

NCERT SOLUTIONS CLASS-8 MATHS

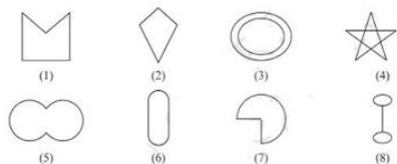
CHAPTER-3 EXERCISE-3.1

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Q1) Given below are some shapes.

Identify the below diagrams based on the following category

- (a) Concave polygon (b) Simple curve (c) Convex polygon
(d) Simple closed curve (e) Polygon



Ans.)

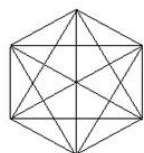
- (a) Concave polygon: 1
(b) Simple curve: 1, 2, 5, 6 and 7
(c) Convex polygon: 2
(d) Simple closed curve: 1, 2, 5, 6 and 7
(e) Polygon: 1 and 2

Q2) Identify the number of diagonals does each figure have?

- (a) Regular hexagon (b) Triangle (c) Convex quadrilateral

Ans.)

- (a) Regular hexagon



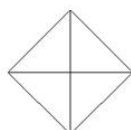
It has 9 diagonals

- (b) Triangle



It has no diagonals.

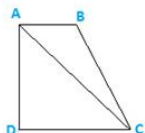
- (c) Convex quadrilateral



It has 2 diagonals.

Q3) In a convex quadrilateral, determine the sum of measures of angles? If the quadrilateral is not convex, will the property be the same?

Ans.)

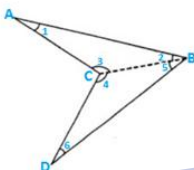


Let the sides of the quadrilateral be ABCD. We can see that the quadrilateral is formed by the combination of 2 triangles that is $\triangle ADC$ and $\triangle ABC$.

Since, we are aware that the total sum of the interior angles of triangle will be 180°

Thus, the sum of the interior angles of both the triangles are 180°

$$+180^\circ = 360^\circ$$



Let us consider another quadrilateral ABCD which is not convex and join BC which divides it into two triangles $\triangle BCD$ and $\triangle ABC$.

In $\triangle ABC$,

$$\angle 1 + \angle 2 + \angle 3 = 180^\circ \quad (\text{angle sum property of triangle})$$

In $\triangle BCD$,

$$\angle 4 + \angle 5 + \angle 6 = 180^\circ \quad (\text{angle sum property of triangle})$$

$$\text{Therefore, } \angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 = 180^\circ + 180^\circ$$

$$\Rightarrow \angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 = 360^\circ$$

$$\Rightarrow \angle A + \angle B + \angle C + \angle D = 360^\circ$$

Thus, this property is valid only if the quadrilateral is not convex.

Q4) Check the table (Each diagram is separated into triangles and the sum of the angles is taken out from that)

Figure				
Side	3	4	5	6
Angle sum	180°	$2 \times 180^\circ$ $= (4-2) \times 180^\circ$	$3 \times 180^\circ$ $= (5-2) \times 180^\circ$	$4 \times 180^\circ$ $= (6-2) \times 180^\circ$

Find out the angle sum of convex polygon with following number of sides?

(a)n (b)11 (c)9 (d)7

Ans.

(a)n

Given $n = n$

Therefore, angle sum = $(n - 2) \times 180^\circ$

(b)11

Given, $n=11$

Therefore, angle sum = $(11 - 2) \times 180^\circ = 1620^\circ$

(c)9

Given, $n=9$

Therefore, angle sum = $(9 - 2) \times 180^\circ = 1260^\circ$

(d)7

Given, $n=7$

Therefore, angle sum = $(7 - 2) \times 180^\circ = 900^\circ$

Q5) What do mean by a regular polygon?

Tell the name of the regular polygon which has

(i) 6 sides (ii) 3 sides (iii) 4 sides

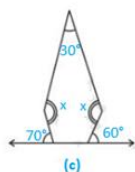
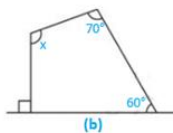
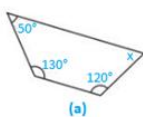
Ans.) A polygon which has sides of equal length and the angles whose measures are equal is called a regular polygon.

(i) Regular polygon which has 6 sides is called regular hexagon.

(ii) Regular polygon which has 3 sides is called equilateral triangle.

(iii) Regular polygon which has 4 sides is square.

Q6) Calculate the measure of the angle x in the figures given below:



Ans.)

(a) The diagram has 4 sides. Hence, Quadrilateral.

Total sum of the angles of quadrilateral = 360°

50° + 130° + 120° + x = 360°

$$50^\circ + 130^\circ + 120^\circ + x = 360^\circ \quad 300^\circ + x = 360^\circ \quad x = 360^\circ - 300^\circ = 60^\circ$$

(b) The diagram is having four sides. It's a quadrilateral.

And, one side is 90°

Sum of the interior angles of the quadrilateral = 360°

$$90^\circ + 70^\circ + 60^\circ + x = 360^\circ \quad 220^\circ + x = 360^\circ \quad x = 360^\circ - 220^\circ = 140^\circ$$

(c) There are 5 sides in the figure. It's a pentagon.

Sum of the interior angles of pentagon = 540°

Angles which are at the bottom are a linear pair

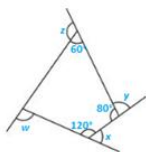
$$\text{Hence, } 180^\circ - 70^\circ = 110^\circ$$

$$180^\circ - 60^\circ = 120^\circ \quad 30^\circ + 110^\circ + 120^\circ + x + x = 540^\circ \quad 260^\circ + 2x = 540^\circ \quad 2x = 540^\circ - 260^\circ = 280^\circ \\ x = 280^\circ / 2 = 140^\circ$$

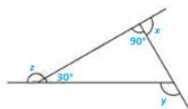
(d) The diagram given has five equal sides. Therefore a regular pentagon. Thus, all interior angles are equal.

$$5x = 540^\circ \quad x = 540^\circ / 5 \quad x = 108^\circ$$

Q7) (a) Find $x + y + z + w$



(b) Find $x + y + z$



Ans.

(a) Sum of all interior angles of quadrilateral = 360°

$$\text{Single side of quadrilateral} = 360^\circ - (60^\circ + 80^\circ + 120^\circ) = 360^\circ - 260^\circ$$

$$x + 120^\circ = 180^\circ \Rightarrow 180^\circ - 120^\circ = 60^\circ \quad y + 80^\circ = 180^\circ \Rightarrow y = 180^\circ - 80^\circ = 100^\circ$$

$$z + 60^\circ = 180^\circ \Rightarrow z = 180^\circ - 60^\circ = 120^\circ \quad w + 100^\circ = 180^\circ \Rightarrow w = 180^\circ - 100^\circ = 80^\circ$$

$$x + y + z + w = 60^\circ + 100^\circ + 120^\circ + 80^\circ = 360^\circ$$

(b) Sum of interior angles of triangle = 180°

$$x + y + z = 180^\circ - (60^\circ + 80^\circ) = 40^\circ$$

$$\text{Single side of triangle} = 180^\circ - (90^\circ + 30^\circ) = 60^\circ$$

$$x + 90^\circ = 180^\circ \Rightarrow x = 180^\circ - 90^\circ = 90^\circ \quad y + 60^\circ = 180^\circ \Rightarrow y = 180^\circ - 60^\circ = 120^\circ$$

$$z + 30^\circ = 180^\circ \Rightarrow z = 180^\circ - 30^\circ = 150^\circ \quad x + y + z = 90^\circ + 120^\circ + 150^\circ = 360^\circ$$

