

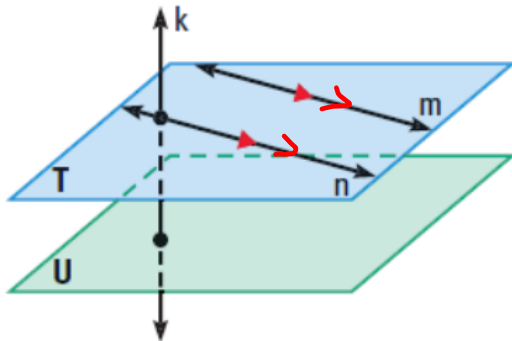
Geometry

4.2 (part 1) Identify Pairs of Lines and Angles

parallel lines - 2 lines that do NOT intersect

skew lines - 2 lines that do NOT intersect and are NOT coplanar

parallel planes - 2 planes that do NOT intersect



Lines m and n are parallel lines ($m \parallel n$).

Lines m and k are skew lines.

Planes T and U are parallel planes ($T \parallel U$).

Lines k and n are intersecting lines, and there is a plane (not shown) containing them.

Symbols to Know:

▶ small triangles (shown above) are used to show that lines are parallel

\parallel means "is parallel to" (from above, $m \parallel n$)

EXAMPLE 1 Identify relationships in space

Think of each segment in the figure as part of a line.
Which line(s) or plane(s) in the figure appear to fit the description?

a. Line(s) parallel to \overleftrightarrow{CD} and containing point A

\overleftrightarrow{AB}

b. Line(s) skew to \overleftrightarrow{CD} and containing point A

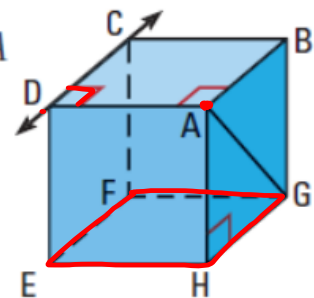
\overleftrightarrow{AG} \overleftrightarrow{AH}

c. Line(s) perpendicular to \overleftrightarrow{CD} and containing point A

$\overleftrightarrow{CD} \perp \overleftrightarrow{AD}$

d. Plane(s) parallel to plane EFG and containing point A

ADC



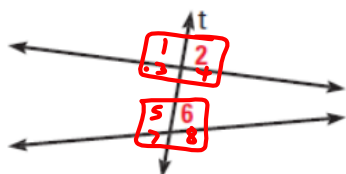
Transversal - a line that intersects 2 or more coplanar lines at different points

Angles Formed by Transversals

Corresponding Angles

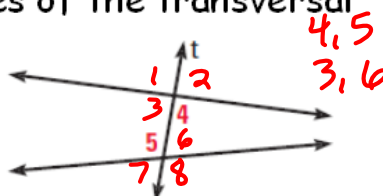
2 angles that have corresponding positions

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



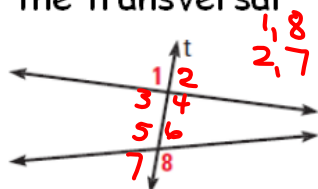
Alternate Interior Angles

2 angles that lie between the 2 lines and on opposite sides of the transversal



Alternate Exterior Angles

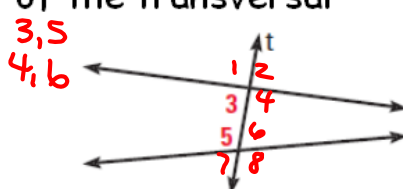
2 angles that lie outside the 2 lines and on opposite sides of the transversal



Same Side

Consecutive Interior Angles

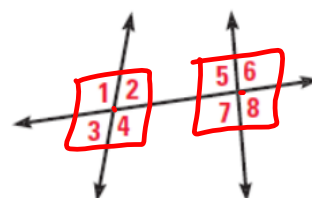
2 angles that lie between the 2 lines and on the same side of the transversal



EXAMPLE 3 Identify angle relationships

Identify all pairs of angles of the given type.

- a. Corresponding b. Alternate interior
c. Alternate exterior d. Consecutive interior



- a) $\sphericalangle 1 \sphericalangle 5, \sphericalangle 2 \sphericalangle 6, \sphericalangle 3 \sphericalangle 7, \sphericalangle 4 \sphericalangle 8$
b) $\sphericalangle 2 \sphericalangle 7, \sphericalangle 4 \sphericalangle 5$
c) $\sphericalangle 1 \sphericalangle 8, \sphericalangle 3 \sphericalangle 6$
d) $\sphericalangle 2 \sphericalangle 5, \sphericalangle 4 \sphericalangle 7$

Identify all pairs of angles of the given type.

a. Corresponding

b. Alternate interior

c. Alternate exterior

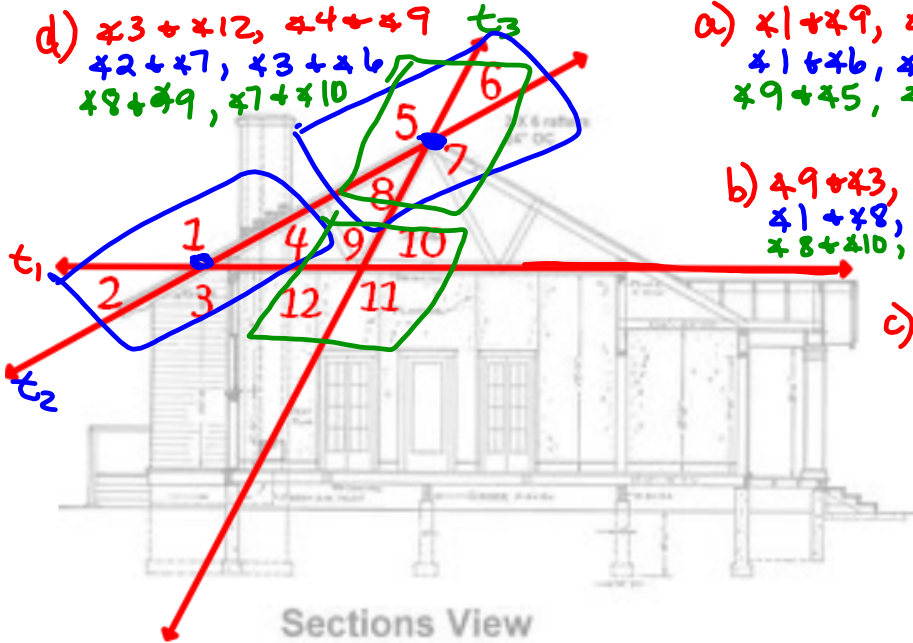
d. Consecutive interior

d) $\angle 3 + \angle 12, \angle 4 + \angle 9$
 $\angle 2 + \angle 7, \angle 3 + \angle 6$
 $\angle 8 + \angle 9, \angle 7 + \angle 10$

a) $\angle 1 + \angle 9, \angle 2 + \angle 12, \angle 3 + \angle 11, \angle 4 + \angle 10$
 $\angle 1 + \angle 6, \angle 2 + \angle 5, \angle 3 + \angle 8, \angle 4 + \angle 7$
 $\angle 9 + \angle 5, \angle 10 + \angle 6, \angle 12 + \angle 8, \angle 11 + \angle 7$

b) $\angle 9 + \angle 3, \angle 4 + \angle 12$
 $\angle 1 + \angle 8, \angle 4 + \angle 5$
 $\angle 8 + \angle 10, \angle 9 + \angle 7$

c) $\angle 1 + \angle 11, \angle 2 + \angle 10$
 $\angle 1 + \angle 8, \angle 4 + \angle 5$
 $\angle 5 + \angle 11, \angle 12 + \angle 6$



Identify all pairs of angles of the given type.

a. Corresponding

b. Alternate interior

c. Alternate exterior

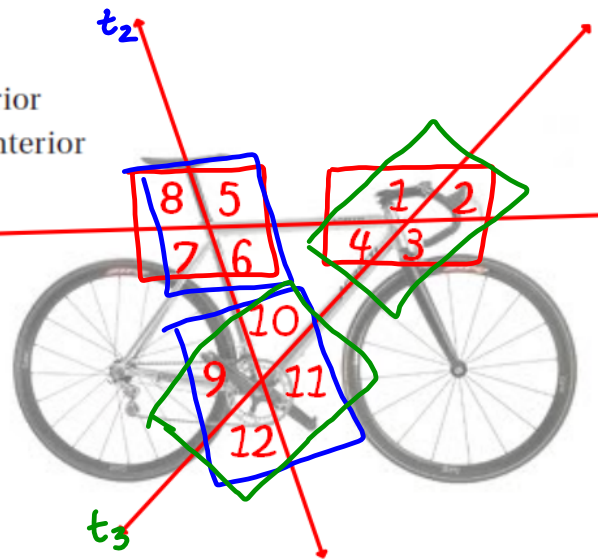
d. Consecutive interior

a) $\angle 8, \angle 1$ $\angle 5, \angle 2$ $\angle 7, \angle 4$ $\angle 6 + \angle 3$
 $\angle 8, \angle 9$ $\angle 5, \angle 10$ $\angle 7, \angle 12$ $\angle 6 + \angle 11$
 $\angle 9, \angle 4$ $\angle 10, \angle 1$ $\angle 12, \angle 3$ $\angle 11, \angle 2$

b) $\angle 5, \angle 4$
 $\angle 6, \angle 1$
 $\angle 7, \angle 10$
 $\angle 6, \angle 9$
 $\angle 10, \angle 3$
 $\angle 11, \angle 4$

c) $\angle 8, \angle 3$
 $\angle 7, \angle 2$
 $\angle 8, \angle 11$
 $\angle 5, \angle 12$
 $\angle 9, \angle 2$
 $\angle 12, \angle 1$

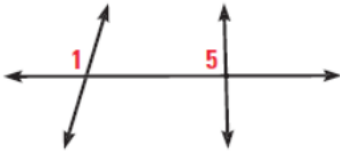
d) $\angle 5, \angle 1$
 $\angle 6, \angle 4$
 $\angle 6, \angle 10$
 $\angle 7, \angle 9$
 $\angle 10, \angle 4$
 $\angle 11, \angle 3$



Try this:

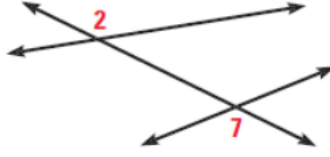
Classify the pair of numbered angles.

3.



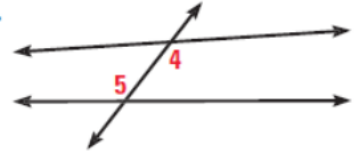
Corresponding

4.



Alternate
Exterior

5.



Alternate
Interior

Homework

Worksheet