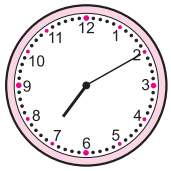
2 Angles

Let's recall.

Angles

Look at the angles shown in the pictures below. Identify the type of angle and write its name below the picture.



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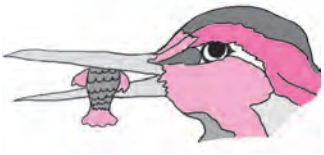
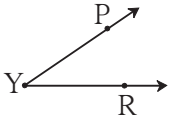
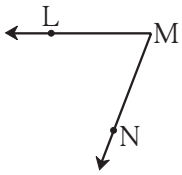
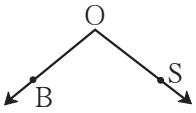
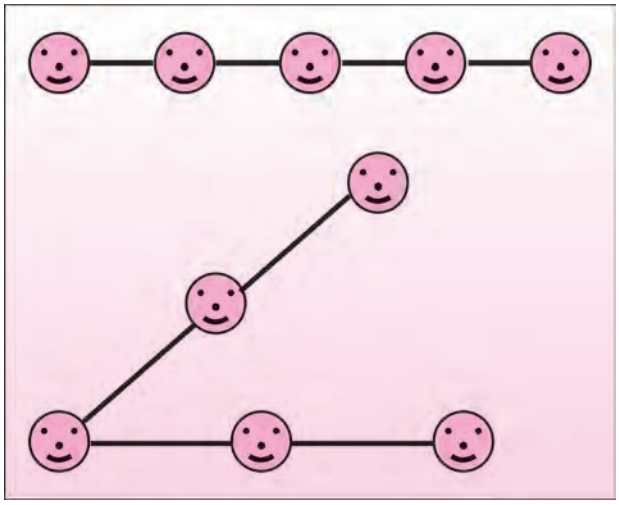


.....

Complete the following table :

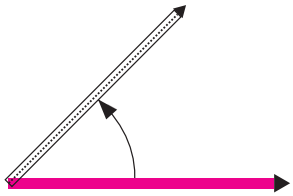
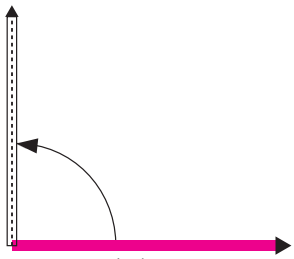
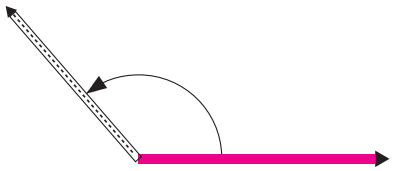
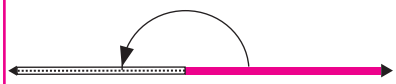
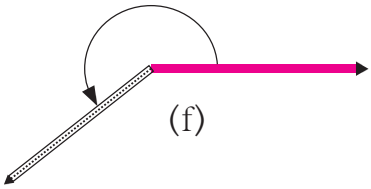
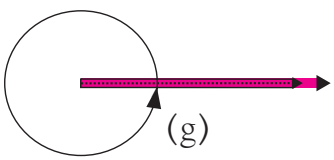
Angle			
Name of the angle			
Vertex of the angle			
Arms of the angle			

Try this.

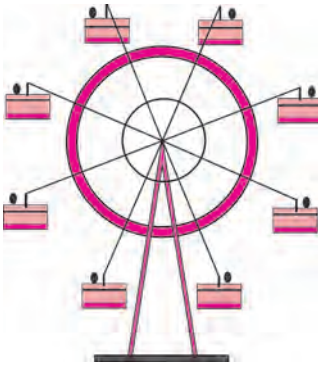
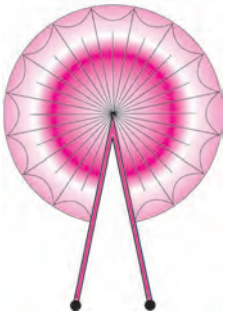
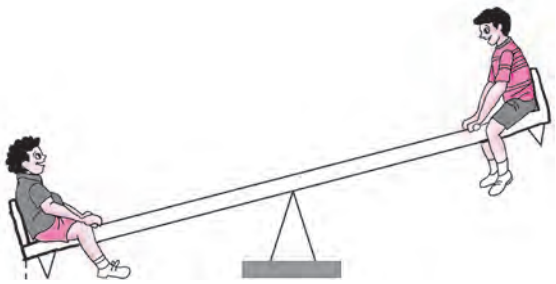


Activity : Ask three or more children to stand in a straight line. Take two long ropes. Let the child in the middle hold one end of each rope. With the help of the ropes, make the children on either side stand along a straight line. Tell them to move so as to form an acute angle, a right angle, an obtuse angle, a straight angle, a reflex angle and a full or complete angle in turn. Keeping the rope stretched will help to ensure that the children form straight lines.

Try this. : Use two sticks of different colours to make the angles from angle (a) to angle (g).

 (a)	In figure (a), the two sticks lie one upon the other. There is no change in their position. In this position, the angle between the sticks is called **a zero angle**. The measure of the zero angle is written as 0°.
 (b)	Now, keeping one stick in place, turn the other one around as shown in the figure. The angle formed in figure (b) is .... angle. An angle greater than 0° but less than 90° is called .... angle.
 (c)	The angle formed in figure (c) is .... angle. An angle of 90° is called .... angle.
 (d)	The angle formed in figure (d) is .... angle. An angle greater than 90° but less than 180° is called .... angle.
 (e)	If the stick is turned further in the direction shown in figure (d) we get a position as in figure (e). An angle like this is called a **straight angle.** A straight angle measures 180°.
 (f)	If the stick is turned even further as shown in figure (e), we get an angle like the one in figure (f). This angle is greater than 180°. Such an angle is called a **reflex angle**. A reflex angle is greater than 180° and less than 360°.
 (g)	The stick in figure (f) completes one round and comes back to its original position as in figure (g). It turned through 180° till it made a straight angle and 180° after making the straight angle, thus completing **360°** in all. An angle made in this way is called a **full** or **complete angle**. The measure of a complete angle is 360°.

My friend, Maths : At the fair, at home, in the garden.

Look at the pictures above and identify the different types of angles.

Practice Set 2

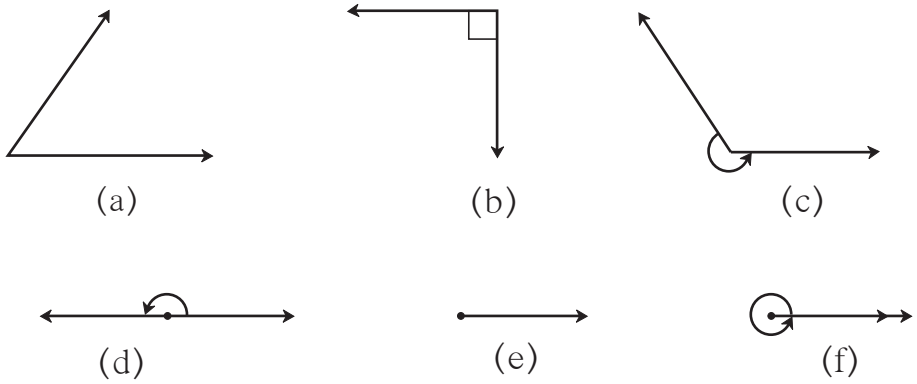
1. Match the following.

Measure of the angle	Type of angle
(1) 180°	(a) Zero angle
(2) 240°	(b) Straight angle
(3) 360°	(c) Reflex angle
(4) 0°	(d) Complete angle

2. The measures of some angles are given below. Write the type of each angle.

(1) 75°	(2) 0°
(3) 215°	(4) 360°
(5) 180°	(6) 120°
(7) 148°	(8) 90°

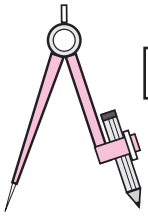
3. Look at the figures below and write the type of each of the angles.



4. Use a protractor to draw an acute angle, a right angle and an obtuse angle.

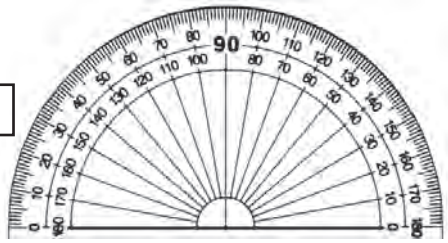
Let's recall.

Get to know your compass box.

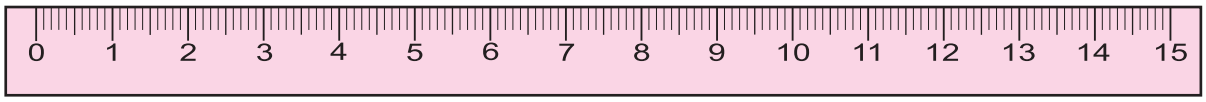


Compass

Protractor



Scale/Ruler

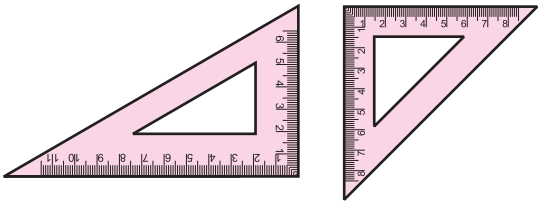


You have learnt what these instruments are used for.

Let's learn.

There are two more types of instruments in the compass box. Let's see how to use them.

Set Squares



Look at the two **set squares** in the box and observe their angles. Try and see how they can be used to draw angles of $90°, 30°, 60°$ and $45°$.

The Divider

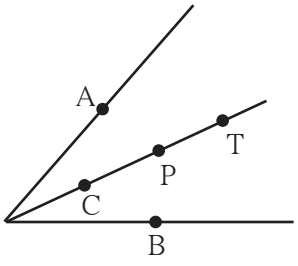
The instrument shown alongside is the **divider**. It is used to measure the distance between two points. To do so, a scale also has to be used along with the divider.

Try this.

An Angle Bisector

Take a sheet of tracing paper. Draw an angle of any measure on it. Fold the paper so that the arms of the angle fall on each other. What does the fold do? Observe that the fold divides the angle into two equal parts. This fold is the **bisector** of the angle.

Take points A and B on the arms of the angle at equal distances from the vertex. Now take points C, P, T on the bisector of the angle. Measure the distance of each of these points from the points A and B.

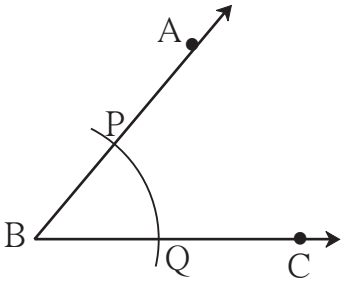


Note that each of the points on the bisector is equidistant from the points A and B.

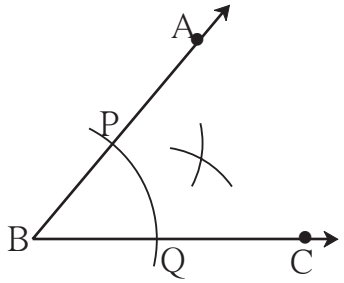
Let us see how to use geometrical instruments to construct geometrical figures.

(1) To draw an angle bisector using a compass.

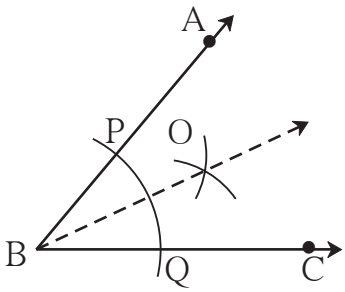
Example : Draw any angle ABC. Draw its bisector.



- Draw an angle ∠ABC of any measure.



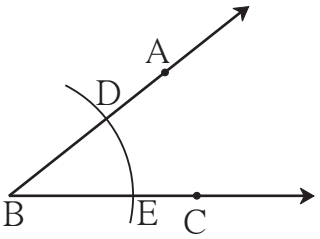
- Now place the point of a compass on point B and with any convenient distance draw an arc to cut rays BA and BC. Name the points of intersection as P and Q respectively.



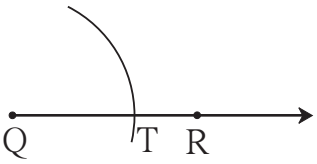
- Now, place the point of the compass at P and taking a convenient distance, draw an arc inside the angle. Using the same distance, draw another arc inside the angle from the point Q, to cut the previous arc.
- Name the point of intersection as point O. Now draw ray BO. Ray BO is the bisector of ∠ABC. Measure ∠ABO and ∠CBO.
- Are they of equal measure?

(2) To construct an angle equal in measure to a given angle, using a compass and ruler.

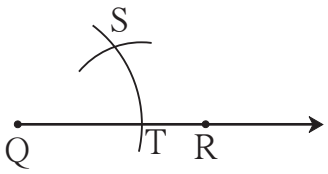
Example : Look at the given ∠ABC in the figure alongside. Draw ∠PQR equal in measure to ∠ABC.

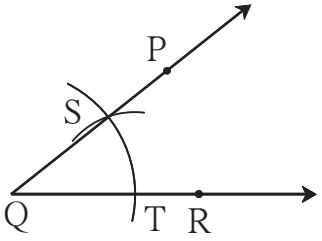


- Draw ray QR.
- Place the compass point at vertex B of ∠ABC and taking a convenient distance, draw an arc to cut the rays BA and BC at points D and E respectively.
- Using the same distance again, place the compass point at point Q of ray QR and draw an arc. Let this arc cut the ray QR at T.
- Now place the point of the compass at point E and open the compass to a distance equal to DE.



- Now place the compass point on point T.
- Using the distance equal to DE, draw an arc to cut the previous arc at S.
- Draw the ray QS. Take any point P on ray QS.
- Using a protractor verify that the ∠PQR so formed is of the same measure as ∠ABC.





Try this.

(1) Construct an angle bisector to obtain an angle of 30°.

First construct an ∠ABC of measure 60°. Use a compass and ruler to bisect ∠ABC. What is the measure of each angle so formed? Verify using a protractor.

(2) Construct an angle bisector to draw an angle of 45°.

Draw two intersecting lines perpendicular to each other. Construct an angle bisector to get an angle of 45°.

Practice Set 3

✸ Use the proper geometrical instruments to construct the following angles. Use the compass and the ruler to bisect them.

(1) 50° (2) 115° (3) 80° (4) 90°

ICT Tools or Links

Use the tools in Geogebra to draw angles of different measures. Use the 'move' option and see how the measures of the angle change!