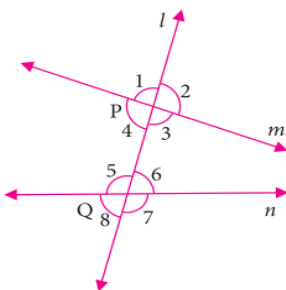


## Angles formed when a transversal cuts two lines

### ⇒ Angles made by Transversal

When a transversal cuts two or more straight lines, the angles formed are identified by different names by virtue of their position.

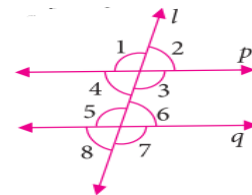


Name	Angles
Interior angles	$\angle 3, \angle 4, \angle 5, \angle 6$
Exterior angles	$\angle 1, \angle 2, \angle 7, \angle 8$
Pairs of corresponding angles	$\angle 1$ and $\angle 5$ , $\angle 2$ and $\angle 6$ $\angle 3$ and $\angle 7$ , $\angle 4$ and $\angle 8$
Pairs of alternate interior angles	$\angle 3$ and $\angle 5$ , $\angle 4$ and $\angle 6$
Pairs of alternate exterior angles	$\angle 1$ and $\angle 7$ , $\angle 2$ and $\angle 8$
Pairs of interior angles on the same side of the transversal	$\angle 3$ and $\angle 6$ , $\angle 4$ and $\angle 5$

## Angles formed when a transversal cuts two lines

In figure  $p \parallel q$  and transversal  $l$  cuts  $p$  and  $q$  forming angles as shown. Then,

1. the pair of corresponding angles are equal in measure, that is,  $\angle 1 = \angle 5$ ,  $\angle 2 = \angle 6$ ,  $\angle 3 = \angle 7$ , and  $\angle 4 = \angle 8$
2. the pair of alternate interior angles are equal in measure, that is,  $\angle 3 = \angle 5$ , and  $\angle 4 = \angle 6$
3. the pair of alternate exterior angles are equal in measure, that is,  $\angle 1 = \angle 7$ , and  $\angle 2 = \angle 8$
4. the pair of consecutive interior angles are supplementary, that is,  $\angle 4 + \angle 5 = 180^\circ$ , and  $\angle 3 + \angle 6 = 180^\circ$ .



⇒ **The above results may be summarised as follows.**

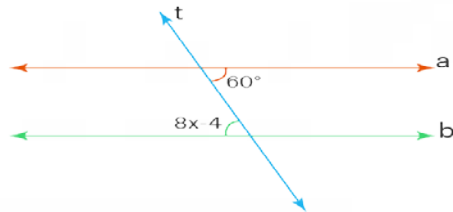
When any two parallel lines are cut by a transversal, they acquire some properties. In other words, any two lines can be termed as parallel lines if the following conditions related to the angles are fulfilled.

- Any two lines that are intersected by a transversal are said to be parallel if the corresponding angles are equal.
- Any two lines that are intersected by a transversal are said to be parallel if the alternate interior angles are equal.
- Any two lines that are intersected by a transversal are said to be parallel if the alternate exterior angles are equal.
- Any two lines that are intersected by a transversal are said to be parallel if the consecutive interior angles are supplementary.

**Let us understand with an example:**

**Example:** Find the value of  $x$  in the given parallel lines 'a' and 'b', cut by a transversal 't'.

## Angles formed when a transversal cuts two lines



**Solution:** The given parallel lines are cut by a transversal, therefore, the marked angles in the figure are the alternate interior angles which are equal in measure.

This means,  $8x - 4 = 60^\circ$ , and  $8x = 64$ ,  $x = 8$ .

Therefore, the value of  $x = 8$ .