15. Understanding Shapes-I (Polygons)

Exercise 15.1

1. Question

Draw rough diagram to illustrate the following:

(i) Open curve

(ii) Closed curve

Answer

(i) Open curve

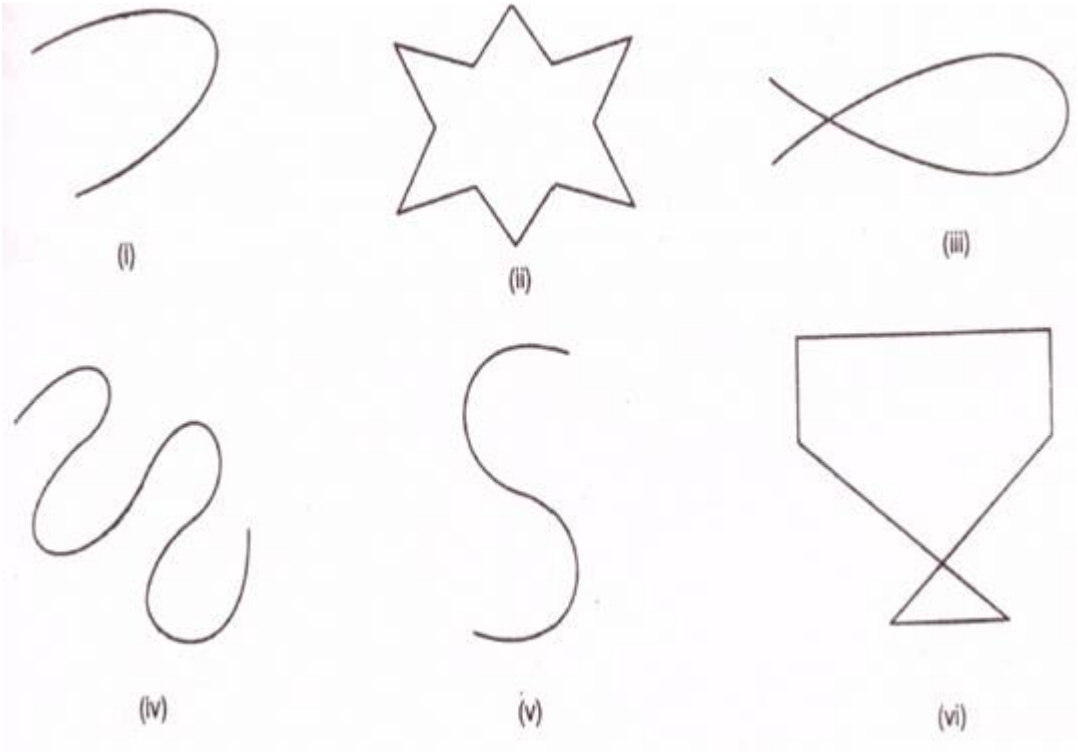
Rough diagram of open curve:

(ii) Closed curve

Rough diagram of close curve:

2. Question

Classify the following curves as open or closed:



Answer

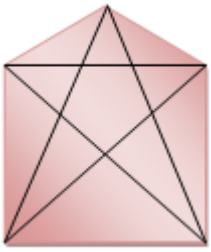
Closed curves: (ii), (iii) and (vi)

Open curves: (i), (iv) and (v)

3. Question

Draw a polygon and shade its interior. Also draw its diagonals, if any.

Answer



4. Question

Illustrate, if possible each one of the following with a rough diagram.

(i) A closed curve that is not a polygon.

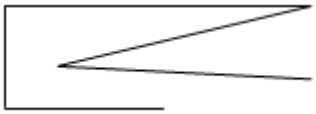
(ii) An open curve made up entirely of line segments.

(iii) A polygon with two sides.

Answer

(i) A closed curve that is not a polygon.

(ii) An open curve made up entirely of line segments.



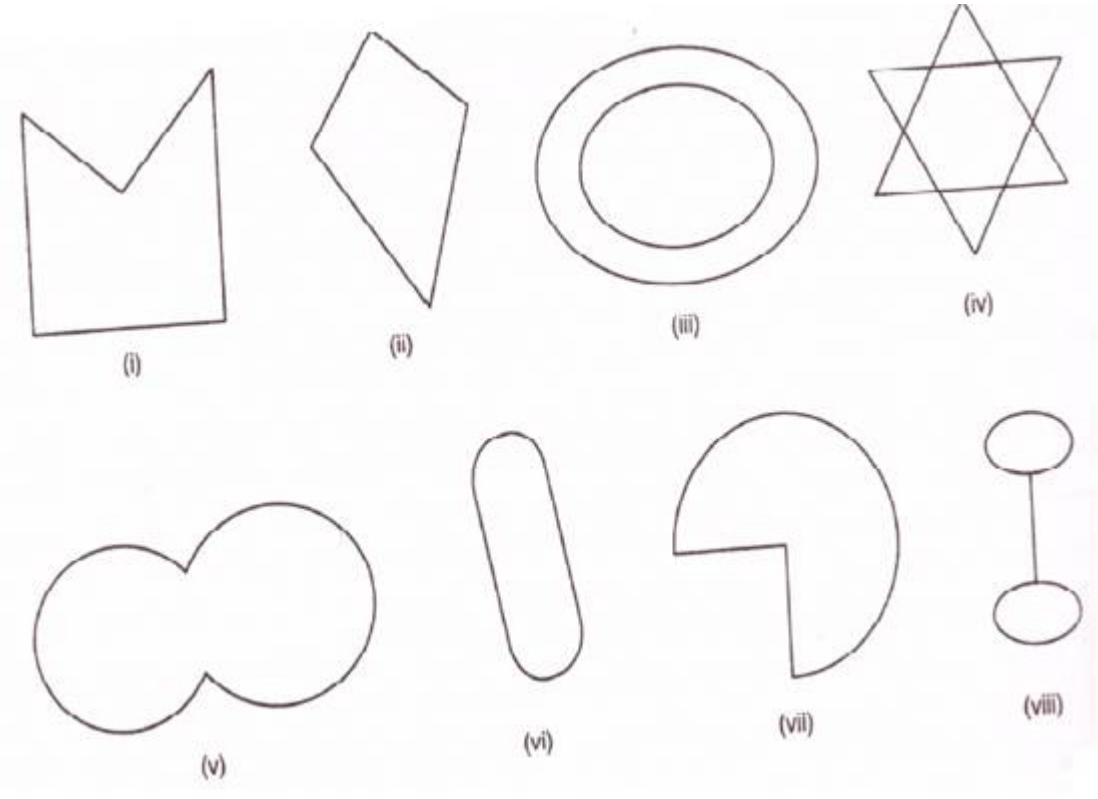
(iii) A polygon with two sides.

A polygon with two sides is not possible.

As we know that a polygon has minimum three sides.

5. Question

Following are some figures: Classify each of these figures on the basis of the following:



(i) Simple curve (ii) Simple closed curve

(iii) Polygon (iv) Convex polygon

(v) Concave polygon (vi) Not a curve

Answer

(i) Simple curve

Fig (i), (ii), (v), (vi) and (vii) are simple curves.

(ii) Simple closed curve

Fig (i), (ii), (v), (vi) and (vii) are simple closed curves.

(iii) Polygon

Fig (i) and (ii are polygons. Polygons are minimum three sided enclosed figure.

(iv) Convex polygon

Fig (ii) is a convex polygon. In a convex polygon all the vertices are pointing outwards.

(v) Concave polygon

Fig (i) is a concave polygon. In a concave polygon all the vertices are not pointing outwards.

(vi) Not a curve

Fig (viii) is not a curve.

6. Question

How many diagonals does each of the following have?

(i) A convex quadrilateral

(ii) A regular hexagon

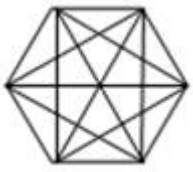
(iii) A triangle

Answer

(i) A convex quadrilateral

Convex quadrilateral has two diagonals.

(ii) A regular hexagon



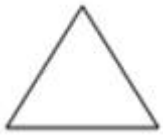
An n-sided convex polygon has $\frac{n(n-3)}{2}$ diagonals.

∴Applying the above relation for hexagon:

Number of diagonals = $\frac{6(6-3)}{2} = \frac{18}{2} = 9$

Regular Hexagon has 9 diagonals.

(iii) A triangle



An n-sided convex polygon has $\frac{n(n-3)}{2}$ diagonals.

∴Applying the above relation for triangle:

Number of diagonals = $\frac{3(3-3)}{2} = 0$

Therefore a triangle has no diagonal

7. Question

What is a regular polygon? State the name of a regular polygon of

(i) 3 sides

(ii) 4 sides

(iii) 6 sides

Answer

(i) 3 sides

Regular Polygon: A regular polygon is an enclosed figure. In a regular polygon minimum sides are three.

(ii) 4 sides

A regular polygon with 4 sides is known as quadrilateral.

(iii) 6 sides

A regular polygon with 6 sides is known as hexagon.