

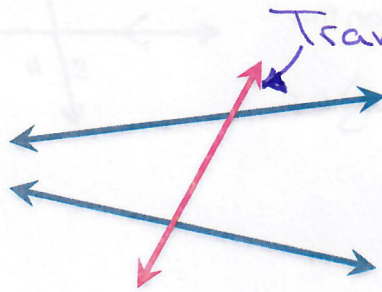


**Lesson #2.1 – Exploring Parallel Lines**

**Parallel Lines & Transversals**

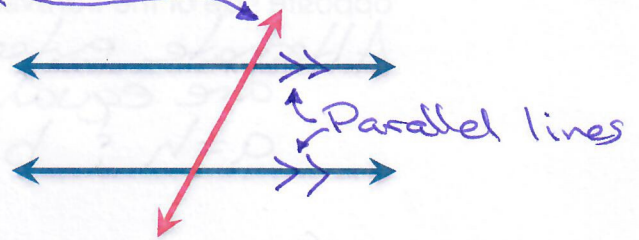
**Transversal Line**

A **transversal** is a line that intersects two or other lines at distinct points.

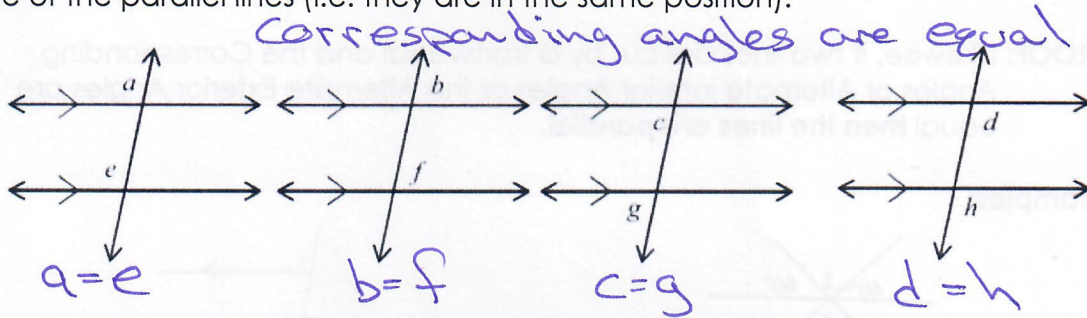


**Parallel Lines**

**Parallel** lines are lines that have the same slope and as result these will never cross (i.e. intersect) each other.



**Corresponding angles** are on the same side of a transversal, and on the same side of the parallel lines (i.e. they are in the same position).



**Interior angles** lie inside the parallel lines.

**Co-Interior Angles:** interior angles on the same side as the transversal

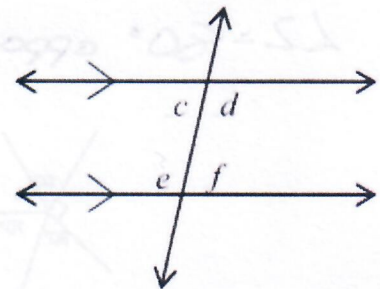
*Co-interior angles are supplementary*

$c + e = 180^\circ$   
 $d + f = 180^\circ$

**Alternate Interior Angles:** interior angles on the opposite side of the transversal

*Alternate interior angles are equal*

$c = f$        $d = e$





**Exterior angles** lie outside the parallel lines.

**Co-Exterior Angles:** exterior angles on the same side as the transversal

*Co-Exterior angles are supplementary*

$$a + g = 180^\circ$$

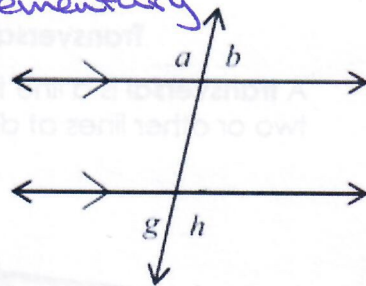
$$h + b = 180^\circ$$

**Alternate Exterior Angles:** exterior angles on the opposite side of the transversal

*Alternate exterior angles*

*are equal*

$$a = h \quad ; \quad b = g$$

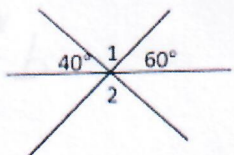


If two parallel lines are cut by a transversal, then:

**Corresponding Angles = Alternate Interior Angles = Alternate Exterior Angles**

**PROOF:** Likewise, if two lines are cut by a transversal and the Corresponding Angles or Alternate Interior Angles or the Alternate Exterior Angles are equal **then the lines are parallel.**

**Examples:**

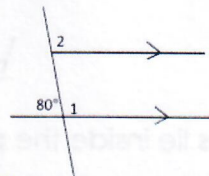


$$\angle 1 = 180^\circ - 40^\circ - 60^\circ = 80^\circ$$

*angles of line*

$$\angle 2 = 80^\circ$$

*opposite angles*

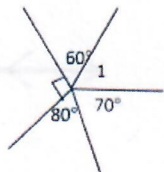


$$\angle 1 = 180^\circ - 80^\circ = 100^\circ$$

*supplementary*

$$\angle 2 = 100^\circ$$

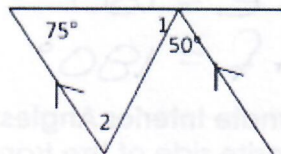
*corresponding angles*



$$\angle 1 = 360^\circ - 60^\circ - 90^\circ - 80^\circ$$

$$= 60^\circ$$

*angles around a point*



$$\angle 1 = 180^\circ - 75^\circ - 50^\circ = 55^\circ$$

*corresponding angles on a line*

$$\angle 2 = 180^\circ - 75^\circ - 55^\circ = 50^\circ$$

*sum of angles of a triangle*

**Practice Questions: Page 72, #'s 2 - 6**