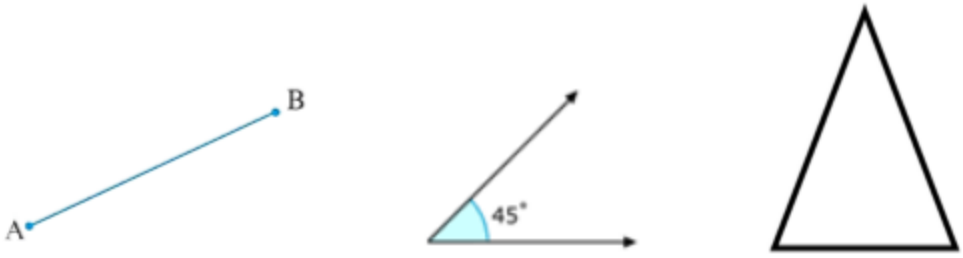
Board – CBSE	Class – 6	Topic – INETGERS

Introduction to Understanding Elementary Shapes

There are so many shapes around us made up of lines and curves like line segments, angles, triangles, polygons, and circles, etc. These shapes are of different sizes and measures.

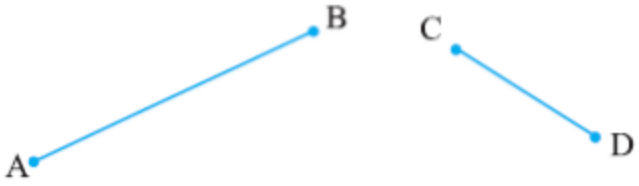


Measuring Line Segments

A line segment is a fixed part of the line, so it must have some length. We can compare any line segment on the basis of its length.

1. Comparison by Observation

We can tell which line segment is greater than the other just by observing the two line segments but it is not the best method to determine the length.



Here we can clearly say that AB > CD but sometimes it is difficult to tell which one is greater.

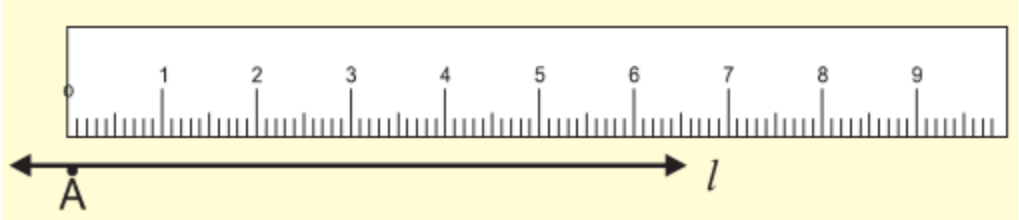
2. Comparison by Tracing

In this method we have to trace one line on paper then put the traced line segment on the other line to check which one is greater.

But this is a difficult method because every time to measure the different sizes of line segments we have to make a separate line segment.

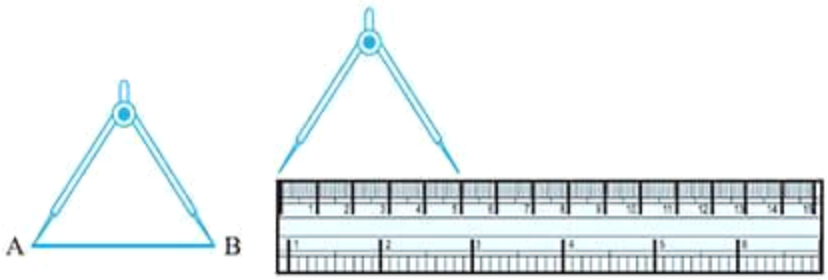
3. Comparison using Ruler and a Divider

We can use a ruler to measure the length of a line segment.



Put the zero mark at point A and then move toward l to measure the length of the line segment, but it may have some errors on the basis of the thickness of the ruler.

This could be made accurate by using a Divider.



a. Put the one end of the divider on point A and open it to put another end on point B.
b. Now pick up the divider without disturbing the opening and place it on the ruler so that one end lies on "0".
c. Read the marking on the other end and we can compare the two lines.

Angles – "Right" and "Straight"

We can understand the concept of right and straight angles by directions.

There are four directions-North, South, East, and West.

When we move from North to East then it forms an angle of 90° which is known as a Right Angle.

When we move from North to South then it forms an angle of 180° which is known as a Straight Angle.

When we move four right angles in the same direction then we reach the same position again i.e. if we make a clockwise turn from North to reach to North again then it forms an angle of 360° which is called a Complete Angle. This is called one revolution.

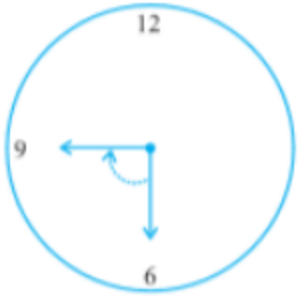
In a clock, there are two hands i.e. minute hand and hour hand, which move clockwise every minute. When the clock hand moves from one position to another then turns through an angle.

When a hand starts from 12 and reaches 12 again then it is said to complete a revolution.

From 12 to 6

$\frac{1}{2}$ revolution

2 right angles



From 6 to 9

$\frac{1}{4}$ revolution

1 right angle

From 1 to 10

$\frac{3}{4}$ revolution

3 right angles

Acute, Obtuse, and Reflex Angles

There are so many other types of angles that are not right or straight angles.

Angles	Meaning	Image

Acute Angle	An angle less than the right angle is called an Acute angle.	
Obtuse Angle	An angle greater than a right angle and lesser than a straight angle is called an Obtuse angle.	
Reflex Angle	An angle greater than the straight angle is called Reflex angle.	

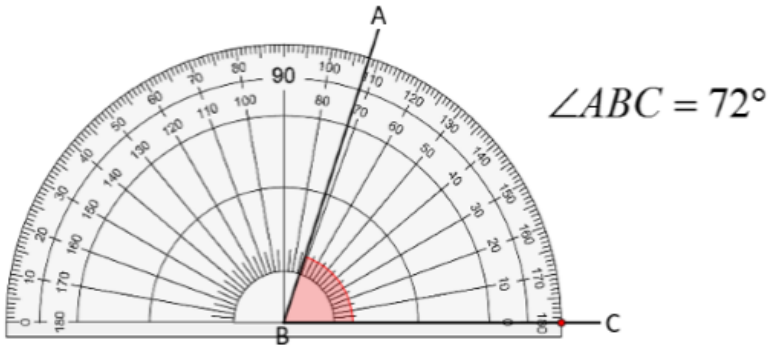
Measuring Angles

By observing an angle we can only get the type of angle but to compare it properly we need to measure it.

An angle is measured in the “degree”. One complete revolution is divided into 360 equal parts so each part is one degree. We write it as 360° and read as “three hundred sixty degrees".

We can measure the angle using a ready-to-use device called Protractor.

It has a curved edge that is divided into 180 equal parts. It starts from 0° to 180° from right to left and vice versa.



$\angle ABC = 72°$

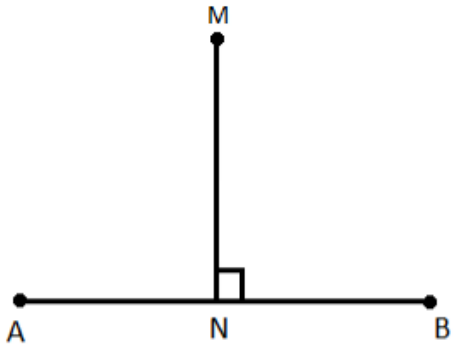
To measure an angle using protractor-

- Place the protractor on the angle in such a way that the midpoint of the protractor coincides with the vertex B of the angle.
- Adjust it so that line BC comes on the straight line of the protractor.
- Read the scale which starts from 0° coinciding with the line BC.
- The point where the line AB comes on the protractor is the degree measure of the angle.

Hence, $\angle ABC = 72°$

Perpendicular Lines

If two lines intersect with each other and form an angle of 90° then they must be perpendicular to each other.



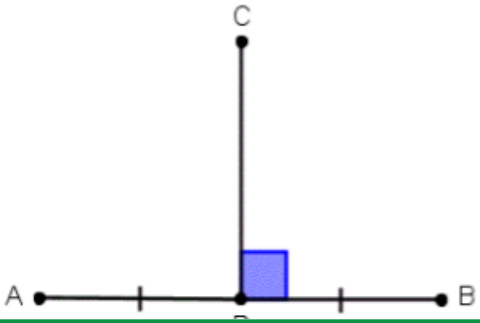
Here AB and MN are intersecting at point N and form a right angle. We will write it as

$AB \perp MN$ or $MN \perp AB$.

It is read as AB is perpendicular to MN or MN is perpendicular to AB.

Perpendicular Bisector

If a perpendicular divides another line into two equal parts then it is said to be a perpendicular bisector of that line.

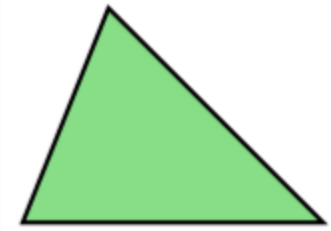
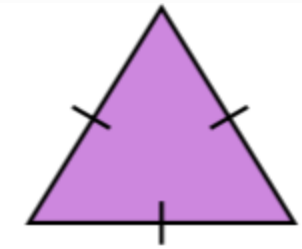


Here, CD is the perpendicular bisector of AB as it divides AB into two equal parts i.e. AD = DB.

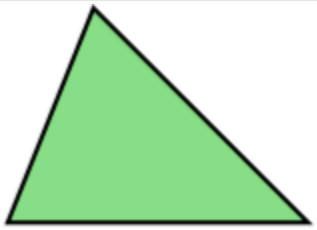
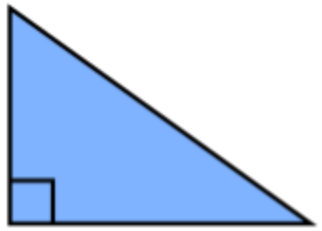
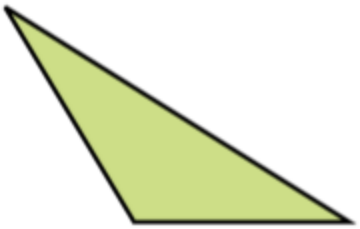
Classification of Triangles

Triangle is a polygon with three sides. It is the polygon with the least number of sides. Every triangle is of a different size and shape. We classify them on the basis of their sides and angles.

1. Classification on the basis of sides

Triangle	Meaning	Image
Scalene	If all the sides are different then it is called a Scalene triangle.	
Isosceles	If two sides are equal then it is called an Isosceles triangle.	
Equilateral	If all the sides are equal then it is called an Equilateral triangle.	

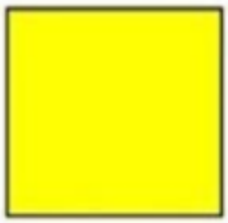
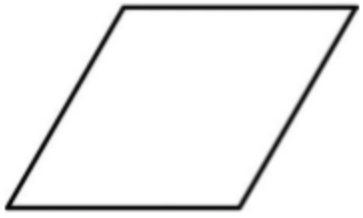
2. Classification on the basis of Angles

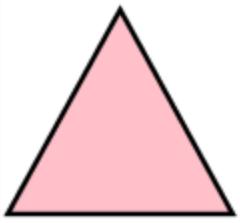
Triangle	Meaning	Image
Acute Angled Triangle	If all the angles are less than 90° then this is known as an acute-angled triangle.	
Right Angled Triangle	If one of the angles is 90° then it is called known as a right-angled triangle.	
Obtuse-angled Triangle	If one of the angles of the triangle is an obtuse angle then it is known as an Obtuse angled triangle.	

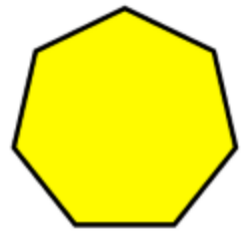
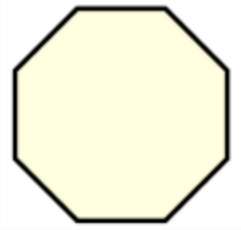
Quadrilaterals

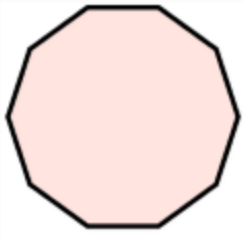
A polygon with four sides is called a Quadrilateral.

S.No.	Name	Properties	Image

1.	Rectangle	• It has two pairs of equal opposite sides. • The opposite sides are parallel. • All the angles are right angles.	
2.	Square	• All four sides are equal. • The opposite sides are parallel. • All the angles are right angles.	
3.	Parallelogram	• It has two pairs of parallel opposite sides. • Square and rectangle are also parallelograms.	
4.	Rhombus	• All four sides are equal. • The opposite sides are parallel. • Opposite angles are equal. • Diagonals intersect each other at the center and at 90°.	
5.	Trapezium	• One pair of opposite sides is parallel.	

Number of sides	Name of Polygon	Figure
3	Triangle	

4	Quadrilateral	
5	Pentagon	
6	Hexagon	
7	Heptagon	
8	Octagon	
9	Nonagon	

10	Decagon	
n	n-gon	

Polygons

Any closed figure made up of three or more line segments is called Polygon.

We can classify the polygons on the basis of their sides and vertices -

Three-dimensional Shapes

The solid shapes having three dimensions are called 3D shapes.

Some of the 3D shapes around us

Cone		ice-cream cone
Cube		Block
Cuboid		Match-box
Cylinder		Glass

Sphere		Ball
Pyramid		Rubrics in a pyramid shape

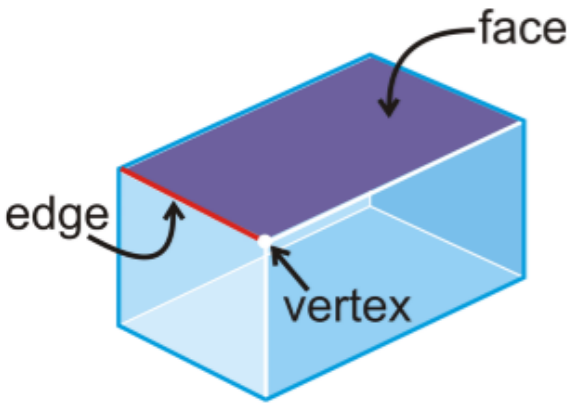
Faces, Edges, and Vertices:

All the flat surfaces of the solid shape are called the Faces of that figure.

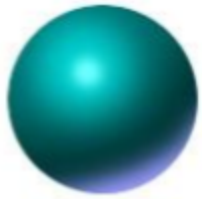
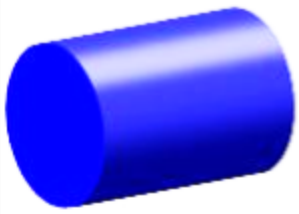
The line segment where the two faces meet with each other is called Edge.

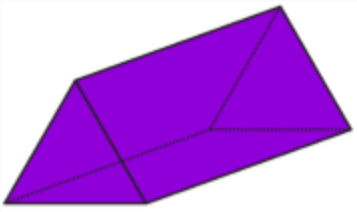
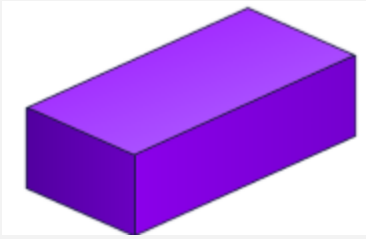
The point where the two edges meet with each other is called Vertex.

No. of Faces, Edges, and Vertices in some common 3- D shapes



S.No.	3 – D shape	Figure	Faces	Edges	Vertices

1.	Cube		6	12	8
2.	Cuboid		6	12	8
3.	Cone		2	1	1
4.	Sphere		1	1	0
5.	Cylinder		3	2	0
6.	Square-based Pyramid		6	8	5

7.	Triangular Prism		5	9	6
8.	Rectangular Prism		6	12	8