

PRACTICE PAPER 17 (2026-27)

CHAPTER-06

PERIMETER AND AREA

SUBJECT: MATHEMATICS

CLASS : IX

MAX. MARKS : 40

DURATION : 1½ hrs

General Instructions:

- (i). All questions are compulsory.
- (ii). This question paper contains 20 questions divided into five Sections A, B, C, D and E.
- (iii). **Section A** comprises of 10 MCQs of 1 mark each. **Section B** comprises of 4 questions of 2 marks each. **Section C** comprises of 3 questions of 3 marks each. **Section D** comprises of 1 question of 5 marks each and **Section E** comprises of 2 Case Study Based Questions of 4 marks each.
- (iv). There is no overall choice.
- (v). Use of Calculators is not permitted

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. The circumferences of two circles are in the ratio 4 : 5. What is the ratio of their radii ?
(a) 16 : 25 (b) 25 : 16 (c) 2 : 5 (d) 4 : 5
2. The area of the square that can be inscribed in a circle of radius 8 cm is
(a) 256 cm² (b) 128 cm² (c) 64√2 cm² (d) 64 cm²
3. Perimeter of a sector of a circle whose central angle is 90° and radius 7cm is:
(a) 35cm (b) 11cm (c) 22cm (d) 25cm
4. In a circle of diameter 42cm, if an arc subtends an angle of 60° at the centre, then the length of the arc is:
(a) 22/7 cm (b) 11cm (c) 22 cm (d) 44 cm
5. The lengths of the three sides of a triangle are 30 cm, 24 cm and 18 cm respectively. The length of the altitude of the triangle corresponding to the smallest side is
(a) 24 cm (b) 18 cm (c) 30 cm (d) 12 cm
6. Each side of an equilateral triangle is 10 cm long. The height of the triangle is
(a) 10√3 cm (b) 5√3 cm (c) 10√2 cm (d) 5 cm
7. The area of an equilateral triangle with side 2√3 cm is (use √3 = 1.732)
(a) 5.196 cm² (b) 0.866 cm² (c) 3.496 cm² (d) 1.732 cm²
8. The sides of a triangle are 56 cm, 60 cm and 52 cm long. Then the area of the triangle is
(a) 1322 cm² (b) 1311 cm² (c) 1344 cm² (d) 1392 cm²

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

- (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.

9. **Assertion (A):** If the length of an arc of a circle is 10 cm and its radius is 5 cm, the area of the corresponding sector is 25 cm².

Reason (R): Area of a sector is given by $\frac{1}{2} \times \text{arc length} \times \text{radius}$.

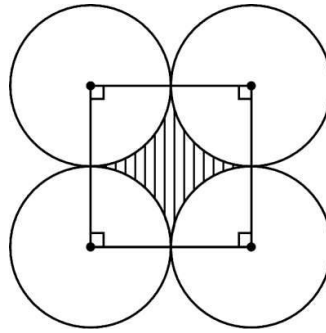
10. Assertion (A): Area of an equilateral triangle having each side 4 cm is $10\sqrt{3} \text{ cm}^2$

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

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. Find the area of the shaded region if length of radius of each circle is 7 cm. Each circle touches the other two externally.



12. A chord is subtending an angle of 90° at the centre of a circle of radius 14 cm. Find the area of the corresponding minor segment of the circle.

13. The perimeter of an equilateral triangle is 60 cm. Find its area. (Use $\sqrt{3} = 1.73$)

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

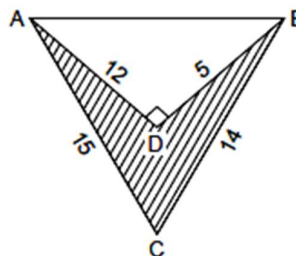
SECTION – C

Questions 15 to 17 carry 3 marks each.

15. The short and long hands of a clock are 4 cm and 6 cm long respectively. Find the sum of distances travelled by their tips in 2 days

16. The sides of a triangle are in the ratio 13 : 14 : 15 and its perimeter is 84 cm. Find the area of the triangle.

17. Find the area of shaded region in the given figure. (All measurements are in cm)



SECTION – D

Questions 18 carry 5 marks.

18. The below figure depicts a racing track whose left and right ends are semicircular.



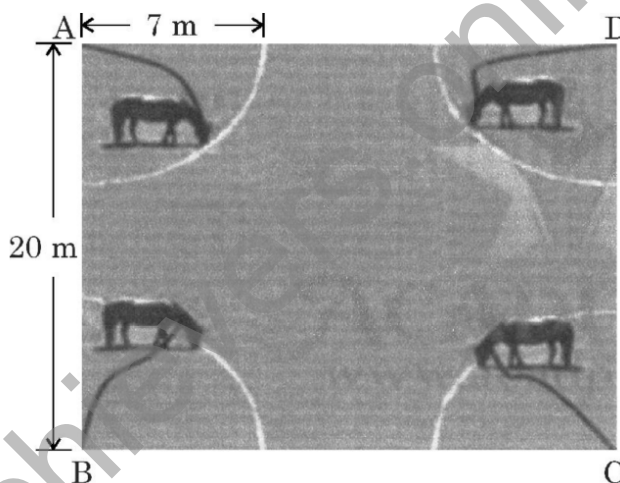
The distance between the two inner parallel line segments is 60 m and they are each 106 m long. If the track is 10 m wide, find :

- the distance around the track along its inner edge
- the area of the track.

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

- 19.** 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.



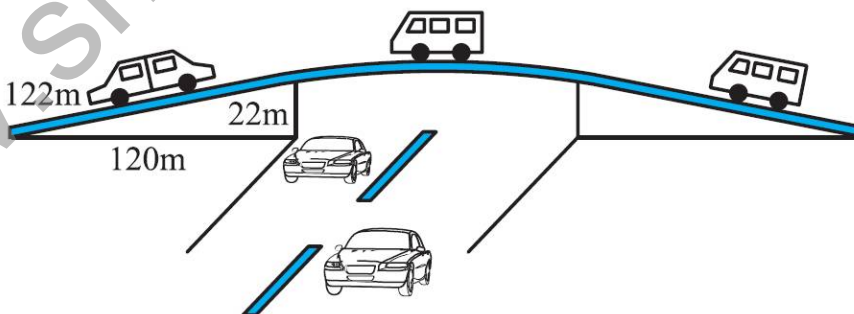
Based on the above, answer the following questions :

- Find the area of the square shaped grass field. (1)
- (a) Find the area of the total field in which these horses can graze. (2)

OR

- 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)
- What is area of the field that is left ungrazed, if the length of the rope of each horse is 7 cm? (1)

- 20.** There is a road running across the city, which is also a connecting road between the 2 towns. Due to this busy road, lot of traffic generally occurs on this road. To get rid of it a flyover was made on it. The triangular side walls of a flyover have been used for advertisements. The sides of the walls are 122m, 22m and 120m.



- What type of triangle is the side wall of the flyover? (1)
- If there are 2 walls for the advertisement what is the total area of the 2 walls? (1)
- If the advertisements yields an earning of Rs. 6,000 m² per year. What is the monthly rent for 2 walls? (1)
- If a company hires these 2 walls for 4 months, how much rent they need to pay? (1)

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(ANSWERS)

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SECTION – A

Questions 1 to 10 carry 1 mark each.

1. The circumferences of two circles are in the ratio 4 : 5. What is the ratio of their radii ?
(a) 16 : 25 (b) 25 : 16 (c) 2 : 5 (d) 4 : 5

Ans: (d) 4 : 5

Circumference of circle = $2\pi r$

$$\therefore \frac{2\pi r_1}{2\pi r_2} = \frac{4}{5} \Rightarrow \frac{r_1}{r_2} = \frac{4}{5}$$

Hence, Ratio of their radii = 4 : 5.

2. The area of the square that can be inscribed in a circle of radius 8 cm is
(a) 256 cm² (b) 128 cm² (c) $64\sqrt{2}$ cm² (d) 64 cm²

Ans: (b) 128 cm²

Radius of circle = 8 cm

⇒ Diameter = $8 \times 2 = 16$ cm

The diameter of circle = diagonal of square = 16 cm = $a\sqrt{2}$

⇒ $a = 16/\sqrt{2} = 8\sqrt{2}$

Area of square = (side)² = $(8\sqrt{2})^2 = 128$ cm²

3. Perimeter of a sector of a circle whose central angle is 90° and radius 7cm is:
(a) 35cm (b) 11cm (c) 22cm (d) 25cm

Ans: (d) 25cm

4. In a circle of diameter 42cm, if an arc subtends an angle of 60° at the centre, then the length of the arc is:

(a) $22/7$ cm (b) 11cm (c) 22 cm (d) 44 cm

Ans: (c) 22 cm

5. The lengths of the three sides of a triangle are 30 cm, 24 cm and 18 cm respectively. The length of the altitude of the triangle corresponding to the smallest side is

(a) 24 cm (b) 18 cm (c) 30 cm (d) 12 cm

Ans: (a) 24 cm

6. Each side of an equilateral triangle is 10 cm long. The height of the triangle is

(a) $10\sqrt{3}$ cm (b) $5\sqrt{3}$ cm (c) $10\sqrt{2}$ cm (d) 5 cm

Ans: (b) $5\sqrt{3}$ cm

$$\text{Height of equilateral triangle} = \frac{\sqrt{3}}{2} \times \text{Side} = \frac{\sqrt{3}}{2} \times 10 = 5\sqrt{3} \text{ cm}$$

7. The area of an equilateral triangle with side $2\sqrt{3}$ cm is (use $\sqrt{3} = 1.732$)
 (a) 5.196 cm^2 (b) 0.866 cm^2 (c) 3.496 cm^2 (d) 1.732 cm^2
 Ans: (a) 5.196 cm^2

$$\text{Area of an equilateral triangle} = \frac{\sqrt{3}}{4} \times (\text{side})^2 = \frac{\sqrt{3}}{4} \times 2\sqrt{3} \times 2\sqrt{3} = 3\sqrt{3} \text{ cm}^2 = 5.196 \text{ cm}^2$$

8. 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
 Ans: (c) 1344 cm^2

We have, $a = 56$ cm, $b = 60$ cm and $c = 52$ cm.

$$s = \frac{a+b+c}{2} \Rightarrow s = \frac{56+60+52}{2} = 84$$

$$\text{Area of triangle} = \sqrt{s(s-a)(s-b)(s-c)} = \sqrt{84(84-56)(84-60)(84-52)}$$

$$= \sqrt{84 \times 28 \times 24 \times 32} = \sqrt{3 \times 7 \times 4 \times 4 \times 7 \times 4 \times 2 \times 3 \times 16 \times 2} = 3 \times 7 \times 4 \times 2 \times 2 \times 4 = 1344 \text{ cm}^2$$

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

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9. **Assertion (A):** If the length of an arc of a circle is 10 cm and its radius is 5 cm, the area of the corresponding sector is 25 cm^2 .

Reason (R): Area of a sector is given by $\frac{1}{2} \times \text{arc length} \times \text{radius}$.

Ans. (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

10. **Assertion (A):** Area of an equilateral triangle having each side 4 cm is $10\sqrt{3} \text{ cm}^2$

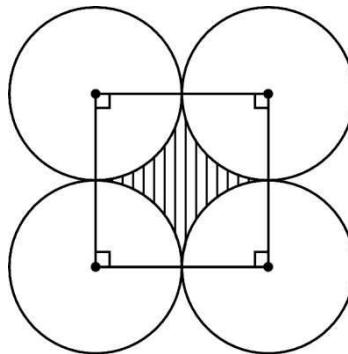
Reason (R): Area of an equilateral triangle = $\frac{\sqrt{3}}{4} \times (\text{Side})^2$

Ans: (d) A is false but R is true.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. Find the area of the shaded region if length of radius of each circle is 7 cm. Each circle touches the other two externally.



Ans. Side of square = 14 cm

Area of shaded region = area of square – area of 4 quadrants

$$= 14^2 - \frac{1}{4}\pi r^2$$

$$= 196 - \frac{1}{4} \times \frac{22}{7} \times 7 \times 7 = (196 - 154) = 42$$

Hence, area of shaded region = 42 cm²

12. A chord is subtending an angle of 90° at the centre of a circle of radius 14 cm. Find the area of the corresponding minor segment of the circle.

Ans. Area of minor segment = Area of minor sector - Area of triangle

$$= \frac{1}{4}\pi r^2 - \frac{1}{2} \times 14 \times 14$$

$$= \frac{1}{4} \times \frac{22}{7} \times 14 \times 14 - 98 = (154 - 98) = 56$$

Hence, area of minor segment = 56 cm²

13. The perimeter of an equilateral triangle is 60 cm. Find its area. (Use $\sqrt{3} = 1.73$)

Ans: Given perimeter of an equilateral triangle = 60 cm

$$\Rightarrow x + x + x = 60$$

$$\Rightarrow 3x = 60$$

$$\Rightarrow x = \frac{60}{3} = 20 \text{ cm}$$

Therefore, each side of triangle = 20 cm

$$\therefore \text{Area of an equilateral triangle by Heron's formula} = \frac{\sqrt{3}}{4} \times (\text{side})^2$$

$$= \frac{\sqrt{3}}{4} \times (20)^2 \quad (\text{Side} = 20 \text{ cm})$$

$$= 100\sqrt{3} \text{ cm}^2 = 100 \times 1.73 = 173 \text{ cm}^2$$

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

Ans: Given $a = 18$ cm, $b = 24$ cm and $c = 30$ cm

The semi-perimeter of the triangle,

$$s = \frac{a+b+c}{2} = \frac{18+24+30}{2} = 36$$

$$\Rightarrow s = 36 \text{ cm}$$

Using Heron's formula,

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

$$= \sqrt{36(36-18)(36-24)(36-30)}$$

$$= \sqrt{36 \times 18 \times 12 \times 6} = \sqrt{6 \times 6 \times 6 \times 3 \times 6 \times 2 \times 6}$$

$$= \sqrt{6 \times 6 \times 6 \times 6 \times 6 \times 6} = 6 \times 6 \times 6 = 216 \text{ cm}^2$$

SECTION – C

Questions 15 to 17 carry 3 marks each.

15. The short and long hands of a clock are 4 cm and 6 cm long respectively. Find the sum of distances travelled by their tips in 2 days

Ans: In 2 days, the short hand will complete 4 rounds.

$\therefore$ Distance moved by its tip = 4(circumference of a circle of radius 4 cm)

$$= 4 \times \left(2 \times \frac{22}{7} \times 4 \right) \text{cm} = \frac{704}{7} \text{cm}$$

In 2 days, the long hand will complete 48 rounds.

∴ Distance moved by its tip = 48(circumference of a circle of radius 6 cm)

$$= 48 \times \left(2 \times \frac{22}{7} \times 6 \right) \text{cm} = \frac{12672}{7} \text{cm}$$

Hence, sum of distances moved by the tips of two hands of the clock = $\left(\frac{704}{7} + \frac{12672}{7} \right) \text{cm}$

$$= 1910.85 \text{ cm}$$

16. The sides of a triangle are in the ratio 13 : 14 : 15 and its perimeter is 84 cm. Find the area of the triangle.

Ans:

Given ratio of the sides of a triangle = 13 : 14 : 15

Let $a = 13k$, $b = 14k$ and $c = 15k$

Perimeter of triangle = 84 cm

$$\Rightarrow 13k + 14k + 15k = 84$$

$$\Rightarrow 42k = 84$$

$$\Rightarrow k = \frac{84}{42} = 2$$

So, the sides of a triangle are $13 \times 2 = 26$ cm, $14 \times 2 = 28$ cm and $15 \times 2 = 30$ cm

Its semi-perimeter, $s = \frac{84}{2} = 42$ cm

Using Heron's formula,

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

$$= \sqrt{42(42-26)(42-28)(42-30)}$$

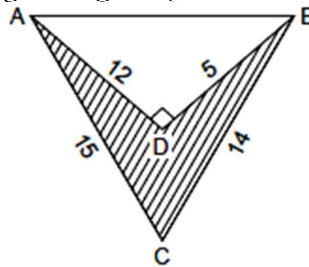
$$= \sqrt{42 \times 16 \times 14 \times 12}$$

$$= \sqrt{14 \times 3 \times 4 \times 4 \times 14 \times 4 \times 3}$$

$$= \sqrt{14 \times 14 \times 4 \times 4 \times 3 \times 3 \times 2 \times 2}$$

$$= 14 \times 4 \times 3 \times 2 = 336 \text{ cm}^2$$

17. Find the area of shaded region in the given figure. (All measurements are in cm)



Ans: Area of right-angled $\triangle ADB = \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times BD \times AD$

(Base = BD, height = AD)

$$= \frac{1}{2} \times 5 \times 12 = 30 \text{ cm}^2$$

Using Pythagoras theorem in right-angled $\triangle ADB$, we have

$$AB^2 = AD^2 + BD^2 = 12^2 + 5^2 = 144 + 25 = 169$$

$$\therefore AB = \sqrt{169} = 13 \text{ cm}$$

Now, in $\triangle ABC$, $AB = 13$ cm, $AC = 15$ cm and $BC = 14$ cm

∴ Perimeter of triangle, $2s = AB + BC + AC = 13 + 14 + 15 = 42$ cm

$$\therefore \text{Semi-perimeter, } s = \frac{42}{2} = 21 \text{ cm}$$

Using Heron's formula,

$$\begin{aligned} \text{Area of } \triangle ABC &= \sqrt{s(s-a)(s-b)(s-c)} = \sqrt{21(21-13)(21-15)(21-14)} \\ &= \sqrt{21 \times 8 \times 6 \times 7} = \sqrt{7 \times 3 \times 2 \times 2 \times 2 \times 3 \times 7} \\ &= \sqrt{7 \times 7 \times 3 \times 3 \times 2 \times 2 \times 2 \times 2} = 7 \times 3 \times 2 \times 2 = 84 \text{ cm}^2 \end{aligned}$$

$$\therefore \text{Area of shaded portion} = \text{ar}(\triangle ABC) - \text{ar}(\triangle ADB) = 84 - 30 = 54 \text{ cm}^2$$

SECTION – D

Questions 18 carry 5 marks.

18. The below figure depicts a racing track whose left and right ends are semicircular.

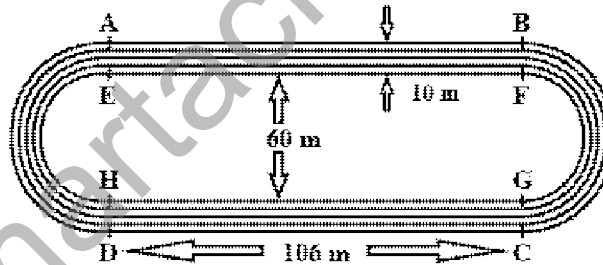


The distance between the two inner parallel line segments is 60 m and they are each 106 m long. If the track is 10 m wide, find :

- the distance around the track along its inner edge
- the area of the track.

Ans: The distance around the track along its inner edge

= EF + HG + circumference of semicircle with diameter EH + circumference of semicircle with diameter FG



Circumference of semicircle with diameter EH + Circumference of semicircle with diameter FG = $2 \times \pi \times 30$

$$= 60\pi \text{ m}$$

$\therefore$ The distance around the track along its inner edge = $60\pi + 106 + 106$

$$= \frac{2804}{7} \text{ m}$$

$\therefore$ Area of track = Area of rectangle ABFE + Area of rectangle HGCD + (Area of semicircle with diameter AD – Area of semicircle with diameter EH) + (Area of semicircle with diameter BC – Area of semicircle with diameter FG)

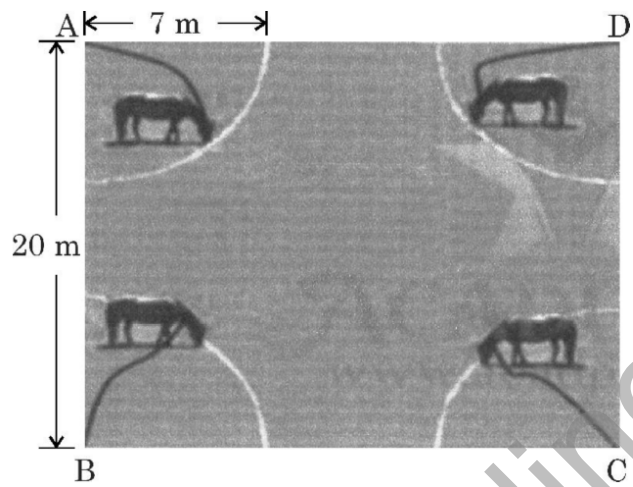
$$= (106 \times 10) + (106 \times 10) + \left(\frac{\pi}{2} \times 40 \times 40 - \frac{\pi}{2} \times 30 \times 30 \right) + \left(\frac{\pi}{2} \times 40 \times 40 - \frac{\pi}{2} \times 30 \times 30 \right)$$

$$= 2120 + 2200 = 4320 \text{ m}^2$$

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. 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.



Based on the above, 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 area of the field that is left ungrazed, if the length of the rope of each horse is 7 cm? (1)
- Ans. (i) Area of square shaped grass field = 400 m^2

(ii) (a) area of total field that horses can graze = $4 \times \frac{1}{4} \times \frac{22}{7} \times 7 \times 7 = 154 \text{ m}^2$

OR

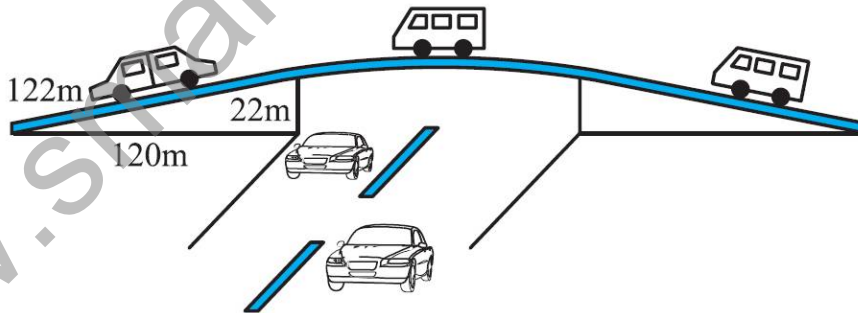
(ii) (b) area grazed by one horse = $\frac{1}{4} \times 3.14 \times 10 \times 10 = 78.5 \text{ m}^2$

(iii) Area of the field left ungrazed = area of square field - area of field in which horses can graze.

Area of field in which horses can graze = $4 \times \frac{1}{4} \times \frac{22}{7} \times 7 \times 7 = 154 \text{ cm}^2$

Area of the field left ungrazed = $400 - 0.0154 = 399.9846 \text{ m}^2$

20. There is a road running across the city, which is also a connecting road between the 2 towns. Due to this busy road, lot of traffic generally occurs on this road. To get rid of it a flyover was made on it. The triangular side walls of a flyover have been used for advertisements. The sides of the walls are 122m, 22m and 120 m.



- (i) What type of triangle is the side wall of the flyover? (1)
- (ii) If there are 2 walls for the advertisement what is the total area of the 2 walls? (1)
- (iii) If the advertisements yields an earning of Rs. 6,000 m^2 per year. What is the monthly rent for 2 walls? (1)
- (iv) If a company hires these 2 walls for 4 months, how much rent they need to pay? (1)

Ans: (i) $122^2 = 14884$

$22^2 = 484$

$120^2 = 14400$

$\Rightarrow 122^2 = 120^2 + 22^2$

$\Rightarrow$ By Pythagoras theorem, the triangle is right angled triangle.

(ii) Area of two walls = $2 \times \frac{1}{2} \times b \times h = b \times h = 120 \times 22 = 2640 \text{ m}^2$

(iii) Yearly rent = Rs. 6000 per m²

$\therefore$ Monthly rent = Rs. 6000 / 12 = Rs. 500 per m².

(iv) Monthly rent of 2 walls = Rs. 500 $\times$ 2640 = Rs. 13,20,000

$\therefore$ Total rent paid for 4 years = Rs. 13,20,000 $\times$ 4 = Rs. 52,80,000

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