ICSE Class 8 Maths Selina Solutions Chapter 20: ICSE Class 8 Maths Selina Solutions Chapter 20 focuses on the concept of calculating the area of trapeziums and polygons. This chapter introduces students to formulas and methods for finding the area of these shapes, emphasizing practical applications in geometry.

It covers step-by-step explanations and examples to help students understand the differences between trapeziums and polygons, and how to apply specific formulas for accurate area calculations. By mastering these techniques, students develop a strong foundation in geometry and problem-solving skills, preparing them for more complex mathematical challenges ahead.

ICSE Class 8 Maths Selina Solutions Chapter 20 Area of Trapezium and a Polygon Overview

The ICSE Class 8 Maths Selina Solutions for Chapter 20, "Area of Trapezium and a Polygon," are created by subject experts from Physics Wallah. This chapter explains how to calculate the area of trapeziums and polygons in an easy-to-understand way.

It provides clear explanations and examples to help students learn the formulas and methods for finding these areas accurately. These solutions are designed to improve students understanding of geometry and prepare them well for solving math problems effectively.

Area of Trapezium and a Polygon

Trapezium: A trapezium (in American English) or trapezoid (in British English) is a quadrilateral with at least one pair of parallel sides. The parallel sides are called the bases of the trapezium, and the other two sides are called the legs. The height of a trapezium is the perpendicular distance between its two parallel sides.

Area of Trapezium

The area AAA of a trapezium (or trapezoid) can be calculated using the formula:

A=12×(a+b)×hA = \frac{1}{2} \times (a + b) \times hA=21×(a+b)×h

where:

- aaa and bbb are the lengths of the parallel sides (bases) of the trapezium,
- hhh is the height (perpendicular distance) between the bases.

This formula derives from the concept of finding the average length of the bases and multiplying by the height to determine the area enclosed within the trapezium.

Polygon: A polygon is a closed geometric figure with straight sides. It is formed by connecting a finite number of line segments in a closed loop. Polygons can have any number of sides, but they must have at least three sides (making them triangles or higher-order polygons). Common examples include triangles, squares, pentagons, hexagons, and so on. Polygons are classified based on the number of sides they have (e.g., triangles have three sides, quadrilaterals have four sides).

Area of Polygon

The area of a polygon can vary depending on its shape and complexity. Here are the general methods to find the area of different types of polygons:

Regular Polygon (like a square or equilateral triangle):

- The area AAA can often be found using specific formulas that depend on the shape and dimensions of the polygon.

Irregular Polygon:

- For irregular polygons, the area can be determined by dividing the polygon into simpler shapes like triangles or rectangles.

ICSE Class 8 Maths Selina Solutions Chapter 20 PDF

You can find the PDF link for ICSE Class 8 Maths Selina Solutions Chapter 20 "Area of Trapezium and a Polygon" below. This PDF provides detailed solutions and explanations on how to calculate the area of trapeziums and polygons using specific formulas and methods.

It is a valuable resource for students looking to practice and understand these concepts thoroughly preparing them for geometry problems and applications in various fields.

ICSE Class 8 Maths Selina Solutions Chapter 20 PDF

ICSE Class 8 Maths Selina Solutions Chapter 20 Area of Trapezium and a Polygon

Below we have provided ICSE Class 8 Maths Selina Solutions Chapter 20 Area of Trapezium and a Polygon for the ease of the students –

ICSE Class 8 Maths Selina Solutions Chapter 20 Area of Trapezium and a Polygon Exercise

Question 1.

Find the area of a triangle, whose sides are:

(i) 10cm, 24cm and 26cm

Solution:-

Sides of Δ are

a=10cm

b=24cm

c=26cm

$\mathrm{s} = \frac{\mathrm{a+b+c}}{2} = \frac{10+24+26}{2}$ (Simplifying we get)

$= \frac{60}{2} = 30$

Area of $\Delta = \sqrt{S(S-a)(S-b)(S-c)}$ (Formula)

$= \sqrt{30(30-10)(30-24)(30-26)} = \sqrt{30 \times 20 \times 6 \times 4} = \sqrt{10 \times 3 \times 10 \times 2 \times 2 \times 3 \times 2 \times 2}$

$= \sqrt{10 \times 10 \times 3 \times 3 \times 2 \times 2 \times 2 \times 2}$ $\mathrm{Ans} = 10 \times 3 \times 2 \times 2 = 120\mathrm{cm}^2$

(ii) 18mm, 24 mm and 30mm

Solution:-

Sides of Δ are

a=18mm

b=24mm

C=30mm

$\mathrm{S} = \frac{a+b+c}{2} = \frac{18+24+30}{2} = \frac{72}{2} = 36$

Area of $\Delta = \sqrt{S(S-a)(S-b)(S-c)}$ (Formula)

$= \sqrt{36(36-18)(36-24)(36-30)} = \sqrt{36 \times 18 \times 12 \times 6} = \sqrt{18 \times 2 \times 18 \times 2 \times 6 \times 6}$

$= \sqrt{18 \times 18 \times 2 \times 2 \times 6 \times 6}$ $\mathrm{Ans} = 18 \times 2 \times 6 = 216\mathrm{mm}^2$

(iii) 21 m, 28 m and 35 m

Solution:-

Sides of Δ are

a=21m

b=28m

c=35m

$S=\frac{a+b+c}{2}=\frac{21+28+35}{2}$ (Simplifying we get)
$=\frac{84}{2}=42$
Area of $\Delta=\sqrt{S(S-a)(S-b)(S-c)}$ (Formula)
$=\sqrt{42(42-21)(42-28)(42-35)}=\sqrt{42\times 21\times 14\times 7}=\sqrt{7\times 3\times 2\times 3\times 7\times 2\times 7\times 7}$
$=\sqrt{7\times 7\times 7\times 7\times 3\times 3\times 2\times 2}=7\times 7\times 3\times 2 \text{ Ans}=294\mathrm{m}^2$

Question 2.

Two sides of a triangle are 6 cm and 8 cm. If height of the triangle corresponding to 6 cm side is 4 cm; find.

(i) Area of the triangle

(ii) Height of the triangle corresponding to 8 cm side.

Solution:-

BC=6cm

Height AD=4cm

Area of $\Delta=\frac{1}{2}\text{ base }\times height=\frac{1}{2}\times BC\times AD=\frac{1}{2}\times 6\times 4=12\mathrm{cm}^2$

Area of $\Delta=\frac{1}{2}AC\times BE\, 12=\frac{1}{2}\times 8\times BE\therefore\quad BE=\frac{12\times 2}{8}$

BE=3cm

(i) $12\mathrm{cm}^2$ (ii)3cm

Question 3.

The sides of a triangle are 16cm, 12cm and 20cm. Find:

(i) Area of the triangle;

(ii) Height of the triangle, corresponding to the largest side;

(iii) Height of the triangle, corresponding to the smallest side.

Solution:-

Sides of Δ are

a=20cm

b=12cm

c=16cm

$S=\frac{a+b+c}{2}=\frac{20+12+16}{2}=\frac{48}{2}=24$

Area of $\Delta=\sqrt{s(s-a)(s-b)(s-c)}=\sqrt{24(24-20)(24-12)(24-16)}=\sqrt{24\times4\times12\times8}$
$=\sqrt{12\times12\times4\times12\times2\times4}=\sqrt{12\times12\times4\times4\times2\times2}=12\times4\times2=96\mathrm{cm}^2$

AD is height of Δ corresponding to largest side.

$\therefore\quad \frac{1}{2}\times BC\times AD=96\ \frac{1}{2}\times20\times\mathrm{AD}=96\ \mathrm{AD}=\frac{96\times2}{20}$
AD=9.6cm

BE is height of Δ corresponding to smallest side.

$\therefore \frac{1}{2}AC\times BE=96\ \frac{1}{2}\times12\times BE=96\ BE=\frac{96\times2}{12}$
BE=16cm

(i) $96\mathrm{cm}^2$ (ii)9.6cm(iii)16cm

Question 4.

Two sides of a triangle are 6.4 m and 4.8 m. If height of the triangle corresponding to 4.8m side is 6m; find:

(i) Area of the triangle;

(ii) height of the triangle corresponding to 6.4 m side.

Solution:-

ABC is the Δ in which BC=4.8m

AC=6.4m and AD=6m

$\therefore$ Area of $\Delta\mathrm{ABC}=\frac{1}{2}\mathrm{BC}\times\mathrm{AD}=\frac{1}{2}\times4.8\times6=14.4\mathrm{m}^2$
BE is height of Δ corresponding to 6.4 m

$\frac{1}{2}AC\times BE=14.4\ \frac{1}{2}\times6.4\times BE=14.4\ BE=\frac{14.4\times2}{64}\ BE=\frac{14-4}{3.2}=\frac{9}{2}=4.5\mathrm{m}$
Therefore, (i) $14.4m^2$ (ii) 4.5 m

Question 5.

The base and the height of a triangle are in the ratio 4:5. If the area of the triangle is 40 m2; find its base and height.

Solution:-

Consider base of $\Delta = 4 \times mandheightof\Delta = 5 \times \mathrm{m}$

Area of $\Delta = 40\mathrm{m}^2 \because \frac{1}{2}$ Base $\times$ height $=$ area of Δ $\frac{1}{2} \times 44x \times 5x = 40$ $10x^2 = 40$ $x^2 = 4$
$x = \sqrt{4}$

x=2

$\therefore$ Base $= 4x = 4 \times 2 = 8\mathrm{m}$
Height $= 5x = 5 \times 2 = 10\mathrm{m}$

Therefore, the base and height of the triangle is 8m; 10m.

Question 6.

The base and the height of a triangle are in the ratio 5:3. If the area of the triangle is 67m2.find its base and height.

Solution:-

Consider base =5×m

Height =3×m

Area of $\Delta = \frac{1}{2}$ base $\times$ *height* $\therefore$ $\frac{1}{2} \times 5x \times 3x = 67.5$ $x^2 = \frac{67.5 \times 2}{15}$ $x^2 = 4.5 \times 2$ $x^2 = 9.0$
$x = \sqrt{9}$

x=3

Base $= 5x = 5 \times 3 = 15\mathrm{m}$

Height $= 3\mathrm{x} = 3 \times 3 = 9\mathrm{m}$

Question 7.

The area of an equilateral triangle is $144\sqrt{3}\mathrm{cm}^2$; find its perimeter.

Solution:

Consider each side of an equilateral triangle = x cm

Area $= \frac{\sqrt{3}}{4}(\text{side})^2 = \frac{\sqrt{3}}{4}x^2 = 144\sqrt{3} \Rightarrow x^2 = 144\sqrt{3} \times \frac{4}{\sqrt{3}} \Rightarrow x^2 = 144 \times 4 \Rightarrow x^2 = 576$
$\Rightarrow x = \sqrt{576} = 24\mathrm{cm}$

Each side =24cm

Therefore, perimeter =3(24)=72cm

Question 8.

The area of an equilateral triangle is numerically equal to its perimeter. Find its perimeter correct to 2 decimal places.

Solution:-

Consider each side of the equilateral triangle = x

Area $= \frac{\sqrt{3}}{4}x^2$

Area perimeter =3x

By the given condition $= \frac{\sqrt{3}}{4}x^2 = 3x\, x^2 = 3x \times \frac{4}{\sqrt{3}}\, x^1 = \frac{3x \times 4 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{3x \times 4 \times \sqrt{3}}{3} = 4x\sqrt{3}$
$\Rightarrow x^2 = \sqrt{3}(4x) \Rightarrow x = 4\sqrt{3}[\because x \neq 0]$

Perimeter $= 12\sqrt{3}units$

=12(1.732) =20.784=20.78 Units

Question 9.

A field is in the shape of a quadrilateral ABCD in which side AB = 18m, side AD = 24m, side BC = 40m, DC = 50m and angle A = 90°. Find the area of the field.

Solution:-

∠A=90°

By Pythagoras Theorem,

In ΔABD,

Question 10.

The lengths of the sides of a triangle are in the ratio 4 : 5 : 3 and its perimeter is 96 cm . Find its area.

Solution:-

Consider the sides of the triangle ABC be 4 x, 5 x and 3x

AB=4 x, AC=5 x and BC=3 x

Perimeter = 4 x+5x+3x=96

12 x=96

Question 11.

One of the equal sides of an isosceles triangle is 13cm and its perimeter is 50cm. Find the area of the triangle.

Solution:-

In Isosceles ΔABC

AB=AC=13cm But perimeter =50cm

BC=50-(13+13)cm

=50-26=24cm

AD⊥BC

$$\mathrm{AD}=\mathrm{DC}=\frac{24}{2}=12\mathrm{cm}$$

In right ΔABD,

$\mathrm{AB}^2=\mathrm{AD}^2+\mathrm{BD}^2$ (Pythagoras Theorem)

$$(13)^2=\mathrm{AD}^2+(12)^2 \Rightarrow 169=AD^2+144 \Rightarrow AD^2=169-144$$

=25=(5)^{2}

AD=5cm.

Area of $\Delta ABC=\frac{1}{2}$ Base $\times Altitude=\frac{1}{2}\times BC\times AD=\frac{1}{2}\times 24\times 5=60\mathrm{cm}^2$

Question 12.

The altitude and the base of a triangular field are in the ratio 6:5. If its cost is Rs.49, 57,200 at the rate of Rs.36, 720 per hectare and 1 hectare =10,000 sq. m, find (in meter) dimensions of the field,

Solution:-

Total cost =349,57,200

Rate = 736,720 per hectare

Total area of the triangular field

$= \frac{4957200}{36720} \times 10000\mathrm{m}^2 = 1350000\mathrm{m}^2$

Ratio in altitude and base of the field =6:5

Consider altitude =6x and base =5x

$\text{Area } = \frac{1}{2} \text{ Base } \times Altitude \Rightarrow 1350000 = \frac{1}{2} \times 5\mathrm{x} \times 6\mathrm{x} \Rightarrow 15\mathrm{x}^2 = 1350000 \Rightarrow \mathrm{x}^2 = \frac{1350000}{15}$

$\Rightarrow x^2 = 90000 = (300)^2$

x=300

Base $= 5\mathrm{x} = 5 \times 300 = 1500\mathrm{m}$

Altitude $= 6\mathrm{x} = 6 \times 300 = 1800\mathrm{m}$

Question 13.

Find the area of the right-angled triangle with hypotenuse 40cm and one of the other two sides 24cm.

Solution:-

In right angled triangle ABC Hypotenuse AC =40cm

One side AB=24cm

Question 14.

Use the information given in the adjoining figure to find:

(i) The length of AC.

(ii) The area of a ΔABC

(iii) The length of BD, correct to one decimal place.

Solution:-

AB=24 cm, BC=7 cm (i) A C = √ A B 2 + B C 2 = √ 24 2 + 7 2 = √ 576 + 49 = √ 625 = 24 c m

(ii)Area of Δ A B C = 1 2 A B × B C = 1 2 × 24 × 7 = 84 c m 2

(i i i) B D ⊥ A C Area Δ A B C = 1 2 A C × B D 84 = 1 2 × 25 × B D ⇒ B D = 84 × 2 25 = 168 25 = 6.72 c m =6.7 cm

Question 15.

Find the length and perimeter of a rectangle, whose area =120cm^2 and breadth =8cm

Solution:-

Area of rectangle =120cm^2

Breadth, b=8cm

$$\text{Area} = l \times b \; l \times 8 = 120 \; l = \frac{120}{8} = 15\text{cm}$$

$$\text{Perimeter} = 2(1 + b) = 2(15 + 8) = 2 \times 23 = 46\text{cm}$$

Length =15cm

Perimeter =46cm

Benefits of ICSE Class 8 Maths Selina Solutions Chapter 20

- **Clear Understanding:** Students learn how to calculate areas of trapeziums and polygons using easy-to-follow methods, improving their understanding of geometry.
- **Problem-Solving Practice:** Solving problems helps students develop their math skills, making it easier to solve similar problems in exams and real-life situations.
- **Useful Skills:** Learning these concepts prepares students for higher classes and careers that require geometry skills, like engineering or architecture.
- **Confidence Boost:** The chapter provides clear explanations and examples helping students feel more confident in their math abilities.
- **Building a Strong Foundation:** Mastering these concepts lays a solid foundation for future math learning and practical applications in daily life.