Q1. Given here are some figures:

(1)   (2)   (3)   (4)

(5)   (6)   (7)   (8)
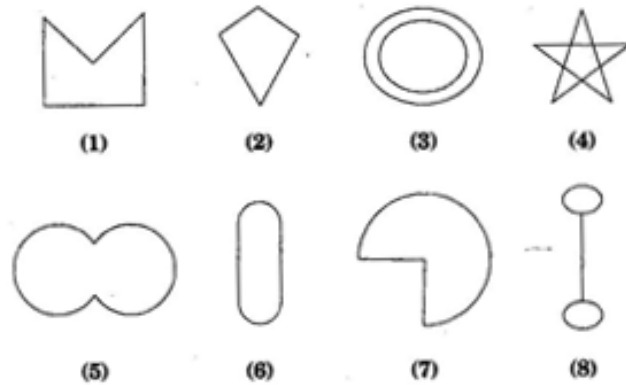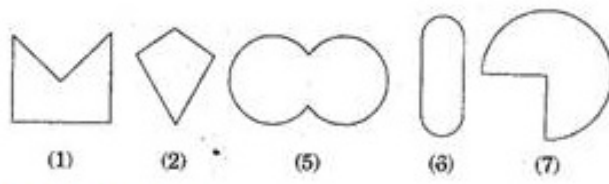
Classify each of them on the basis of the following:

(a) Simple curve

(b) Simple closed curve

(c) Polygon

(d) Convex polygon

(e) Concave polygon

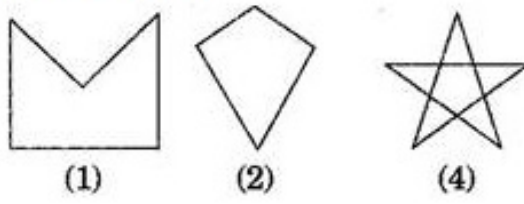**Ans:** (a) Simple curve

(1)   (2)   (5)   (6)   (7)
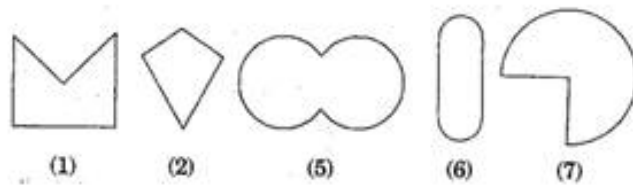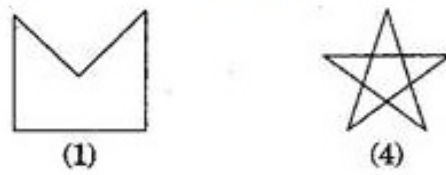
(b) Simple closed curve

(c) Polygons

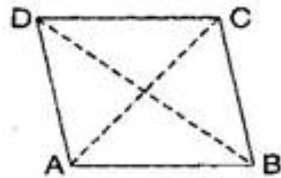(d) Convex polygons

(e) Concave polygon

Q2. How many diagonals does each of the following have?

(a) A convex quadrilateral
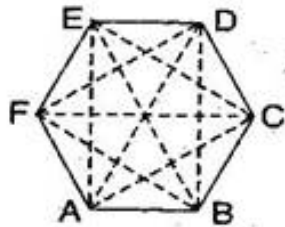
(b) A regular hexagon

(c) A triangle

Ans: (a) A convex quadrilateral has two diagonals.

Here, AC and BD are two diagonals.

(b) A regular hexagon has 9 diagonals.

Here, diagonals are AD, AE, BD, BE, FC, FB, AC, EC and FD.

(c) A triangle has no diagonal.

Q3. What is the sum of the measures of the angles of a convex quadrilateral? Will this property hold if the quadrilateral is not convex? (Make a non-convex quadrilateral and try)

Ans: Let ABCD is a convex quadrilateral, then we draw a diagonal AC which divides the quadrilateral in two triangles.

$\angle A + B + \angle C + \angle D$

$= \angle 1 + \angle 6 + \angle 5 + \angle 4 + \angle 3 + \angle 2$

$= (\angle 1 + \angle 2 + \angle 3) + (\angle 4 + \angle 5 + \angle 6)$
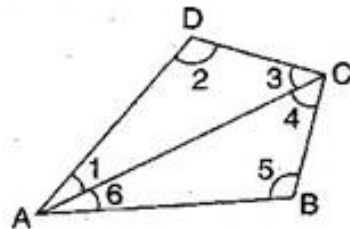
$= 180° + 180°$

[By Angle sum property of triangle]

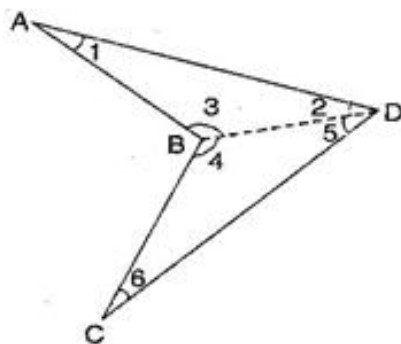$= 360°$

Hence, the sum of measures of the triangles of a convex quadrilateral is $360°$.

Yes, if quadrilateral is not convex then, this property will also be applied.

Let ABCD is a non-convex quadrilateral and join

BD, which also divides the quadrilateral in two triangles.

Using angle sum property of triangle,

In $\triangle ABD$, $\angle 1 + \angle 2 + \angle 3 = 180°$ ....(i)

In $\triangle BDC$, $\angle 4 + \angle 5 + \angle 6 = 180°$ ....(i)

Adding eq. (i) and (ii),

$\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 = 360°$

$\Rightarrow \angle 1 + \angle 2 + (\angle 3 + \angle 4) + \angle 5 + \angle 6$

$= 360°$

$\Rightarrow \angle A + \angle B + \angle C + \angle D = 360°$

Hence proved.

Q4. Examine the table. (Each figure is divided into triangles and the sum of the angles deduced from that.)

Figure				
Side	3	4	5	6
Angle sum	$1 \times 180°$ $= (3-2) \times 180°$	$2 \times 180°$ $= (4-2) \times 180°$	$3 \times 180°$ $= (5-2) \times 180°$	$4 \times 180°$ $= (6-2) \times 180°$

What can you say about the angle sum of a convex polygon with number of sides?

Ans: (a) When $n = 7$, then

Angle sum of a polygon = $(n-2) \times 180°$

$= (7-2) \times 180° = 5 \times 180° = 900°$

(b) When $n = 8$, then

Angle sum of a polygon = $(n-2) \times 180°$

$= (8-2) \times 180° = 6 \times 180° = 1080°$

(c) When $n = 10$, then

Angle sum of a polygon = $(n-2) \times 180°$

$= (10-2) \times 180° = 8 \times 180° = 1440°$

(d) When $n = n$, then

Angle sum of a polygon = $(n-2) \times 180°$

Q5. What is a regular polygon? State the name of a regular polygon of:

(a) 3 sides

(b) 4 sides

(c) 6 sides

Ans: A regular polygon: A polygon having all sides of equal length and the interior angles of equal size is known as regular polygon.

 (i) 3 sides

Polygon having three sides is called a **triangle**.

(ii) 4 sides

Polygon having four sides is called a **quadrilateral**.

(iii) 6 sides

Polygon having six sides is called a **hexagon**.