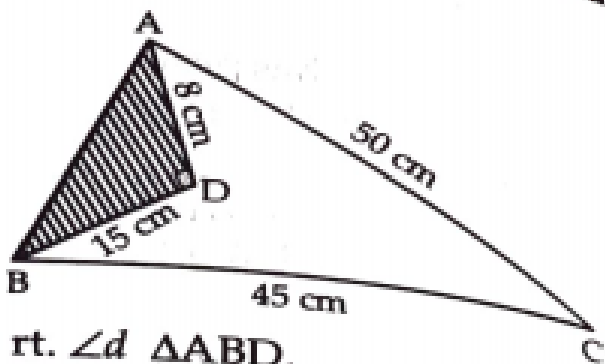**7.** Find the area of triangle two sides of which are 18 cm and 10 cm and the perimeter is 42 cm.

8. The adjacent sides of a parallelogram ABCD are 34 cm and 20 cm and the diagonal AC measure 42 cm. Find the area of the parallelogram.

9. Find the area of the unshade region

ı: In rt. ∠d △ABD,

10. Find the area of the quadrilateral ABCD in which AB = 9 cm, BC = 40 cm, CD = 28 cm, DA = 15 cm and $\angle ABC = 90°$

11. Find the perimeter and areaw of the quadrilaterawl ABCD in which AB = 17 cm, AD = 9 cm, Cd = 12 cm, $\angle ACB = 90°$ and $AC = 15 cm$

12. Find the area of the trapezium whose parallel sides are 25 cm, 13 cm and other sides are 15 cm and 15 cm

13. In a four-sided field, the longer diagonal is 128 m. The lengths of the perpendiculars from

the opposite vertices upon this diagonal are 22.7 m and 17.3 m. find the area of the field.
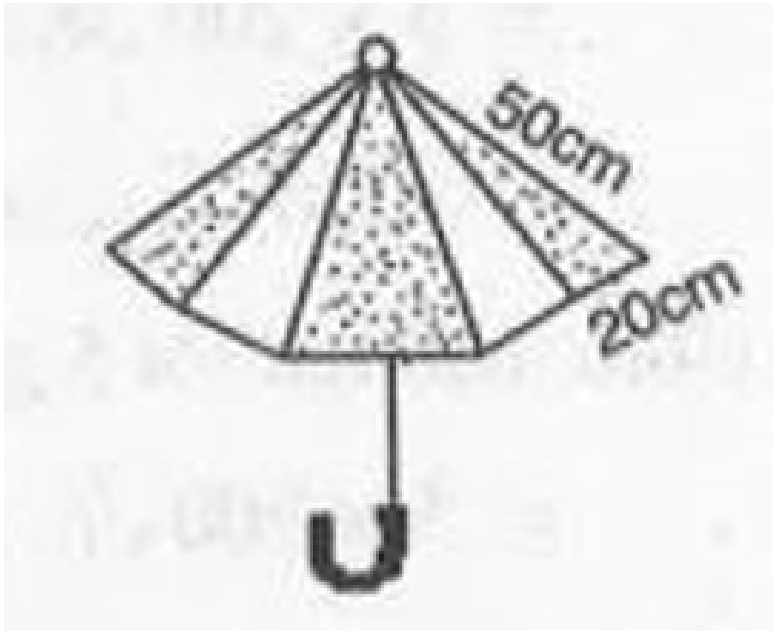
14. A floral design on a floor of 16 tiles, each triangular in shae having sides 16 cm, 12 cm and 20 cm. Find te cost of polishing the tiles at Rs 2 per sq. cm.

15. An umbrella is made by stitching 10 triangular pieces of cloth of two different colours (See Fig.

)

each piece measuring 20 cm, 50 cm and 50 cm. How much cloth of each colour is required for the umbrella ?

16. Find the area of the quadrilateral ABCD in which AB = 9 cm, BC = 40 cm, CD = 28 cm, DA = 15 cm and $\angle ABC = 90°$

17. 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.

18. Find the area of the trapezium whose parallel sides are 25 cm, 13 cm and other sides are 15 cm and 15 cm

19. A traffic signal board, indicating 'SCHOOL AHEAD', is an equilateral triangle with side 'a'. Find the area of the signal board, using Heron's formula. If its perimeter is 180 cm, what will be the area of the signal board?

20. The triangular side walls of a flyover have been used for advertisements. The sides of the walls are 122 m, 22 m and 120 m (see Fig. 12.9).

The advertisements yield an earning of ₹ 5000 per m^2 per year. A company hired one of its walls for 3 months. How much rent did it pay?
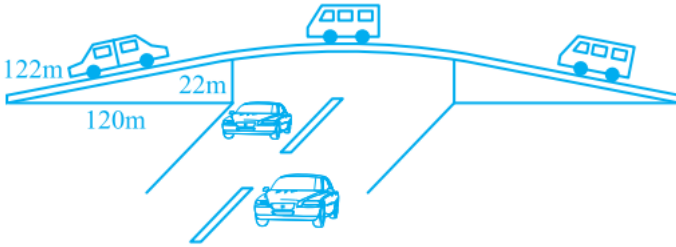

Fig. 12.9

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21. There is slide in a park. One of its side walls has been painted in some colour with a message

22. Find the area of triangle two sides of which are 18 cm and 10 cm and the perimeter is 42 cm.

23. Sides of a triangle are in the ratio of 12 : 17 : 25 and its perimeter is 540cm. Find its area.

24. An isosceles triangle has perimeter 30 cm and each of equal sides is 12 cm. Area of the triangle is :

25. A park, in the shape of a quadrilateral ABCD, has $\angle C = 90°$, $AB = 9m, BC = 12m, CD = 5m$ and $AD = 8m.$ How much area does it occupy ?

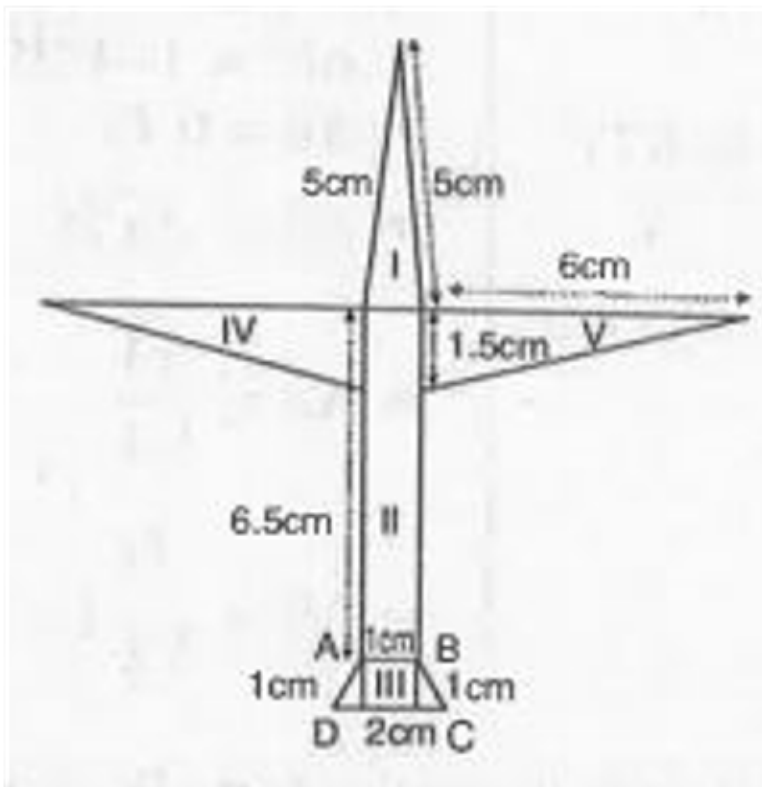**26.** Find the area of a quadrilateral ABCD in which AB = 3 cm, BC = 4 cm, CD = 4 cm, DA = 5 cm and AC = 5 cm.

27. Radha made a picture of an aeroplane with coloured paper as shown in Fig.

Find the total area of the paper used.

28. 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.

29. A rhombus shaped field has green grass for 18 cows to graze. If each side of the rhombus is 30m and its longer diagonal is 48m, grass of

how much area of grass field will each cow be getting ?

30. A floral design on a floor of 16 tiles, each triangular in shae having sides 16 cm, 12 cm and 20 cm. Find te cost of polishing the tiles at Rs 2 per sq. cm.

31. A field is in the shape of a trapezium whose parallel sides are 25m and 10m. The non-parallel sides are 14m and 13 m. Find the area of the field.

32. The area of a triangle with base 4 cm and height 6 cm is $24cm^2$.

33. The area of triangleABC is $8cm^2$ in which AB = BC = 4 cm and $\angle A = 90°$

34. The area of the isosceles triangle is $\frac{5}{4}\sqrt{11}cm^2$, if the sperimeter is 11 cm and the base is 5 cm.

35. The area of the equilateral triangle is $20\sqrt{3}cm^2$ whose each side is 8 cm.

36. If the side of a rhombus is 10 cm and one diagonal is 16 cm, prove the area of the rhombus is $96cm^2$.

37. The base and the corresponding altitude of a parallelogram are 10 cm and 3.5 cm, respectively. The area of the parallelogram is $30cm^2$.

38. The area of a regular hexagon of side a is the sum of the areas of the five equilateral triangles with side a.

39. Prove that the cost of levelling the ground in the form of a triangle having the sides 51 m, 37 m and 20 m at the rate of Rs 3 per m^2 is Rs. 918.

40. In a triangle, the sides are given as 11 cm, 12 cm and 13 cm.Prove that the length of the altitude is 10.25 cm corresponding to the side having length 12 cm.

41. Find the cost of laying grass in a triangular field of sides 50 m, 65 m and 65 m at the rate of Rs $7 per m^2$

42. From a point in the interior of an equilateral triangle, perpendiculars are drawn on the three sides, the lengths of te

perpendicular are 14 cm, 10 cm and 6cm. Find the area of the triangle.

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43. The perimeter of an isosceles triangle is 32 cm. The ratio of the equal side to its base is 3:2. Find the area of the triangle.

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44. Find the area of a parallelogram. Also find the length of the altitude from vertex A on the side DC.

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45. A field in the form of a parallelogram has sides 60 m and 40 m and one of its diagonals is 80 m long. Find the area of te parallelogram.

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46. The perimeter of a triangular field is 420 m and irts sides are in the ratio 6:7:8. Find the area of the triangular field.

47. The sides of a quadrilateral ABCD are 6 cm, 8 cm, 12 cm and 14 cm respectively, and the angle between the first two sides is a right angles. Find its area.
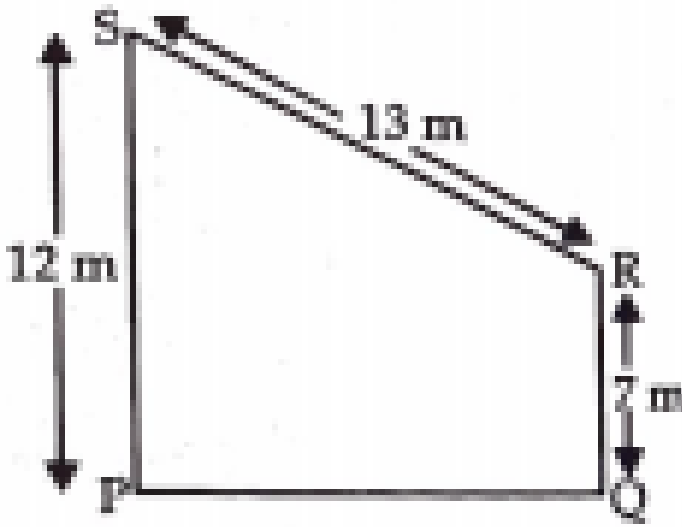
48. A rhombus shaped sheet with perimeter 40 cm and one diagonal 12 cm, is painted on both sides at the rate of $Rs 5 per cm^2$. Find the cost of painting.

49. Find the area of the trapezium PQRS with height PS in given figure.

50. The areaw of a trapezium is $475cm^2$ and the height is 19 cm. Find the length of its two parallel sides if one side is 4 cm greater than the other.

51. A rectangular plot is given for constructing a house having a measurement of 40m length and 15m in the front. According to the laws, a minimum of 3m, wide space should be left in the front and back each and 2m wide space on each of other sides. Find the largest area where house can be constructed.

52. A field is in the shape of a trapezium having parallel sides 90 m and 30 m. These sides meet the third side at right angles. The length of the fourth side is 100 m. If it Rs. 4 costs to plough 1 m2 of the field, find the total cost of ploughing the field.

53. find the area of the rectangle whose sides are 3cm and 5cm

EXERCISE

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

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2. Find the area of the triangle whose sides are 12 cm, 14 cm and 20 cm.

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3. The base of a right-awngled triangle is 48 cm and it hypotenuse is 50 cm. Find the area of the triangle.

4. Find the area of a triangle whose sides are 18 cm 24 cm, and 30 cm in length. Find the height corresponding to the greatest side.

5. Find the area of an isosceles triangle, each of whose equal sides measure 13 cm and whose base measures 20 cm.

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6. An isosceles triangle has perimeter 30 cm and each of equal sides is 12 cm. Area of the triangle is :

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7. The base of an isosceles triangle measures 80 cm and its areaw is $360cm^2$. Find the perimeter of the triangle.

8. If the area of an equilateral is $36\sqrt{3}cm^2$, find its perimeter.

9. If the area of an equilateral is triangle is $8\sqrt{3}cm^2$, find its height.

10. The sides of a triangle are in the ratio 3:5:7` and its perimeter is 600 cm. Find the area of the triangle.

11. The height of an equilateral triangle measures 9 cm. Find its area . $\left(Take\sqrt{3} = 1.732\right)$

12. The perimeter of a triangular field is 540 m and its sides are in the ratio 25:17:12. Find the area of the triangle. Also find the cost of ploughing the field at Rs 20 per $10m^2$

13. The perimeter of an isosceles triangle measures 42 cm and its base is $\dfrac{3}{2}$ times each of the equal sides. Find the length of each side of triangle.

14. The perimeter of an isosceles triangle measures 42 cm and its base is $\dfrac{3}{2}$ times each of the equal sides. Find the area of triangle.

15. The perimeter of an isosceles triangle measures 42 cm and its base is $\dfrac{3}{2}$ times each of the equal sides. Find height of the triangle.

16. The lengths of the sides of a triangle are in the ratio 3:4:2 and its perimeter is 144 cm. Find the area of the triangle.

17. The lengths of the sides of a triangle are in the ratio 3:4:5 and its perimeter is 144 cm. Find the height corresponding to the largest side.

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18. Find the area of a parallelogram ABCD in which AB = 28 cm, BC = 26 cm and diagonal AC = 30 cm.

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19. Find the area of a parallelogram ABCD in which AB = 14 cm, BC = 10 cm and AC = 16 cm.

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20. The sides of a quadrilateral are 5 cm,12 cm, 14 cm and 15 cm and the angle between the first two sides is a right-angle. Find its area.

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21. Find the area of a quadrilateral ABCD whose sides AB, BC, CD and DA are 9 cm, 40 cm, 28 cm and 15 cm respectivelyand the angle between the firswt two sides is a right angle.

22. Find the perimeter and area of the quadrilateral ABCD in which AB = 42 cm, BC = 21 cm, CD = 29 cm, DA = 34 cm and $\angle CBD = 90°$

23. Find the perimeter and area of the quadrilateral ABCD in which AB = 17 cm, AD = 9 cm, CD = 12 cm, $\angle ACB = 90°$ and AC = 15 cm

24. Find the area of a rhombus whose perimeter is 80 cm and one of whose diagonals is 24 cm

25. Two parallel sides of a trapezium are 60 cm and 77 cm and other sides are 25 cm and 26 cm. Find the area of the trapezium.

26. Find the area of the quadrilateral ABCD in which AD = 24 cm, $\angle BAD = 90°$ and BCD forms an equilateral triangle whose each side is 26 cm.
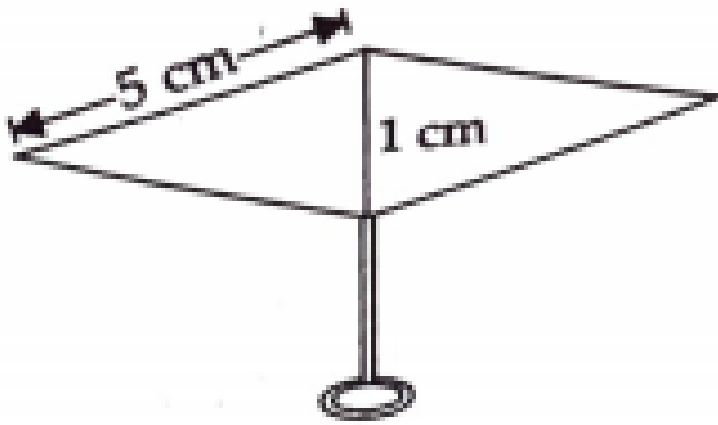
27. A rhombus sheet, whose perimeter is 32 m and whose one diagonal is 10 m long, is painted on both sides at the rate of Rs 5 per square metre. Determine the cost of painting.

28. Find the area of the blades of the magnetic compass shown in the figure

29. Find the area of an equilateral triangle whose each side is 4 cm.

30. What is the area of an equilateral triangle whose sides is 'a'?

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31. Find the area of a triangle whose sides are 3 cm, 4 cm and 5 cm.

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32. Find the area of a triangle whose base is 5 cm and altitude 4 cm.

33. Find the area of an isosceles triangle having base a cm and one side b cm.

34. Find the area of an equilateral triangle having altitude h cm.

35. If each side of a triangle is doubled, then find the percentage increase in its area.

36. If each side of an equilateral triangle is tripled, then find the percentage increase in its area.

37. The perimeter of a triangular field is 144 cm and the ratio of the sides is 3:4:5. Find the area of the field.

38. If $\triangle$ be the area of the triangle, find the area of te triangle whose each side is doubled.

39. True/False:

If the base of an isosceles triangle is 6 cm and its perimeter is 16 cm, then, its area is $12cm^2$

40. True/False:

If the sides of a triangular field measure 51 m, 37 m and 20 m, then the cost of levelling it at Rs 5 per m^2` is 1540

41. True/False:

If each side of an equilateral triangle is 8 cm, then its area is $20\sqrt{3}cm^2$

42. True/False:

If each side of a triangle is doubled, then the percentage increase in its area is 200%

43. True/False:

If 'triangle' be the area of the triangle, then the area of the triangle whose each side is doubled is 4 triangle.

44. Fill in the Blanks:

Square is a special type of _____

45. Fill in the Blanks:

Area of a cyclic quadrialteral is _____

46. Fill in the Blanks:

The diagonal of a square = _____

47. Fill in the Blanks:

Side of an equilateral triangle is 16 cm, its altitude is _____

48. The lengths of three sides of a triangle are 20 cm, 16 cm and 12 cm. The area of the triangle is

A. $96cm^2$

B. $144cm^2$

C. $120cm^2$

D. $160cm^2$

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49. The base of an isosceles triangle is 8 cm long and each of its equal sids measures 6 cm. The area of the triangle is

A. $8\sqrt{5}cm^2$

B. $16\sqrt{5}cm^2$

C. $16\sqrt{3}cm^2$

D. $8\sqrt{3}cm^2$

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50. The sides of a triangle are in the ratio 3:5:7`

and its perimeter is 600 cm. Find the area of

the triangle.

A. $750cm^2$

B. $375cm^2$

C. $250cm^2$

D. $500cm^2$

51. The base of an isosceles triangle is 16cm and its area is $48cm^2$. The perimeter of the triangle is

A. 41 cm

B. 48 cm

C. 36 cm

D. 324 cm

52. Each of the equal sides of an isosceles triangle is 13 cm and its base is 24 cm. The area of the triangle is

A. $156 cm^2$

B. $60 cm^2$

C. $78 cm^2$

D. $120 cm^2$

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53. The area of an equilateral triangle is $81\sqrt{3}cm^2$. Its height is

A. $6\sqrt{3}cm$

B. $9\sqrt{3}cm$

C. $18\sqrt{3}cm$

D. 9 cm

54. The lengths of each side of an equilateral triangle of area $4\sqrt{3}cm^2$ is

A. $\dfrac{4}{\sqrt{3}}cm$

B. 4 cm

C. $\dfrac{\sqrt{3}}{4}cm$

D. 3 cm

55. A sqaure and an equilateral triangle have equal perimeters. If the diagonal of the square is $12\sqrt{2}cm$, then area of the triangle is

A. $24\sqrt{2}cm^2$

B. $24\sqrt{3}cm^2$

C. $64\sqrt{3}cm^2$

D. $48\sqrt{3}cm^2$

56. An isosceles right triangle has area $8cm^2$.

The length of its hypotenuse is :

A. $\sqrt{32}cm$

B. $\sqrt{16}cm$

C. $\sqrt{48}cm$

D. $\sqrt{24}cm$

57. The sides of a triangle are 56 cm, 60 cm and 52 cm long. Then the area of the triangle is :

A. $1322 cm^2$

B. $1311 cm^2$

C. $1344 cm^2$

D. $1392 cm^2$

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58. The length of each side of an equilateral triangle having an area of $9\sqrt{3}cm^2$ is :

A. 8 cm

B. 36 cm

C. 4 cm

D. 6 cm

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59. If the area of an equilateral triangle is $16\sqrt{3}cm^2$, then the perimeter of the triangle is

A. 48 cm

B. 24 cm

C. 12 cm

D. 306 cm

60. The edges of a triangular board are 6 cm, 8 cm and 10 cm. The cost of painting it at the rate of 9 paise per cm^2 is :

A. Rs 2.00

B. Rs 2.16

C. Rs 2.48

D. Rs 3.00

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61. The area of a trapezium of height 3 cm is $12 cm^2$. If one of the parallel side is 3 cm, then find the other side.

62. In the fig. fourth quadrant of a circle is OACB where O is the centre of the circle and radius of the circle is 3.5 cm. Find the area of fourth quadrant of the circle.and find the area of shaded portion of the part ADBC if OD=2cm

$$\left(\pi = \frac{22}{7}\right)$$
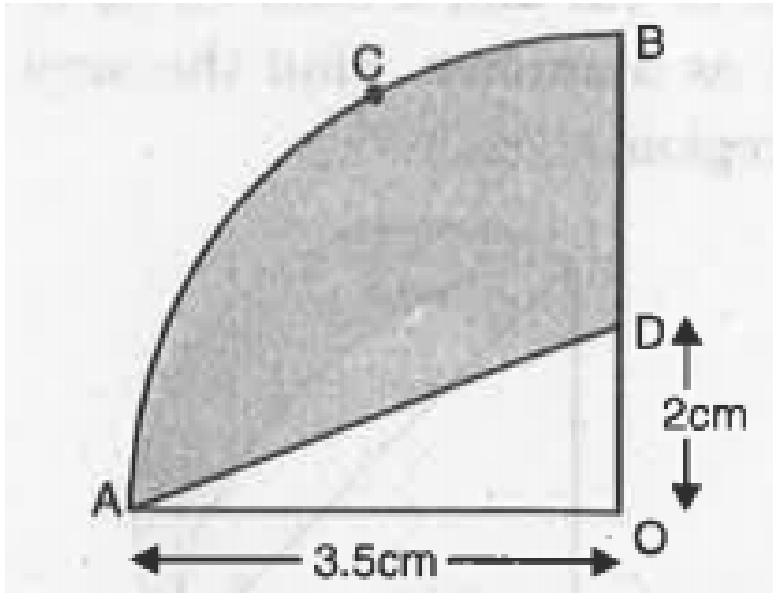
63. What is the hypotenuse in an isosceles right angled triangle is equal to?

64. The area of a rhombus is $192 cm^2$. The length of one diagonal is twice the other, find the length of diagonals.

65. The sides of a triangular field are 20m, 37 m and 51 m. Find the number of flower beds that can be prepared if each bed measures $(2 \times 3) m^2$

66. A parallelogram, the length of whose side

are 60 cm and 25 cm has one diagonal 65 m

long . Find the area of the parallelogram.

67. From a point in the interior of an

equilateral triangle, perpendiculars are drawn

on the three sides, the lengths of te

perpendicular are 14 cm, 10 cm and 6cm. Find the area of the triangle.

68. Find the area of a quadrilateral ABCD whose sides AB,BC, CD and DA are 9 cm, 40 cm, 28 cm and 15 cm respectivelyand the angle between the firswt two sides is a right angle.

69. A field in the form of a parallelogram has sides 60 m and 40 m and one of its diagonals is 80 m long. Find the area of te parallelogram.