3-1

Lines and Angles

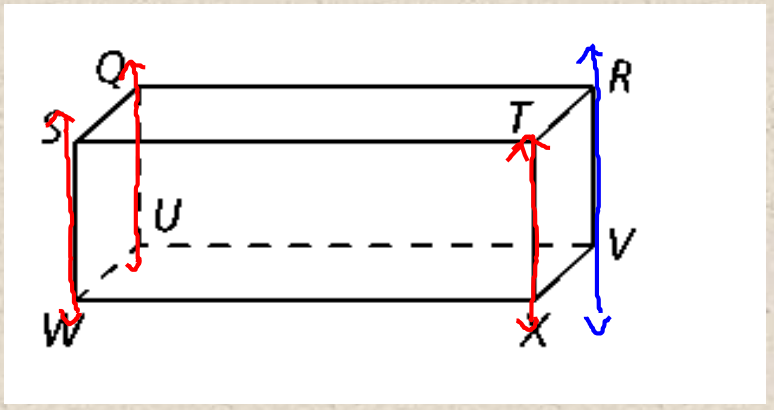
OBJECTIVES

- to identify parallel, perpendicular, and skew lines
- To identify the angles formed by two lines and a transversal

VOCABULARY

Parallel lines are coplanar lines that do not intersect. The symbol ∥ means "is parallel to".

$\overleftrightarrow{RV} \parallel \overleftrightarrow{TX} \parallel \overleftrightarrow{QU} \parallel \overleftrightarrow{SW}$

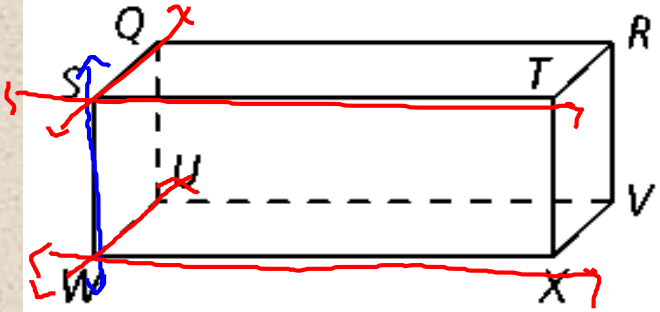


VOCABULARY

Perpendicular lines intersect at 90°. The symbol ⊥ means "is perpendicular to".

Perpendicular to $\overleftrightarrow{SW}$:

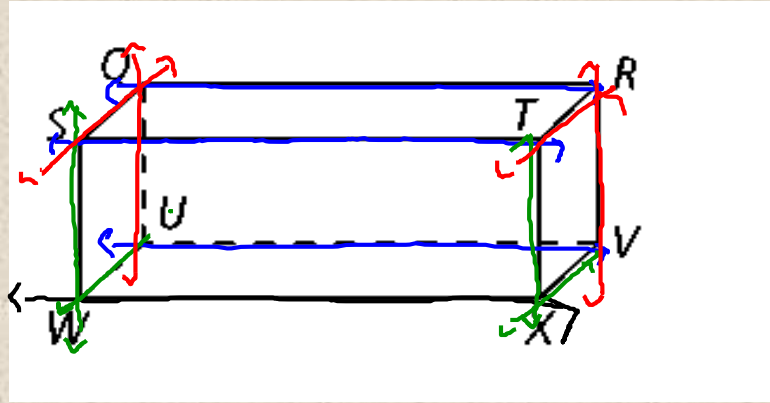
$\overleftrightarrow{WX}$, $\overleftrightarrow{WU}$, $\overleftrightarrow{ST}$, $\overleftrightarrow{SQ}$.



VOCABULARY

Skew lines are noncoplanar. They are not parallel and do not intersect.

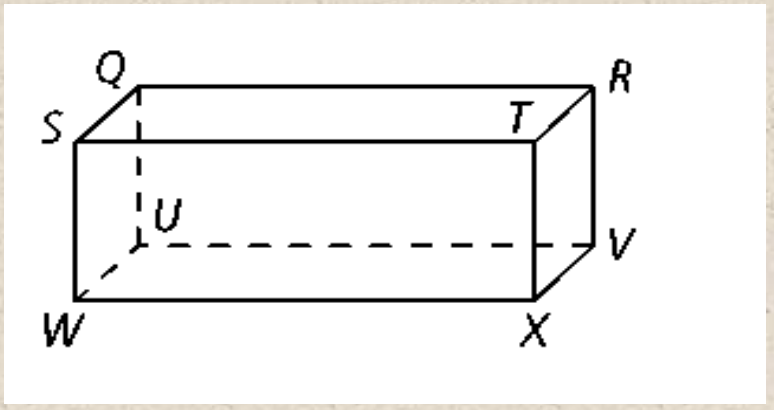
Skew to $\overleftrightarrow{WX}$: QU, RV, QS, TR.



VOCABULARY

Parallel planes are planes that do not intersect.

Plane QUW is ∥ to plane RTX



CLASS WORK

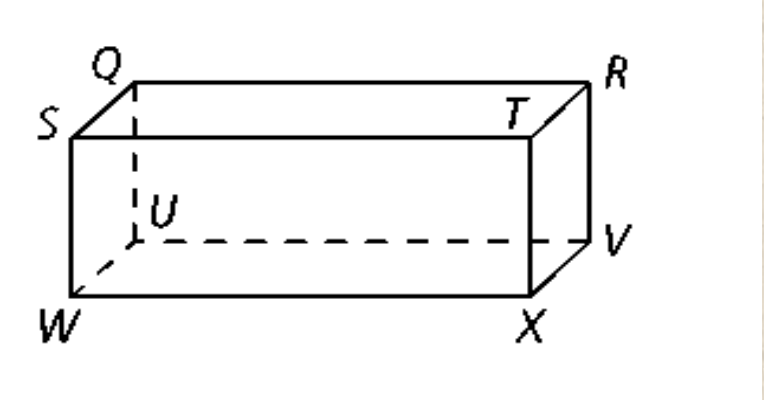
Name the following:

1. a pair of parallel planes

   Plane SWX || plane QRV

2. All lines that are parallel to plane QUR

   $\overleftrightarrow{SW}$, $\overleftrightarrow{TX}$, $\overleftrightarrow{ST}$, $\overleftrightarrow{WX}$



CLASS WORK

In Exercises 3-8, describe the statement as *true* or *false*.

3. $\overleftrightarrow{AE}$ and $\overleftrightarrow{EF}$ are skew lines. F

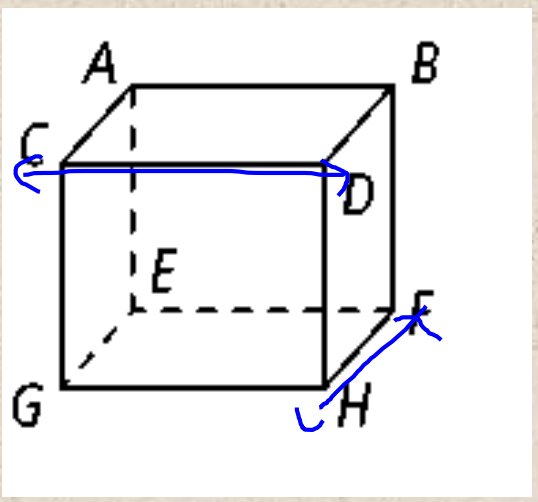
4. plane *DBF* ∥ plane *ABD* F

5. $\overleftrightarrow{GH} \parallel \overleftrightarrow{EF}$ T

6. $\overleftrightarrow{DB} \parallel \overleftrightarrow{AE}$ F

7. plane *EFH* ∥ plane *ABD* T

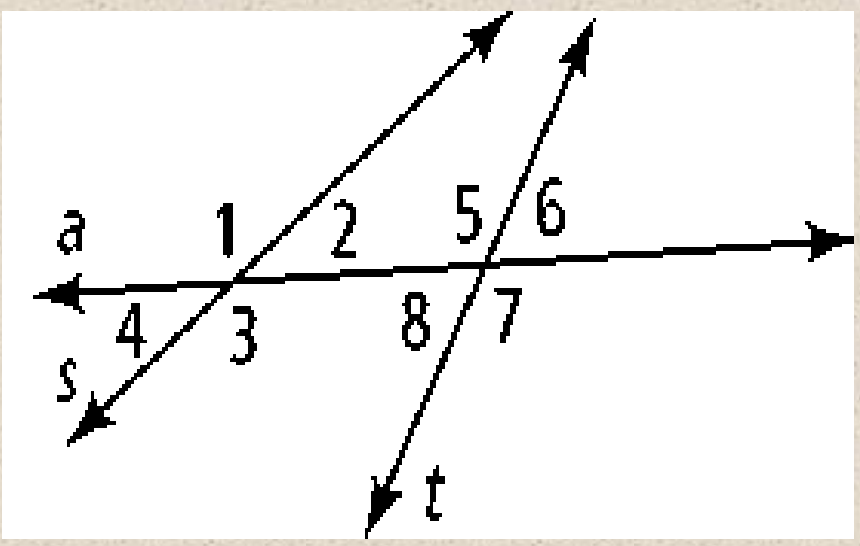
8. $\overleftrightarrow{FH}$ and $\overleftrightarrow{CD}$ are skew lines. T



VOCABULARY

Transversal – line that intersects two or more coplanar lines at two or more different (distinct) points.

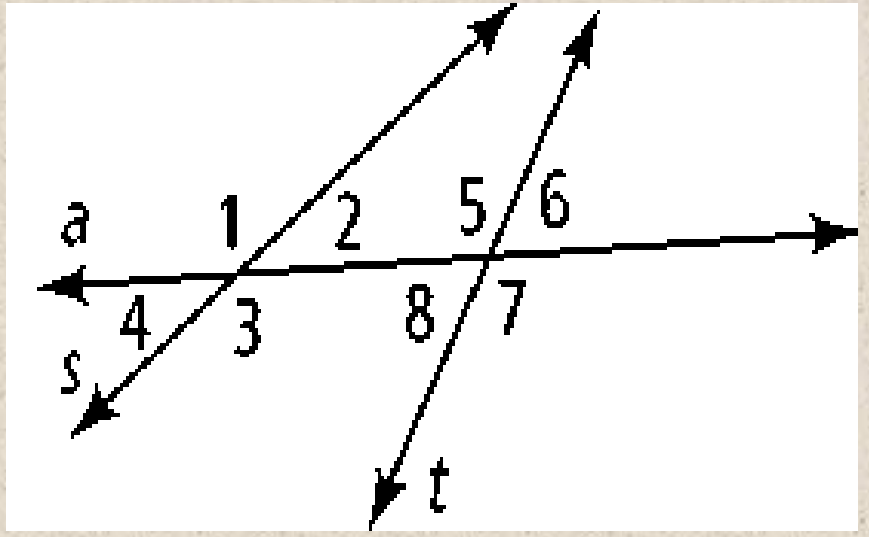
Line *a* is the transversal that intersects line *s* and line *t*



VOCABULARY

Alternate interior angles are nonadjacent interior angles that lie on opposite sides of the transversal.

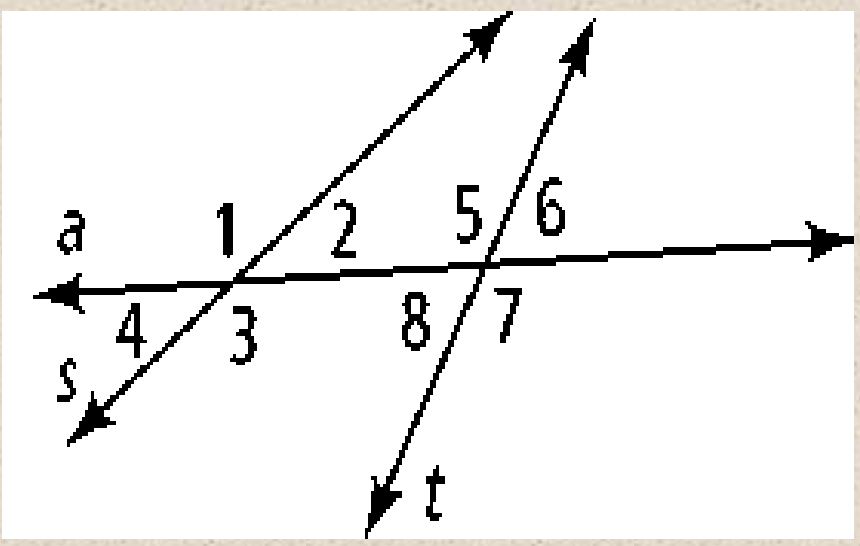
∠2 and ∠8;
∠3 and ∠5



VOCABULARY

Same-side interior angles (or consecutive interior angles) are interior angles that lie on the same side of the transversal.

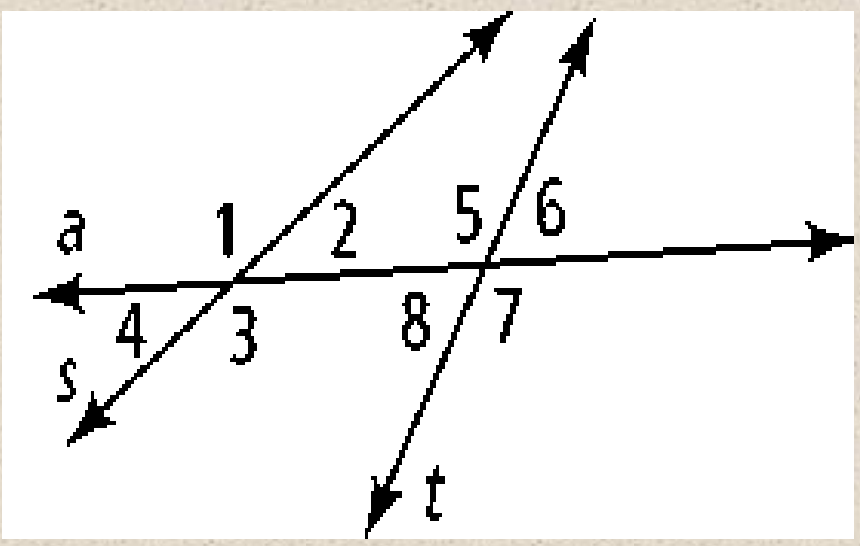
∠2 and ∠5;
∠3 and ∠8



VOCABULARY

Corresponding angles lie on the same side of the transversal and on the same sides of the lines (s and t).

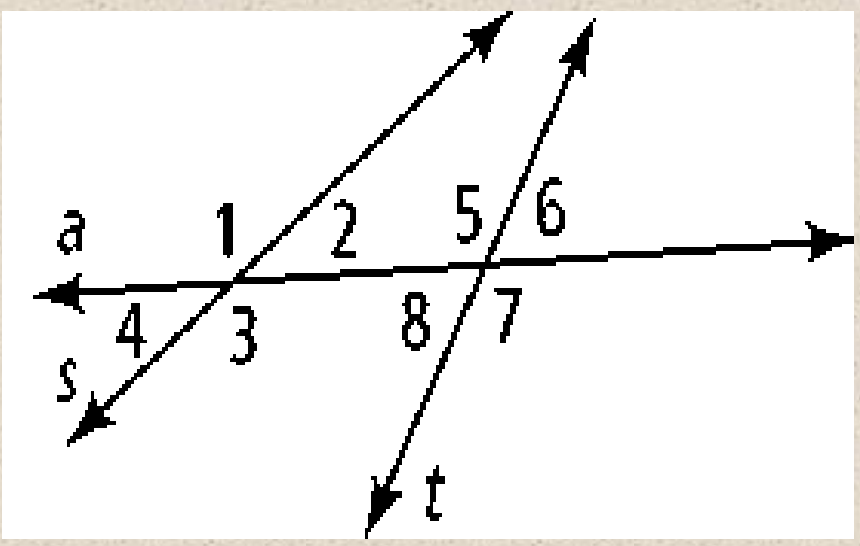
∠1 and ∠5;
∠2 and ∠6;
∠3 and ∠7;
∠4 and ∠8



VOCABULARY

Alternate exterior angles are nonadjacent exterior angles that lie on opposite sides of the transversal.

$\angle 1$ and $\angle 7$;
$\angle 4$ and $\angle 6$



CLASS WORK

Decide whether the angles are *alternate interior angles, same-side interior angles, corresponding angles,* or *alternate exterior angles.*

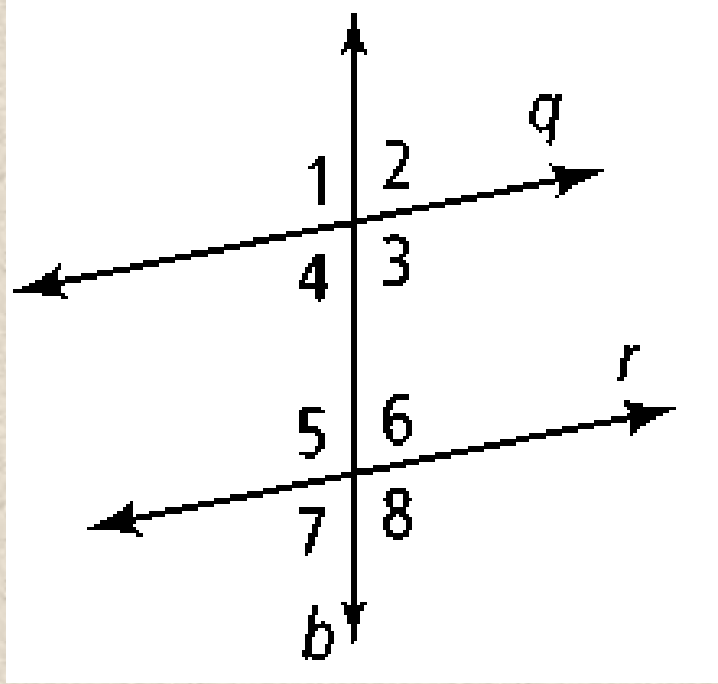
9. $\angle 2$ and $\angle 7$ alt. ext. $\angle$s

10. $\angle 5$ and $\angle 4$ ss int. $\angle$s

11. $\angle 8$ and $\angle 3$ Corr. $\angle$s

12. $\angle 6$ and $\angle 4$ alt. int. $\angle$s

13. $\angle 1$ and $\angle 5$ Corr $\angle$s



SUMMARY

- A transversal is a line that intersects two or more coplanar lines at distinct points.
- These intersections form 4 different kinds of angle pairs.

CHALLENGE AND EXTEND

Your friend says that the sides of a ladder and the rungs of a ladder are skew. Is this true? Explain.

No. The sides of the ladder would need to be perpendicular to the rungs for the ladder to be functional. Also, the sides of the ladder would be parallel to each other, and the rungs of the ladder would be parallel to each other.

LEARNING RUBRIC

- Got It: Classifies planes, lines, and angle pairs in real-world situations
- Almost There: Classifies angle pairs with two lines and a transversal
- Moving Forward: Classifies lines as parallel, intersecting, or skewed
- Getting Started: Classifies planes as parallel or intersecting

HOMEWORK

Pages 149-151

14-32 even

36, 38, 40, 44, 46, 48