ICSE Class 8 Maths Selina Solutions Chapter 16: In ICSE Class 8 Maths Selina Solutions Chapter 16, "Understanding Shapes," you'll learn about different types of shapes and their properties. It covers topics like polygons (shapes with straight sides), how to classify them by their sides and angles, and how to find their perimeter and area using formulas.

You'll also study regular and irregular polygons, symmetry in shapes, and solve problems related to these concepts. This chapter helps you understand geometry better with clear explanations, examples, and practice exercises, so you can do well in exams and use geometry in everyday situations.

ICSE Class 8 Maths Selina Solutions Chapter 16 Understanding Shapes Overview

The solutions for ICSE Class 8 Maths Selina Solutions Chapter 16 "Understanding Shapes" are created by experts from Physics Wallah.

It covers things like polygons (shapes with straight sides), how to classify them based on sides and angles, and how to find their perimeter and area.

The solutions explain these ideas step by step with examples to help students understand them easily. They are designed to make learning geometry easier and to help students do well in exams by building a strong understanding of math concepts.

Understanding Shapes

"Understanding Shapes" refers to the fundamental knowledge of geometric forms and their characteristics. In mathematics, this entails recognizing and categorizing shapes based on their attributes such as sides, angles, symmetry, and measurements like perimeter and area.

It involves learning how to distinguish between different types of polygons, understanding their properties, and applying formulas to calculate dimensions. This understanding is crucial not only for academic purposes but also for practical applications in various fields requiring spatial reasoning and problem-solving skills.

ICSE Class 8 Maths Selina Solutions Chapter 16 Understanding Shapes PDF

You can find the PDF link for ICSE Class 8 Maths Selina Solutions Chapter 16 "Understanding Shapes" below.

It is a useful resource for students looking to understand geometric shapes better and prepare effectively for exams.

ICSE Class 8 Maths Selina Solutions Chapter 16 Understanding Shapes PDF

ICSE Class 8 Maths Selina Solutions for Chapter 16 Understanding Shapes

Below we have provided ICSE Class 8 Maths Selina Solutions Chapter 16 Understanding Shapes for the ease of the students –

ICSE Class 8 Maths Selina Solutions for Chapter 16 Understanding Shapes Exercise

Question 1.

State which of the following are polygons:

If the (given figure in your book) is a polygon, name it as convex or concave.

Solution:

In given Fig. (ii), (iii) and (v) are polygons.

Fig. (ii) and (iii) are concave polygons while

Fig. (v) is convex.

Question 2.

Calculate the sum of angles of a polygon with:

(i) 10 sides

Solution:-

No. of sides n=10

Sum of angles of polygon $= (n-2) \times 180^\circ = (10-2) \times 180^\circ = 1440^\circ$

(ii) 12 sides

Solution:-

No. of sides n=12

Sum of angles $= (n-2)\times 180^\circ = (12-2)\times 180^\circ = 10\times 180^\circ = 1800^\circ$

(iii) 20 sides

Solution:-

n =20

Sum of angles of Polygon $= (n-2)\times 180^\circ = (20-2)\times 180^\circ = 3240^\circ$

(iv) 25 sides

Solution:-

n = 25

Sum of angles of polygon $= (n-2)\times 180^\circ = (25-2)\times 180^\circ = 4140^\circ$

Question 3.

Find the number of sides in a polygon if the sum of its interior angles is:

(i) 900°

Solution:-

Let no. of sides = n

Sum of angles of polygon= 900°

$$(n-2)\times 180^\circ = 900$$

$$n-2 = \frac{900}{180}$$

n-2=5

n=5+2

n=7

(ii) 1620°

Solution:-

Let no. of sides = n

Sum of angles of polygon = 1620°

$$(n-2)\times 180^{\circ}=1620^{\circ}$$

$$n-2=\frac{1620}{180}$$

n-2=9

n=9+2

n=11

(iii) 16 right-angles

Solution:-

Let no. of sides =n

Sum of angles of polygon =16

$$rightangles=16\times 90=1440^{\circ}$$

$$(\mathrm{n}-2)\times 180^{\circ}=1440^{\circ}$$

$$\mathrm{n}-2=\frac{1440}{180}$$

n-2=8

n=8+2

n=10

(iv) 32 right-angles.

Solution:-

Let no. of sides =n

Sum of angles of polygon =32

$$rightangles = 32 \times 90 = 2880^\circ$$

$$(n - 2) \times 180^\circ = 2880$$

$$n - 2 = \frac{2880}{180}$$

n-2=16

n=16+2

n=18

Question 4.

Is it possible to have a polygon; whose sum of interior angles is?

(i) 870°

Solution:-

(i) Let no. of sides = n

Sum of angles =870°

$$(\mathrm{n}-2)\times 180^\circ = 870^\circ$$

$$n-2=\frac{870}{180}$$

$$\mathrm{n}-2=\frac{20}{6}$$

$$n=\frac{29}{6}+2$$

$$\mathrm{n}=\frac{41}{6}$$

Which is not a whole number.

Hence it is not possible to have a polygon, the sum of whose interior angles is 870°

(ii) 2340°

Solution:

Let no. of sides =n

Sum of angles =2340°

$$(n-2)\times 180^\circ = 2340^\circ$$

$$n-2=\frac{2340}{180}$$

n-2=13

n=13+2=15

Which is a whole number.

Hence it is possible to have a polygon, the sum of whose interior angles is 2340°.

(iii) 7 right-angles

Solution:-

Let no. of sides =n

Sum of angles$= 7 right angles = 7 \times 90 = 630^\circ$

$$(n-2)\times 180^\circ = 630^\circ$$

$$\mathrm{n}-2=\frac{630}{180}$$

$$\mathrm{n}-2=\frac{7}{2}$$

$$\mathrm{n}=\frac{7}{2}+2$$

$$\mathrm{n}=\frac{11}{2}$$

Which is not a whole number. Hence it is not possible to have a polygon, the sum of whose interior angles is 7 right-angles.

(iv) 4500°

Solution:-

Let no. of sides = n

$$(n-2) \times 180^\circ = 4500^\circ$$

$$n - 2 = \frac{4500}{180}$$

n-2=25

n=25+2

n=27

Which is a whole number.

Hence it is possible to have a polygon, the sum of whose interior angles is 4500°.

Question 5.

(i) If all the angles of a hexagon are equal; find the measure of each angle.

Solution:-

No. of sides of hexagon, n=6

Let each angle be =x°

Sum of angles =6x°

$(n-2) \times 180^\circ$ = Sum of angles

$$(6-2) \times 180^\circ = 6x^\circ$$

$$4 \times 180 = 6x$$

$$x = \frac{4 \times 180}{6}$$

x=120°

∴ Each angle of hexagon =120°

(ii) If all the angles of a 14 – sided figure are equal; find the measure of each angle.

Solution:-

No. of sides of polygon, n=14

Let each angle =x°

Sum of angles =14x°

$\because (n-2) \times 180^\circ$ =Sum of angles of polygon

$$\because (14-2) \times 180^\circ = 14x$$

$$12 \times 180^\circ = 14x$$

$$x = \frac{12 \times 180}{14}$$

$$x = \frac{1080}{7}$$

$$x = \left(154\frac{2}{7}\right)^\circ$$

Question 6.

Find the sum of exterior angles obtained on producing, in order, the sides of a polygon with:

(i) 7 sides

(ii) 10 sides

(iii) 250 sides.

(i) Solution:

No. of sides n=7

Sum of interior exterior angles at one vertex =180°

Sum of all interior exterior angles $= 7 \times 180^{\circ}$

=1260°

Sum of interior angles $= (n-2) \times 180^{\circ} = (7-2) \times 180^{\circ} = (7-2) \times 180^{\circ}$

=900°

∴Sum of exterior angles =1260°-900°

=360°

(ii)Solution

No. of sides n=10

Sum of interior and exterior angles $= 10^{\circ} \times 180^{\circ}$

=1800°

But sum of interior angles $= (n-2) \times 180^{\circ} = (10-2) \times 180^{\circ}$

=1440°

∴Sum of exterior angles = 1800 – 1440

Sum of exterior angles = 360°

(iii) Solution:

No. of side n=250

Sum of all interior and exterior angles

$= 250 \times 180^{\circ}$

=45000°

But sum of interior angles $= (n-2) \times 180^{\circ} = (250-2) \times 180^{\circ} = 248 \times 180^{\circ}$

=44640°

∴ Sum of exterior angles =45000-44640

=360°

Question 7 :

The sides of a hexagon are produced in order. If the measures of exterior angles so obtained are

(6x-1)° , (10 x+2)°,(8 x+2)°(9 x-3)°,(5 x+4)° and (12 x+6)°;Find each exterior angle.

Solution:-

Sum of exterior angles of hexagon formed by producing sides of order =360°

∴(6x-1)°+(10x+2)°+(8x+2)°+(9x-3)° +(5x+4)°+(12x+6)°=360°

50x+10°=360°

50x=360°-10°

50x=350°

$$x=\frac{350}{50}$$

x=7

∴ Angles are (6x-1)°:(10x+2)°:(8x+2)°;(9x-3)° (5x+4)° and (12x+6)°

i.e., (6×7-1)° ; (10×7+2)° ; (8×7+2)° ; (9×7-3)° ; (5×7+4)°; (12×7+6)°)

41° ; 72° ; 58° ; 60° ; 39° and 90°

Question 8.

The interior angles of a pentagon are in the ratio 4:5:6:7:5. Find each angle of the pentagon.

Solution:-

Let the interior angles of the pentagon be 4 x, 5 x, 6 x, 7 x, 5 x

Their sum = 4 x+5 x+6 x+7 x+5 x=27 x

Sum of interior angles of polygon $= (n-2) \times 180^\circ = (5-2) \times 180^\circ = 540^\circ$

27x = 540

$x = \frac{540}{27} = 20^\circ$

∴ Angles are

$4 \times 20^\circ = 80^\circ$

$5 \times 20^\circ = 100^\circ$

$6 \times 20^\circ = 120^\circ$

$7 \times 20^\circ = 140^\circ$

$5 \times 20^\circ = 100^\circ$

Question 9

Two angles of a hexagon are 120°and 160°. If the remaining four angles are equal, find each equal angle.

Solution:-

Two angles of a hexagon are 120°, 160°

Let remaining four angles be x, x, x and x.

Their sum = 4 x+280°

But sum of all the interior angles of a hexagon $= (6-2) \times 180^\circ = 4 \times 180^\circ = 720^\circ$

∴ 4x+280°=720°

⇒ 4x=720°-280°=440° ⇒ x=110°

∴Equal angles are 110° (each)

Question 10

The figure, given below, shows a pentagon ABCDE with sides AB and ED parallel to each other, and

<B : <C : <D:5:6:7.

(i) Using formula, find the sum of interior angles of the pentagon.

(ii) Write the value of ∠A+∠E

(iii) Find angles B, C and D .

Solution:-

(i) Sum of interior angles of the pentagon $= (5-2) \times 180^\circ$
$= 3 \times 180^\circ = 540^\circ (\because sum for a polygon of x sides = (x-2) \times 180^\circ$

(ii) Since AB || ED

$\therefore \angle A + \angle E = 180^\circ$

(iii) Let $\angle B = 5x$ $\angle C = 6x$ $\angle D = 7x$

$\therefore 5x + 6x + 7x + 180^\circ = 540^\circ$

$\angle A + \angle E = 180^\circ$ Proved in (ii)

$18x = 540^\circ - 180^\circ$

$\Rightarrow 18x = 360^\circ \Rightarrow x = 20^\circ$

$\because \angle B = 5 \times 20^\circ = 100^\circ, \angle C = 6 \times 20 = 120^\circ \ \angle D = 7 \times 20 = 140^\circ$

Question 11.

Two angles of a polygon are right angles and the remaining are 120° each. Find the number of sides in it.

Solution:-

Let number of sides = n

Sum of interior angles $= (n-2) \times 180^\circ$

=180n-360°

Sum of 2 right angles $= 2 \times 90^\circ$

=180°

∴ Sum of other angles =180n-360°-180°

=180 n-540

No. of vertices at which these angles are formed

=n-2

∴ Each interior angle $= \frac{180n-540}{n-2} \because \quad \frac{180n-540}{n-2} = 120^\circ$

180 n-540=120 n-240

180 n-120 n=-240+540

60 n=300

n = 300/60

n = 5

Question 12.

In a hexagon ABCDEF, side AB is parallel to side FE and ∠B:∠C:∠D:∠E=6:4:2:3.find ∠B and ∠D.

Solution:-

Given: Hexagon ABCDEF in which AB II EF

and ∠B:∠C:∠D:∠E=6:4:2:3

To find : ∠B and ∠D

Proof: No of sides n=6

$\therefore$ Sum of interior angles $= (n-2)\times 180^\circ = (6-2)\times 180^\circ = 720^\circ$

$\because$AB∥EF (Given)

$\because \mathrm{A} + \angle\mathrm{F} = 180^\circ$
But $\angle A + \angle B + \angle C + \angle D + \angle E + \angle F = 720^\circ$

(proved)

$\angle B + \angle C + \angle D + \angle E + \angle 180^\circ = 720^\circ \because \angle B + \angle C + \angle D + \angle E = 720^\circ - 180^\circ = 540^\circ$
Ratio =6:4:2:3

Sum of parts =6+4+2+3=15

$\because \angle B = \frac{6}{15} \times 540 = 216^\circ \ \angle\mathrm{D} = \frac{2}{15} \times 540^\circ = 72^\circ$
Hence $\angle B = 216^\circ : \angle D = 72^\circ$

Question 13.

the angles of a hexagon are x+10°,2x+20°,2x-20°,3x-50°,x+40° and x+20°. Find x.

Solution:-

Angles of a hexagon are x+10°, 2x+20°,

2x-20°, 3x-50°,x+40° and x+20°

$\therefore$ But sum of angles of a hexagon $= (x-2)\times 180^\circ = (6-2)\times 180^\circ = 4\times 180^\circ = 720^\circ$

But sum=x+10+2x+20°+2x-20°+3x-50°+x+40+x+20

=10x+90-70=10x+20

∴10x+20=720°⇒10x=720-20=700

$\Rightarrow x = \frac{700^\circ}{10} = 70^\circ$
∴x=70°

Question 14.

In a pentagon, two angles are 40° and 60° and the rest are in the ratio 1:3:7. Find the biggest angle of the pentagon.

Solution:-

In a pentagon, two angles are 40° and 60° Sum of remaining 3 angles $= 3 \times 180^{\circ}$

=540°-40°-60°=540°-100°=440°

Ratio in these 3 angles =1:3:7

Sum of ratios =1+3+7=11

Biggest angle $= \frac{440 \times 7}{11} = 280^{\circ}$

Question 15

Fill in the blanks:

In case of regular polygon, with:

No. of sides	Each exterior angle	Each interior angle
(i).....8.....	....	....
(ii)....12....	....	....
(iii)...........	......72°.....	....
(iv)......	......45°....	....
(v).......	....	......150°.....
(vi)..........	....	......140°.....

Solution:-

No. Of sides	Each exterior angle	Each interior angle
(i)8	45°	135°
(ii)12	30°	150°
(iii)5	72°	108°
(iv)8	45°	135°
(v)12	30°	150°
(vi)9	40°	140°

Explanation:

(i) Each exterior angle $= \frac{360^\circ}{8} = 45^\circ$

Each interior angle=180°-45°-135°

(ii) Each exterior angle $= \frac{360^\circ}{12} = 30^\circ$

Each interior angle =180°-30°=150°

(iii) Since each exterior =72°

∴ Number of sides $= \frac{360^\circ}{72^\circ} = 5$

Also interior angle =180°-72°=108°

(iv) Since each exterior angle =45°

∴ Number of sides $= \frac{360^\circ}{45^\circ} = 8$

Interior angle =180°-45°=135°

(v) Since interior angle =150°

∴ Exterior angle =180°-150°=30°

∴ Number of sides $= \frac{360^\circ}{30^\circ} = 12$

(vi) Since interior angle =140°

∴ Exterior angle =180°-140°=40°

∴ Number of sides $= \frac{360^\circ}{40^\circ} = 9$

Benefits of ICSE Class 8 Maths Selina Solutions for Chapter 16 Understanding Shapes

Clarity and Explanation: These Solutions provide clear explanations of geometric concepts, making it easier for students to understand shapes and their properties.

Step-by-Step Guidance: They provide step-by-step solutions that help students navigate through the calculations of perimeter, area, and other geometric measurements.

Illustrative Examples: Solutions include practical examples that illustrate how to classify polygons and understand symmetry, aiding better comprehension.

Preparation for Exams: By using these solutions students can effectively prepare for exams by practicing and mastering key geometric principles.

Enhanced Problem-Solving Skills: They help in developing problem-solving skills by applying mathematical formulas and concepts to solve geometry-related problems.

Builds Confidence: Detailed solutions build confidence among students as they gain proficiency in handling geometric shapes and their applications.