Chapter - 15

Understanding Shapes - I

(Polygons)

Exercise 15.1

Q.1 Draw Rough diagrams to illustrate the following.

(i) open curve (ii) closed curve.

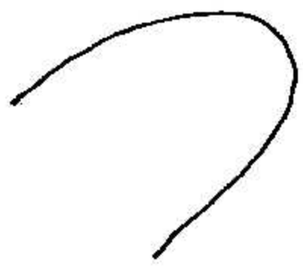
Sol: open curves: A curve which does not cut itself is called an open curve. Following are examples of open curves



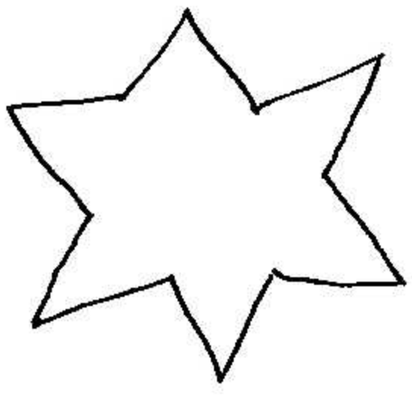
closed curves: A curve which cuts itself is called a closed curve.



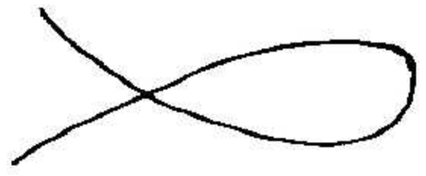
Q.2 Classify the following curves as open or closed.



(i)

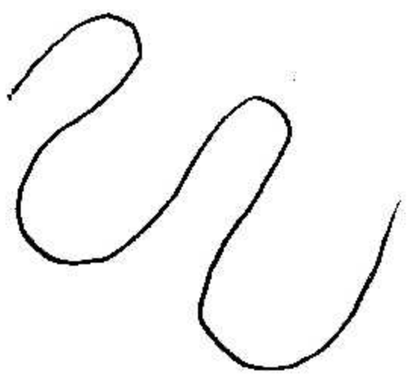


(ii)



(iii)

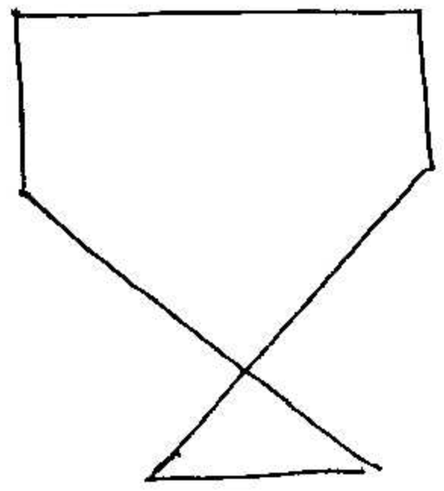
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(iv)



(v)



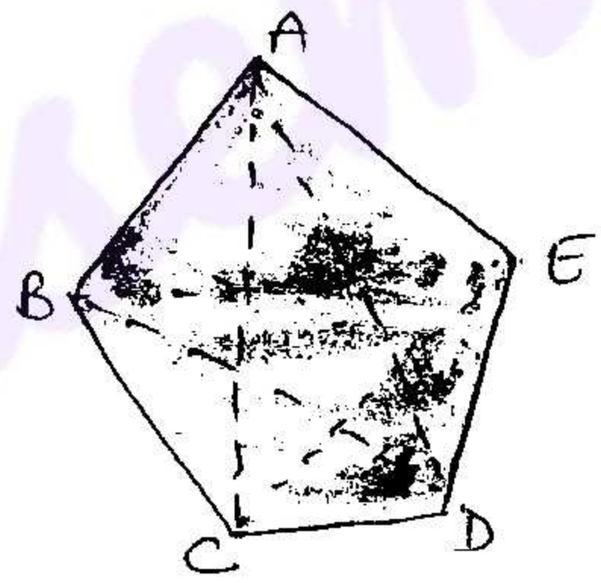
(vi)

Solution: (i) open (ii) closed (iii) closed

(iv) open (v) open (vi) closed.

Q.3 Draw a polygon and shade its interior. Also draw and its diagonals.

Solution:



There AC, AD, BE, BD and CE are diagonals.

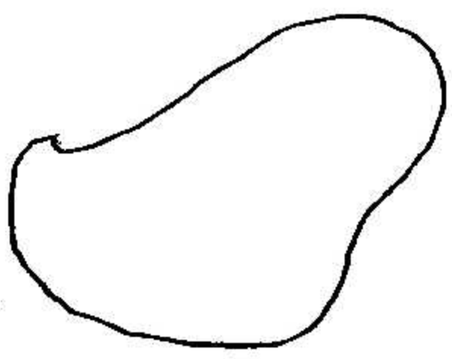
Q.4 Illustrate, if possible, each one of the following with a rough diagram

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

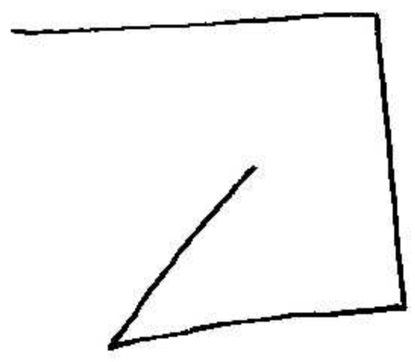
(ii) An open curve made up entirely of line segments.

(iii) A polygon with two sides.

Sol: (i)



(ii)



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(iii) A polygon with two sides is not possible.

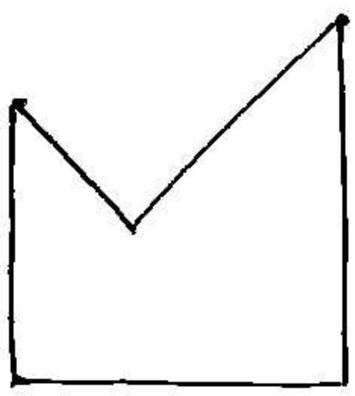
Q 5 Following are some figures : Classify each of these figures on the basis of the following.

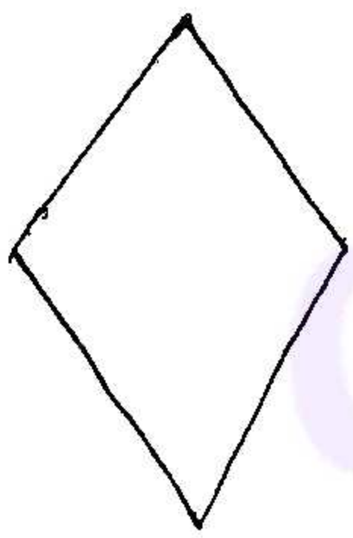
(I) Simple curve (II) Simple closed curve

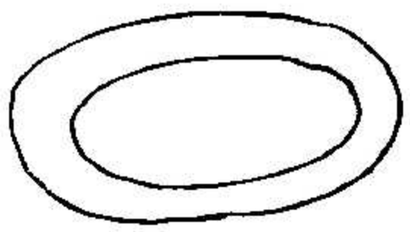
(III) Polygon (IV) Convex polygon

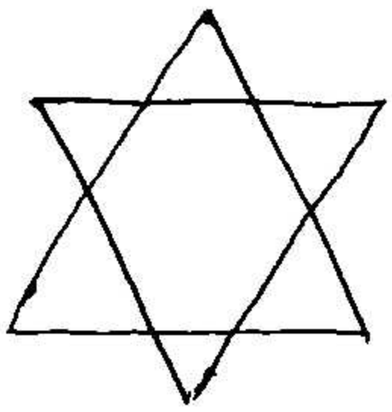
(V) Concave polygon (VI) not a curve.

Sol :

(I)  : Simple closed curve and polygon.

(II)  : Simple closed curve and convex polygon.

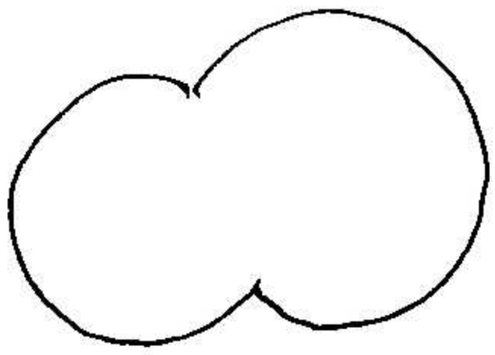
(III)  : Not a curve, not a polygon

(IV)  : Not a curve

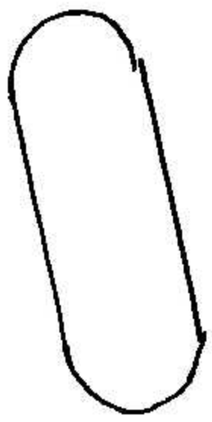
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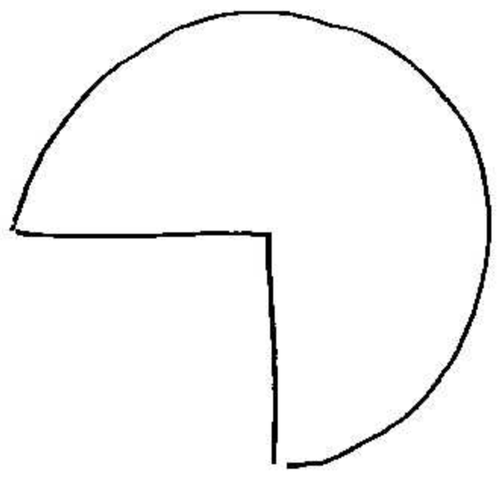
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(v) 

Simple closed curve but not a polygen.

(vi) 

Simple closed curve but not a polygen.

(vii) 

Simple closed curve but not a polygen.

(viii) 

Simple closed curve but not a polygen

Q6 How many diagonals does each of the following have?

(i) A convex quadrilateral (ii) A regular hexagon

(iii) A triangle.

Sol: (i) Number of diagonals of n sided polygon

$$= \frac{n(n-3)}{2}$$

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Sol: for quadrilateral ($n=4$)

(i) $$\text{Diagonals} = \frac{n(n-3)}{2} = \frac{4(4-3)}{2} = \frac{4\times 1}{2} = 2$$

(ii) For hexagon ($n=6$)

$$\text{Diagonals} = \frac{n(n-3)}{2} = \frac{6(6-3)}{2} = \frac{\overset{3}{\cancel{6}}\times 3}{\cancel{2}}$$

$$= 9$$

(iii) A triangle has no diagonals.

Q.7: What is a regular polygon? State the name of a regular polygon of

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

Sol: Regular polygon: A polygon in which all sides are equal and also all angles are equal.

(i) 3 sides regular polygon → Equilateral triangle.

(ii) 4 sided regular polygon → Square

(iii) 6 sided → Regular hexagon.

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