

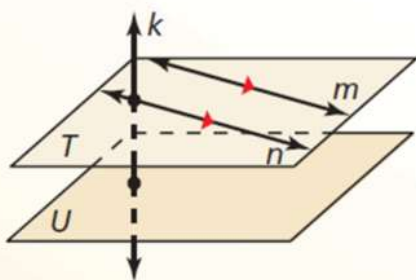
Essential Question

What does it mean when two lines are parallel, intersecting, ~~coincident~~, or skew?

Core Concept

Parallel Lines, Skew Lines, and Parallel Planes

Two lines that do not intersect are either *parallel lines* or *skew lines*. Two lines are **parallel lines** when they do not intersect and are coplanar. Two lines are **skew lines** when they do not intersect and are not coplanar. Also, two planes that do not intersect are **parallel planes**.



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

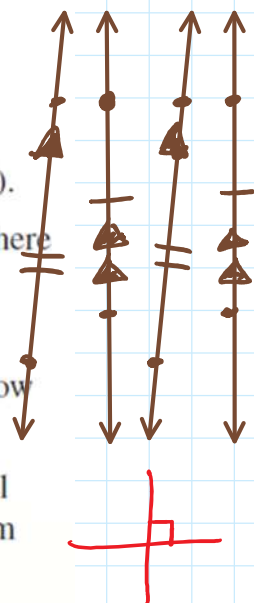
Lines m and k are skew lines. \perp

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

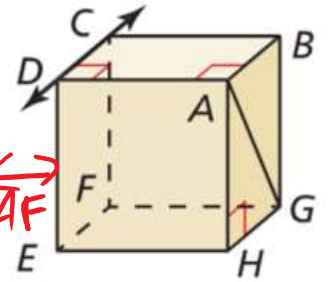
Lines k and n are intersecting lines, and there is a plane (not shown) containing them.

Small directed arrows, as shown in red on lines m and n above, are used to show that lines are parallel. The symbol \parallel means “is parallel to,” as in $m \parallel n$.

Segments and rays are parallel when they lie in parallel lines. A line is parallel to a plane when the line is in a plane parallel to the given plane. In the diagram above, line n is parallel to plane U .



Think of each segment in the figure as part of a line.
Which line(s) or plane(s) 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{AH} \overleftrightarrow{AG} \overleftrightarrow{AE} \overleftrightarrow{AF}
- c. line(s) perpendicular to \overleftrightarrow{CD} and containing point A \overleftrightarrow{DA}
- d. plane(s) parallel to plane EFG and containing point A

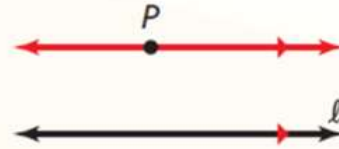
DAB ADC
 DLB Just fine

Postulates

Postulate 3.1 Parallel Postulate

If there is a line and a point not on the line, then there is exactly one line through the point parallel to the given line.

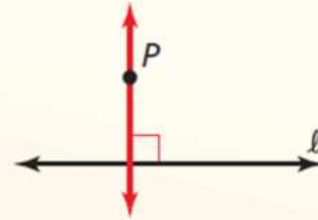
There is exactly one line through P parallel to l .



Postulate 3.2 Perpendicular Postulate

If there is a line and a point not on the line, then there is exactly one line through the point perpendicular to the given line.

There is exactly one line through P perpendicular to l .



The given line markings show how the roads in a town are related to one another.

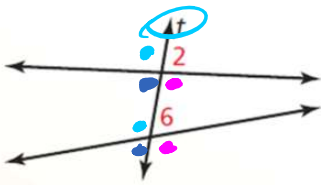
- Name a pair of parallel lines. $\overleftrightarrow{DM} \parallel \overleftrightarrow{EF}$
- Name a pair of perpendicular lines. $\overleftrightarrow{DM} \perp \overleftrightarrow{BF}$
- Is $\overleftrightarrow{FE} \parallel \overleftrightarrow{AC}$? Explain. *No.*

Disjunct-Notion

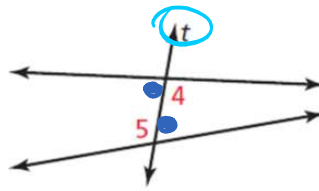


Core Concept

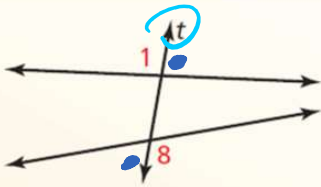
Angles Formed by Transversals



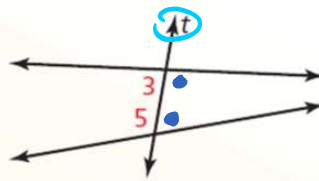
Two angles are **corresponding angles** when they have corresponding positions. For example, $\angle 2$ and $\angle 6$ are above the lines and to the right of the transversal t .



Two angles are **alternate interior angles** when they lie between the two lines and on opposite sides of the transversal t .

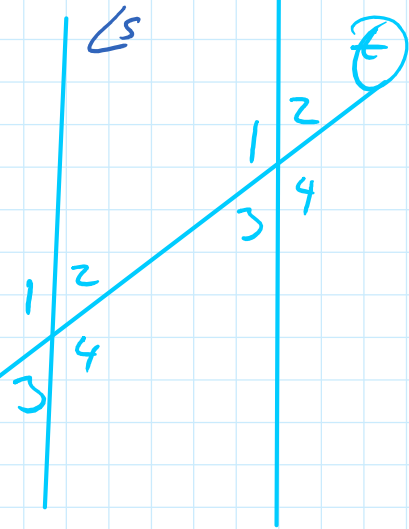


Two angles are **alternate exterior angles** when they lie outside the two lines and on opposite sides of the transversal t .



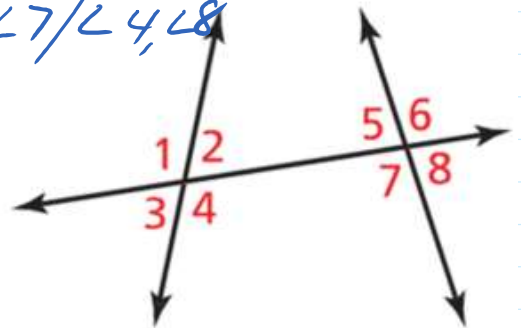
Two angles are **consecutive interior angles** when they lie between the two lines and on the same side of the transversal t .

Corresponding

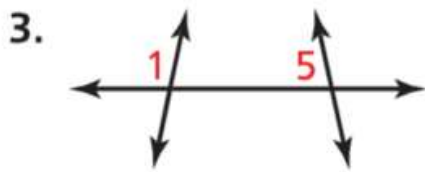


Identify all pairs of angles of the given type.

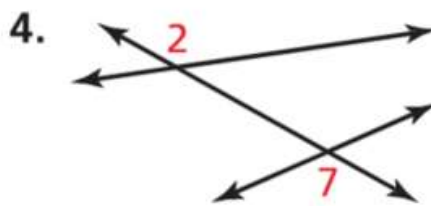
- a. corresponding $\angle 1, \angle 5 / \angle 2, \angle 6 / \angle 3, \angle 7 / \angle 4, \angle 8$
- b. alternate interior $\angle 2, \angle 7 / \angle 4, \angle 5$
- c. alternate exterior $\angle 1, \angle 8 / \angle 3, \angle 6$
- d. consecutive interior $\angle 2, \angle 5 / \angle 4, \angle 7$



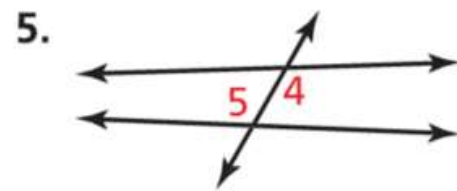
Classify the pair of numbered angles.



Corr. \angle s



Alt. Ext. \angle s



Alt Int. \angle s

Practice sec 3.1 pg.
129: 1-18A

