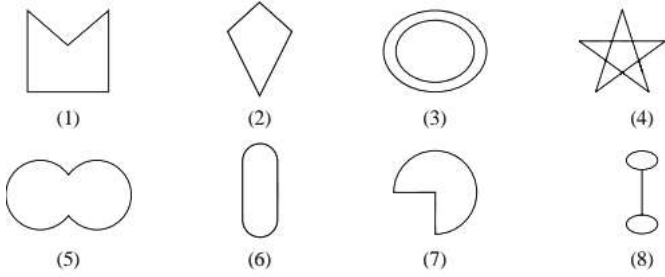


#463354

Topic: Polygons



Given here are some figures:

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

Solution

A curve is said to be simple if it does not cross itself.

- (a) Simple curve \rightarrow 1, 2, 5, 6, 7

A simple closed curve is that curve which forms a path which starts and ends at the same point.

- (b) Simple closed curve \rightarrow 1, 2, 5, 6, 7

A polygon is a two dimensional closed figure which consists of sides and vertices.

- (c) Polygon \rightarrow 1, 2

A polygon in which the measure of each interior angle is less than 180° is called as a convex polygon.

- (d) Convex polygon \rightarrow 2

A polygon in which the measure of one interior angle is greater than 180° is called as a concave polygon.

- (e) Concave polygon \rightarrow 1

#463355

Topic: Polygons

How many diagonals does each of the following have?

- (a) A convex quadrilateral
- (b) A regular hexagon
- (c) A triangle

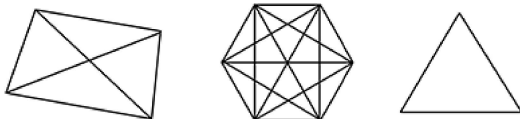
Solution

- (a) There are 2 diagonals in a convex quadrilateral.

- (b) There are 9 diagonals in a regular hexagon.

- (c) A triangle does not have any diagonal in it.

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



#463385

Topic: Polygons

State whether True or False.

- (a) All rectangles are squares.
- (b) All rhombuses are parallelograms.
- (c) All squares are rhombuses and also rectangles.
- (d) All squares are not parallelograms.
- (e) All kites are rhombuses.
- (f) All rhombuses are kites.
- (g) All parallelograms are trapeziums.
- (h) All squares are trapeziums.

Solution

(a) False

All squares are rectangles.

(All sides of rectangle are not equal).

(b) True

Opposite sides are equal and parallel.

(c) True

All sides of the rhombus are equal

\therefore All squares are rhombuses.

All squares are also rectangles as each internal angle measure 90°

(d) False

All squares are parallelogram as opposite sides are equal and parallel.

(e) False

Kite has different lengths.

(f) True

Rhombus also has two distinct consecutive pairs of sides of equal length.

(g) True

Parallelogram pair of parallel sides.

(h) True

All squares have a pair of parallel sides.

#463386

Topic: Polygons

Identify all the quadrilaterals that have

- (a) four sides of equal length
- (b) four right angles

Solution

(a) Quadrilaterals that have four sides of equal length are Rhombus and squares.

(b) Quadrilaterals that have four right angles are Rectangle and squares.

#463387

Topic: Polygons

Explain how a square is:

- (i) a quadrilateral (ii) a parallelogram (iii) a rhombus (iv) a rectangle

Solution

- (a) A quadrilateral has four sides
- (b) A parallelogram's opposite sides are parallel.
- (c) A rhombus's four sides are of same length
- (d) A rectangle's interior angles are equal to 90° .

All of these properties are followed by Square.

#463388

Topic: Polygons

Name the quadrilaterals whose diagonals.

- (i) bisect each other
- (ii) are perpendicular bisectors of each other
- (iii) are equal

Solution

- (i) Bisects each other: Diagonals of a parallelogram, rhombus, square and rectangle.
- (ii) Are perpendicular bisectors of each other: Diagonals of rhombus and square \rightarrow perpendicular bisectors.
- (iii) Are equal: Diagonals of rectangle and square are equal.

#463625

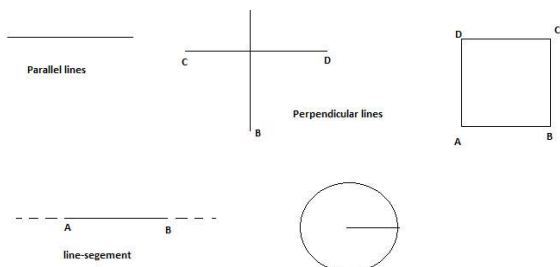
Topic: Introduction

Give a definition for each of the following terms. Are there other terms that need to be defined first? What are they, and how might you define them?

- (i) parallel lines
- (ii) perpendicular lines
- (iii) line segment
- (iv) radius of a circle
- (v) square

Solution

- (i) Parallel line - Two lines are said to be parallel when (a) They never meet or never intersect each other even if they are extended to the infinity. (b) they coplanar.
- (ii) Perpendicular lines - Two lines AB and CD lying the same plane are said to be perpendicular, if they form a right angle. We write $AB \perp CD$
- (iii) Line segment - A line-segment is a part of line. When two distinct points, say A and B on a line are given, then the part of this line with end-points A and B is called the line segment.
- (iv) Radius of a circle - The distance from the centre to a point on the circle is called the radius of the circle. In the following figure OP is the radius.
- (v) Square - A quadrilateral in which all the four angles are right angles and four sides are equal is called a square. $ABCD$ is a square.



#464033

Topic: Introduction

Draw different pairs of circles. How many points does each pair have in common? What is the maximum number of common points?

Solution

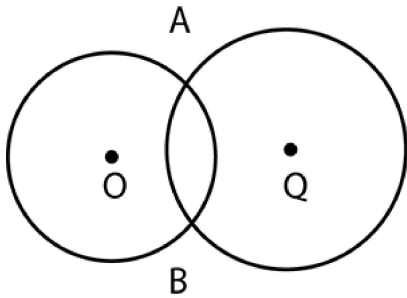
As we can see from the figure, that two circles have two points in common.

Two circles cannot intersect each other at more than two points.

Let us assume that two circles cut each other at three points.

But we already know that through three points only one circle can pass.

So, two circles if intersect each other will intersect at maximum two points.



#464034

Topic: Introduction

Suppose you are given a circle. Give a construction to find its centre.

Solution

1. Let us consider any three points P , Q and R on the circumference of the circle.
2. Make chords PQ and QR by joining P , Q and R .
3. Draw AB and CD , the perpendicular bisectors of PQ and QR . They will intersect each other at O .
4. O will be the center of the circle.

