Section 3.1
Lines and Angles

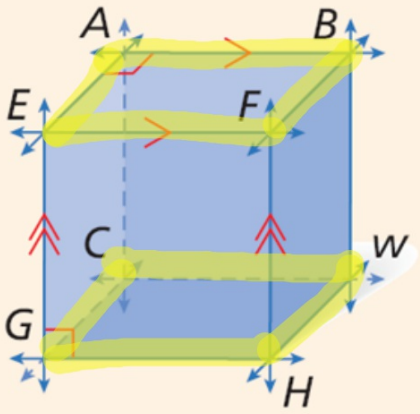
Parallel, Perpendicular, and Skew Lines

Parallel lines ($\parallel$) are coplanar and do not intersect. In the figure, $\overleftrightarrow{AB} \parallel \overleftrightarrow{EF}$, and $\overleftrightarrow{EG} \parallel \overleftrightarrow{FH}$.

Perpendicular lines ($\perp$) intersect at 90° angles. In the figure, $\overleftrightarrow{AB} \perp \overleftrightarrow{AE}$, and $\overleftrightarrow{EG} \perp \overleftrightarrow{GH}$.

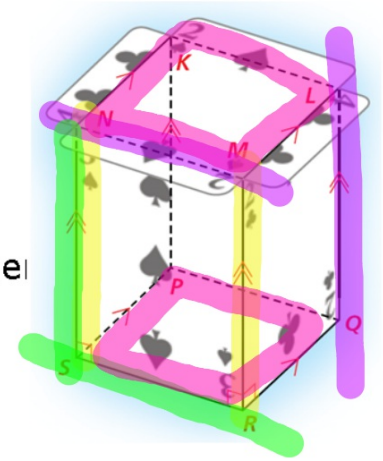
Skew lines are not coplanar. Skew lines are not parallel and do not intersect. In the figure, $\overleftrightarrow{AB}$ and $\overleftrightarrow{EG}$ are skew.

Parallel planes are planes that do not intersect. In the figure, plane $ABE \parallel$ plane CDG.



Arrows are used to show that $\overleftrightarrow{AB} \parallel \overleftrightarrow{EF}$ and $\overleftrightarrow{EG} \parallel \overleftrightarrow{FH}$.

Identify each of the following.



A. a pair of parallel segments

B. a pair of skew segments

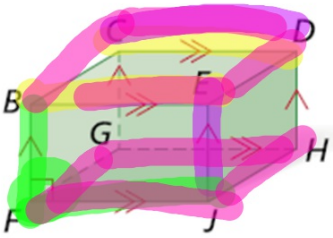
C. a pair of perpendicular segme

$\overline{NS} \perp \overline{SP}$

D. a pair of parallel planes

plane *NMR* || plane *KLQ*

Identify each of the following.



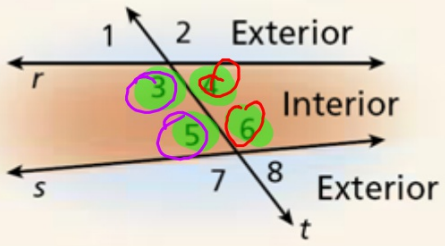
a. a pair of parallel segments

b. a pair of skew segments

c. a pair of perpendicular segments

d. a pair of parallel planes

Angle Pairs Formed by a Transversal

TERM	EXAMPLE
A **transversal** is a line that intersects two coplanar lines at two different points. The transversal t and the other two lines r and s form eight angles.	
Corresponding angles lie on the same side of the transversal t, on the same sides of lines r and s.	$\angle 1$ and $\angle 5$
Alternate interior angles are nonadjacent angles that lie on opposite sides of the transversal t, between lines r and s.	$\angle 3$ and $\angle 6$
Alternate exterior angles lie on opposite sides of the transversal t, outside lines r and s.	$\angle 1$ and $\angle 8$
Same-side interior angles or *consecutive interior angles* lie on the same side of the transversal t, between lines r and s.	$\angle 3$ and $\angle 5$

Give an example of each angle pair.

A. corresponding angles

1,3 2,4 5,7 6,8

B. alternate interior angles

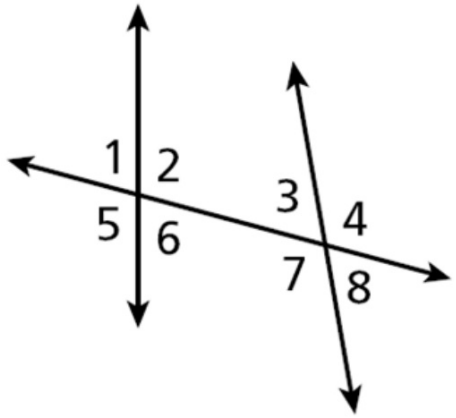
2,7 3,6

C. alternate exterior angles

1,8 4,5

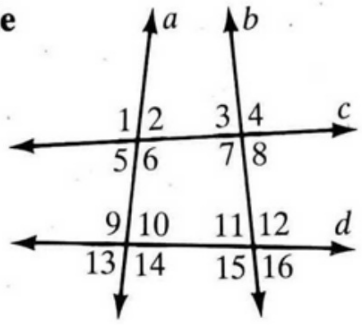
D. same-side interior angles

6,7 2,3

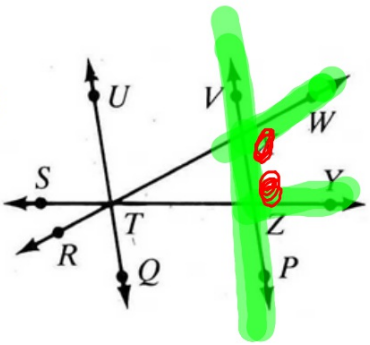


Classify each pair of angles as alternate interior angles, same-side interior angles, or corresponding angles.

11. $\angle 2$ and $\angle 4$ corresponding
12. $\angle 10$ and $\angle 11$ s-s int
13. $\angle 14$ and $\angle 15$ s-s int
14. $\angle 7$ and $\angle 12$ alt-int
15. $\angle 5$ and $\angle 10$ alt-int
16. $\angle 3$ and $\angle 11$ corresponding



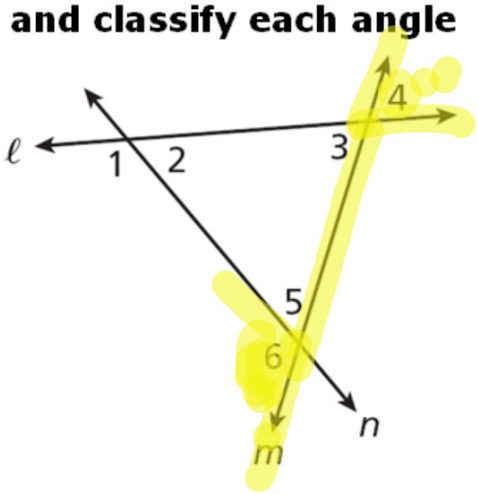
17. $\angle STU$ and $\angle SZX$ corr
18. $\angle WXZ$ and $\angle YZX$ s-s int
19. $\angle UTZ$ and $\angle VZY$ corr
20. $\angle VXT$ and $\angle UTX$ s-s-int
21. $\angle QTZ$ and $\angle VZT$ alt-int
22. $\angle VXT$ and $\angle XTQ$ alt-int
23. $\angle WXZ$ and $\angle YZP$ corr
24. $\angle QTZ$ and $\angle PZT$ s-s int



Helpful Hint

To determine which line is the transversal for a given angle pair, locate the line that connects the vertices.

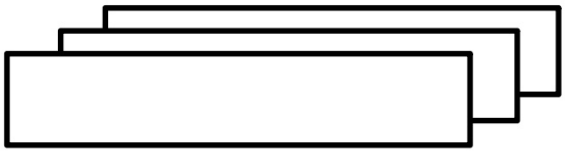
Identify the transversal and classify each angle pair.



A. ∠1 and ∠3
transversal *ℓ*
corr. ∠s

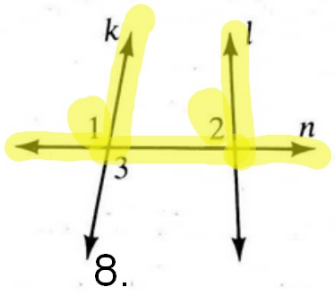
B. ∠2 and ∠6
transversal *n*
alt. int ∠s

C. ∠4 and ∠6
transversal *m*
alt. ext ∠s



Name the two lines and the transversal that form each pair of angles.

7. ∠1 and ∠2
   ∠2 and ∠3

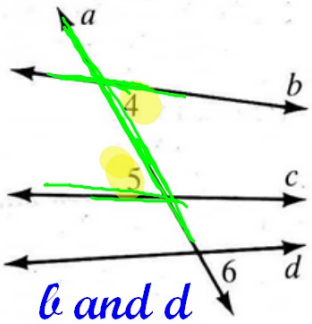


8.

lines *k & l*

transversal *n*

8. ∠4 and ∠5
   ∠4 and ∠6



lines *b and c* *b and d*

transversal *a* *a*

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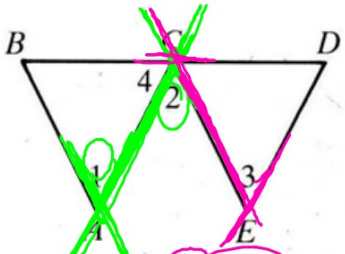
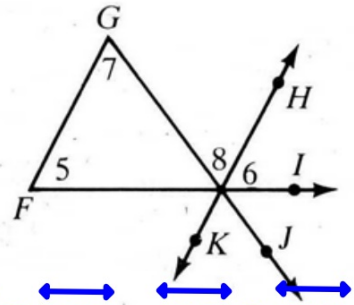
9. ∠1 and ∠2
   ∠2 and ∠3



lines AB & CE AC & DE

transversal AC CE

10. ∠5 and ∠6
    ∠7 and ∠8



lines GF & HK GF & HK

transversal FI GJ

Lesson Quiz: Part I

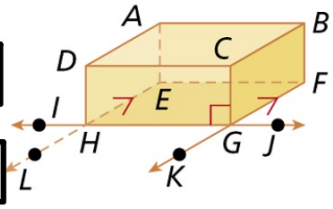
Identify each of the following.

1. a pair of parallel segments

2. a pair of skew segments

3. a pair of perpendicular segments

4. a pair of parallel planes



Lesson Quiz: Part II

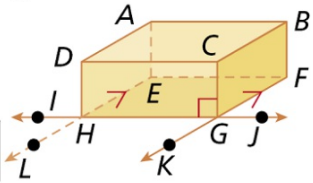
Identify each of the following.

5. one pair alternate interior angles

6. One pair corresponding angles

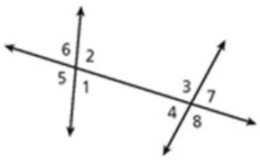
7. one pair alternate exterior angles

8. one pair same-side interior angles



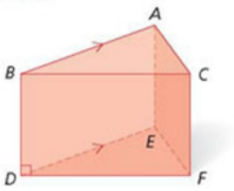
HW 3.1 p148 #6-9, 14-25, 35-40
Draw pictures

Give an example of each angle pair.



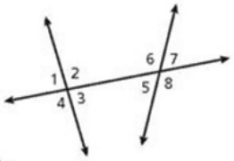
6. alternate interior angles
7. alternate exterior angles
8. corresponding angles
9. same-side interior angles

Identify each of the following.



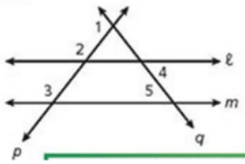
14. one pair of parallel segments
15. one pair of skew segments
16. one pair of perpendicular segments
17. one pair of parallel planes

Give an example of each angle pair.



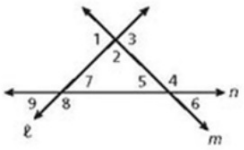
18. same-side interior angles
19. alternate exterior angles
20. corresponding angles
21. alternate interior angles

Identify the transversal and classify each angle pair.



22. ∠2 and ∠3
23. ∠4 and ∠5
24. ∠2 and ∠4
25. ∠1 and ∠2
26. **Sports** A football player runs across the

Use the diagram for Exercises 35–40.



35. Name a pair of alternate interior angles with transversal n.
36. Name a pair of same-side interior angles with transversal ℓ.
37. Name a pair of corresponding angles with transversal m.
38. Identify the transversal and classify the angle pair for ∠3 and ∠7.
39. Identify the transversal and classify the angle pair for ∠5 and ∠8.
40. Identify the transversal and classify the angle pair for ∠1 and ∠6.