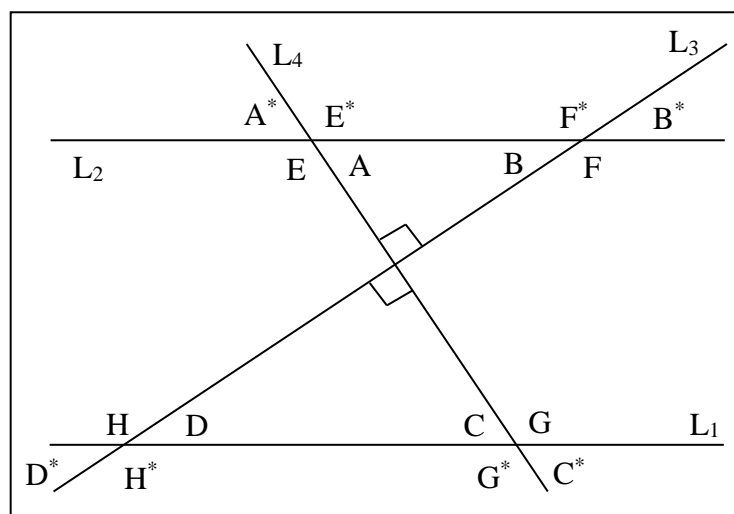


## Elementary Engineering Mathematics

### Geometry: Some Useful Definitions and Concepts

**Figure 1:** Two Parallel and Two Perpendicular Lines

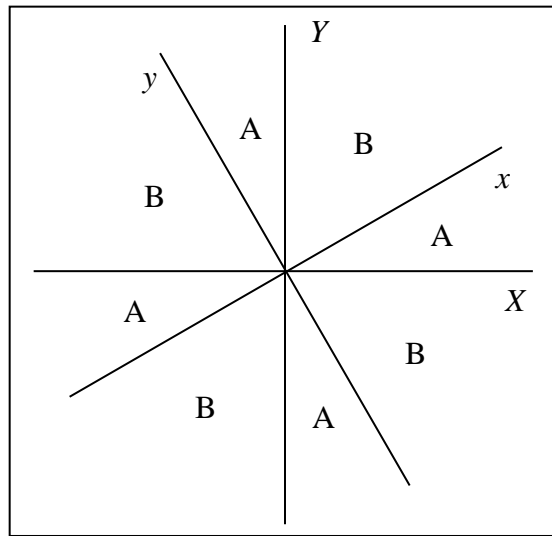
- **Parallel** lines do not intersect. Lines  $L_1$  and  $L_2$  are parallel.
- **Perpendicular** lines intersect at a  $90^\circ$  angle. Lines  $L_3$  and  $L_4$  are perpendicular.
- **Angles** on *opposite sides* of two intersecting lines are equal.  
( $A = A^*$ ,  $B = B^*$ ,  $C = C^*$ , ...,  $H = H^*$ )
- **Acute angles** are angles that are less than  $90^\circ$ . ( $A$ ,  $B$ ,  $C$ ,  $D$ ,  $A^*$ ,  $B^*$ ,  $C^*$ ,  $D^*$ )
- **Obtuse angles** are angles that are greater than  $90^\circ$  and less than  $180^\circ$ .  
( $E$ ,  $F$ ,  $G$ ,  $H$ ,  $E^*$ ,  $F^*$ ,  $G^*$ ,  $H^*$ )
- **Alternate interior angles** are equal. ( $A = C$ ,  $B = D$ )
- **Alternate exterior angles** are equal. ( $A^* = C^*$ ,  $E^* = D^*$ ,  $F^* = H^*$ ,  $B^* = D^*$ )
- **Supplementary angles** are any two angles that add to  $180^\circ$ .  
( $A^*$  and  $E^*$ ,  $E^*$  and  $A$ ,  $A$  and  $E$ ,  $E$  and  $A^*$ , etc.)
- **Complementary angles** are any two angles that add to  $90^\circ$ . Because the *sum* of the angles in any **triangle** is  $180^\circ$ ,  $A$  and  $B$  are complementary angles.  $C$  and  $D$  are also complementary angles.
- Triangles having one angle equal to  $90^\circ$  are called **right triangles**.
- **Similar triangles** are two triangles whose angles are the same, but whose size is not. One is simply a **magnified version** of the other. The two right triangles formed between the two parallel lines are similar.



**Figure 1.** Two Parallel and Two Perpendicular Lines

**Figure 2:** Two Sets of Perpendicular Axes

- $X$  and  $Y$  are two perpendicular axes.  $x$  and  $y$  are also perpendicular axes.
- The angle between  $Y$  and  $y$  is the same as the angle between  $X$  and  $x$  (A) (because  $Y$  is perpendicular to  $X$ , and  $y$  is perpendicular to  $x$ ).
- The acute angle between  $X$  and  $y$  is the same as the angle between  $Y$  and  $x$  (B) (because  $X$  is perpendicular to  $Y$ , and  $y$  is perpendicular to  $x$ ).
- A and B are *complementary* angles.



**Figure 2.** Two Sets of Perpendicular Axes