

Chapter 3 - Parallel and Perpendicular Lines

Section 3-1: Lines and Angles

Parallel lines are coplanar lines that do not intersect.

$$\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$$

Perpendicular lines are coplanar lines that intersect to form right angles.

$$\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$$

Skew lines are non-coplanar lines that do not intersect.

$$\overleftrightarrow{AB} \text{ and } \overleftrightarrow{CD} \text{ are skew}$$

Parallel planes are planes that do not intersect.

$$\text{plane } ABC \parallel \text{plane } DEF$$

Example 1:

a. Name a pair of parallel lines.

multiple answers, i.e. \overleftrightarrow{AD} and \overleftrightarrow{EH} , \overleftrightarrow{AE} and \overleftrightarrow{BF}

b. Name a pair of perpendicular lines.

_____ , i.e. \overleftrightarrow{DH} and \overleftrightarrow{EH} , \overleftrightarrow{DC} and \overleftrightarrow{CG}

c. Name a pair of skew lines.

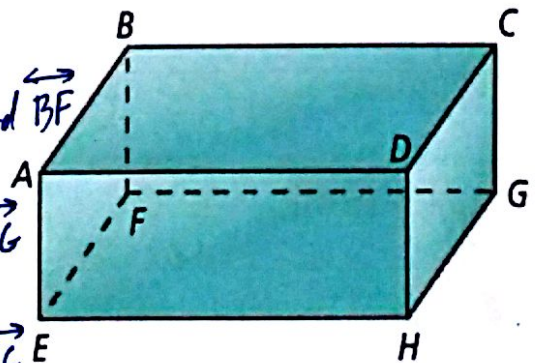
_____ , i.e. \overleftrightarrow{EF} and \overleftrightarrow{BC} , \overleftrightarrow{AD} and \overleftrightarrow{CG}

d. Name a pairs of parallel planes.

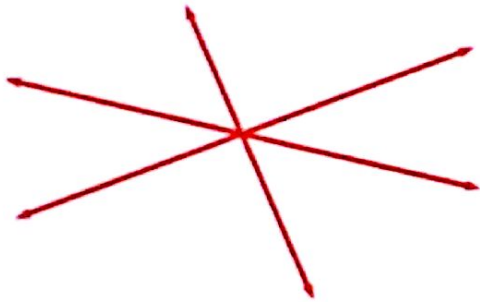
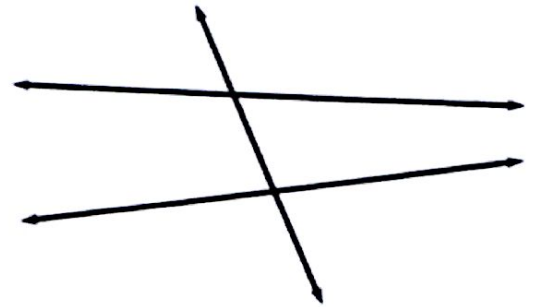
_____ , i.e. planes EFH and BAD , CDH and BAE

e. Name a pair of intersecting planes.

_____ , i.e. BFG and CGH , AEH and FGH



A transversal is a line that intersects two or more coplanar lines at different points.



Here we do NOT have a transversal.

alternate interior angles

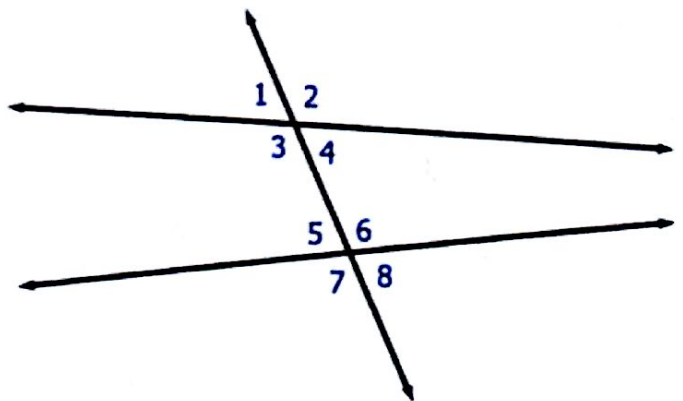
same-side interior angles

corresponding angles

alternate exterior angles

same-side exterior angles

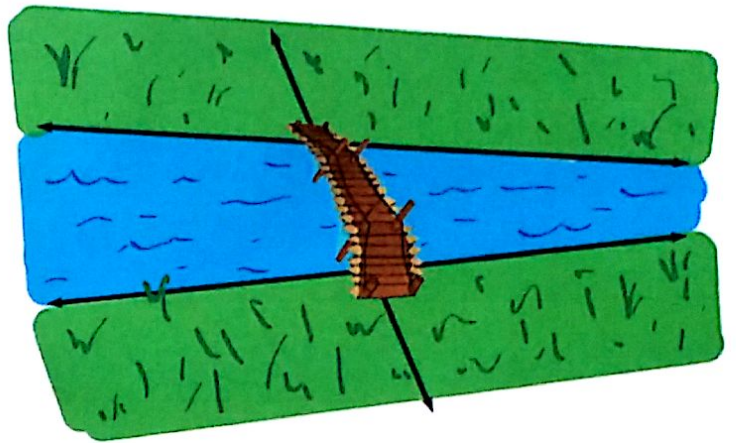
We can name special pairs of angles when we have two lines and a transversal



(answers on future slide)

alternate...
same side... of the bridge

...interior
...exterior of the water



★ corresponding has a different visual - same "spot" at the intersection

alternate interior angles

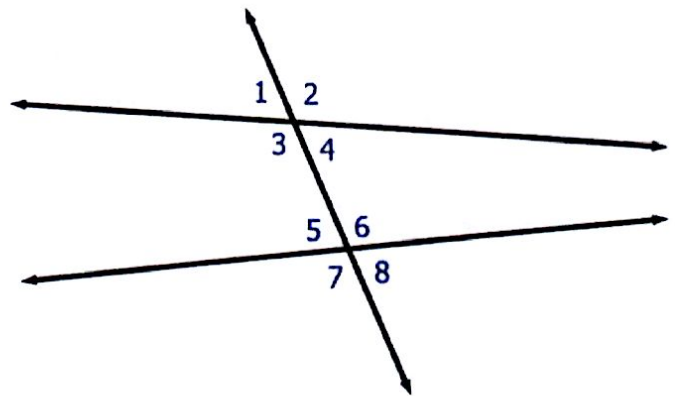
*∠3 and ∠6 are alternate interior angles
∠4 and ∠5 are alternate interior angles*

same-side interior angles

*∠3 and ∠5 are same side interior angles
∠4 and ∠6 are same side interior angles*

corresponding angles

*∠3 and ∠7 are corresponding angles
∠4 and ∠8 are corresponding angles
∠1 and ∠5 are corresponding angles
∠2 and ∠6 are corresponding angles*

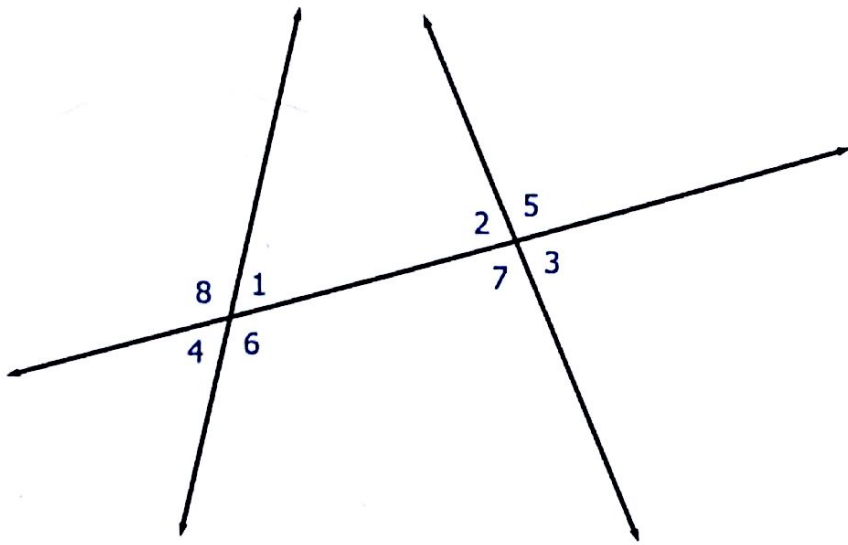


alternate exterior angles

*∠1 and ∠8 are alternate exterior angles
∠2 and ∠7 are alternate exterior angles*

same-side exterior angles

*∠1 and ∠7 are same side exterior angles
∠2 and ∠8 are same side exterior angles*



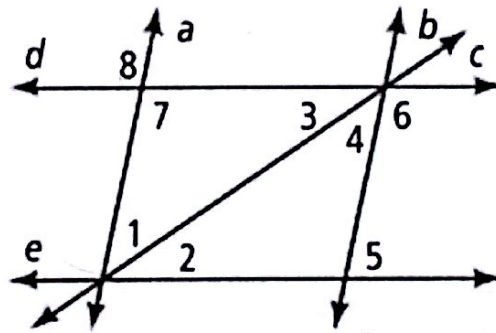
A: Person 1 names 2 \angle s
 Person 2 gives their name

B: Person 1 names a type of angle pair
 Person 2 names 2 \angle s

- a. alt. int. c. alt ext. e. corr.
 b. S-S int. d. S-S ext. f. vert.

Identify all pairs of each type of angles in the diagram. Name the two lines and the transversal that form each pair.

17. corresponding angles
 18. alternate interior angles
 19. same-side interior angles
 20. alternate exterior angles
 21. vertical \sim $\angle 8$ and $\angle 7$



- (17) a and b are lines
 d is transversal
 $\angle 7$ and $\angle 6$
- (18) d & e are lines
 b is transversal
 $\angle 2$ and $\angle 3$
- (19) d & e are lines
 a is transversal
 $\angle 6$ and $\angle 5$
- (20) a & b are lines
 c is transversal
 $\angle 8$ and $\angle 6$