

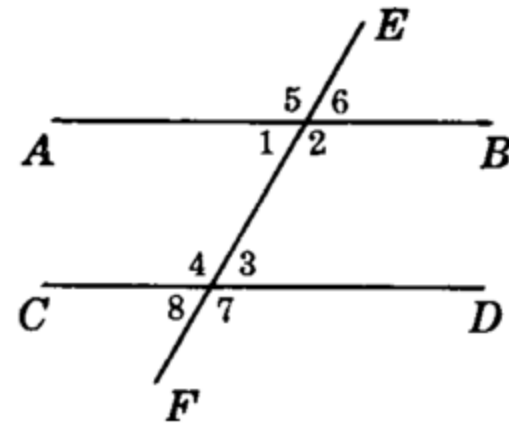
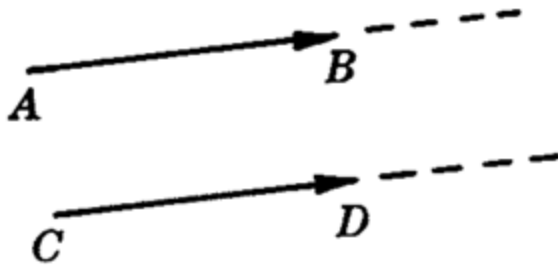


• Parallel Lines

Department of Mathematics Education
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Parallel Line

- Parallel lines are straight lines which lie in the same plane and do not intersect however far they are extended.
- The symbol for parallel is \parallel ; thus line $AB \parallel$ line CD is read “line AB is parallel to line CD .”
- In diagrams, arrows are used to indicate that lines are parallel

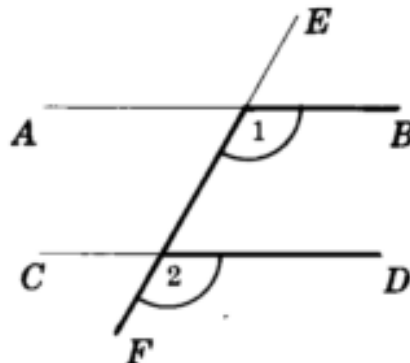


Parallel Line

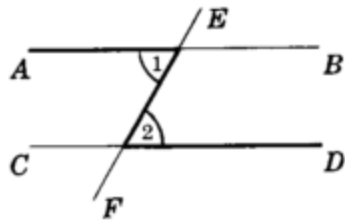
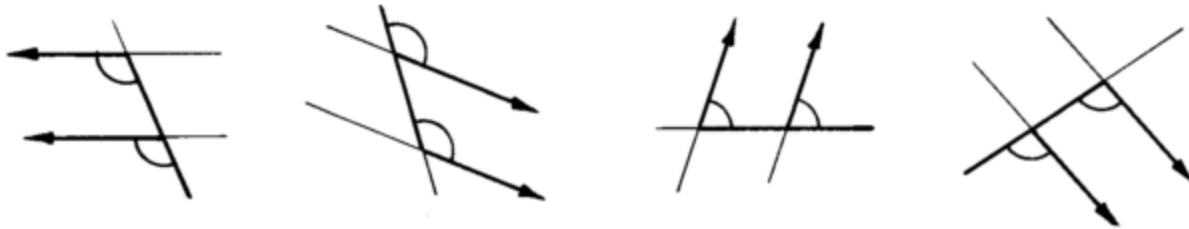
- ❑ A transversal of two or more lines is a line that cuts across these lines. Thus, line EF is a transversal of line AB and CD.
- ❑ The interior angles formed by two lines cut by a transversal are the angles between the two lines, while the exterior angles are those outside the lines. Thus, of the eight angles formed by line AB and CD cut by EF, the interior angles are $\angle 1$, $\angle 2$, $\angle 3$, and $\angle 4$; the exterior angles are $\angle 5$, $\angle 6$, $\angle 7$, and $\angle 8$.

Pairs of Angles Formed by Two Lines Cut By Transversal

- Corresponding angles of two lines cut by a transversal are angles on the same side of the transversal and on the same side of the lines.
- Thus, $\angle 1$ and $\angle 2$ in the figure below are **corresponding angles** of line AB and CD cut by transversal EF. Note that in this case the two angles are both to the right of the transversal and both below the lines

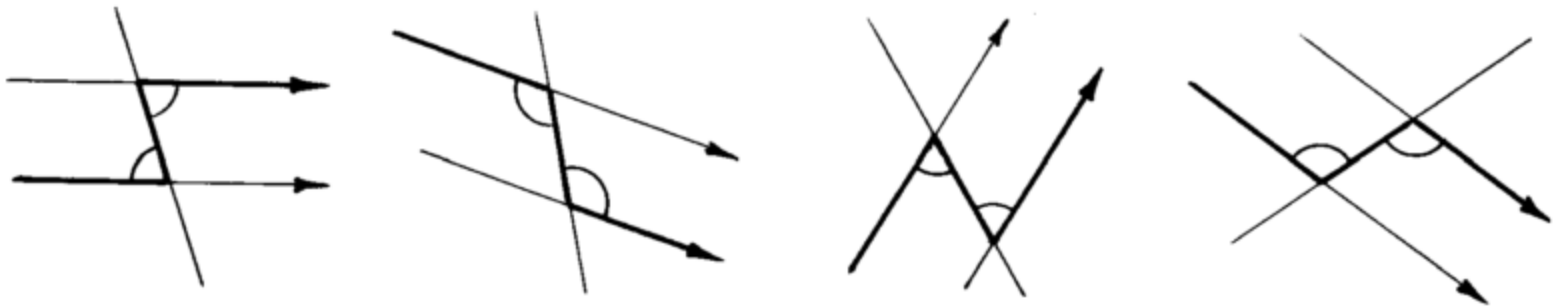


Corresponding Angles

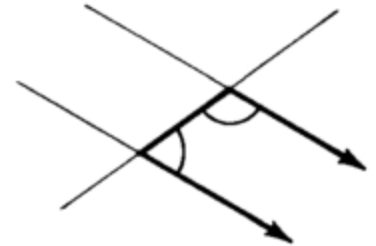
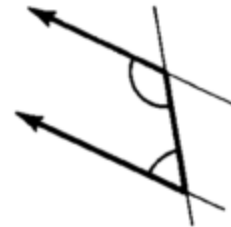


Alternate Interior Angles

Alternate Interior Angles of two lines cut by a transversal are nonadjacent angles between the two lines and on opposite sides of transversal.



Interior Angles on the same side of the transversal

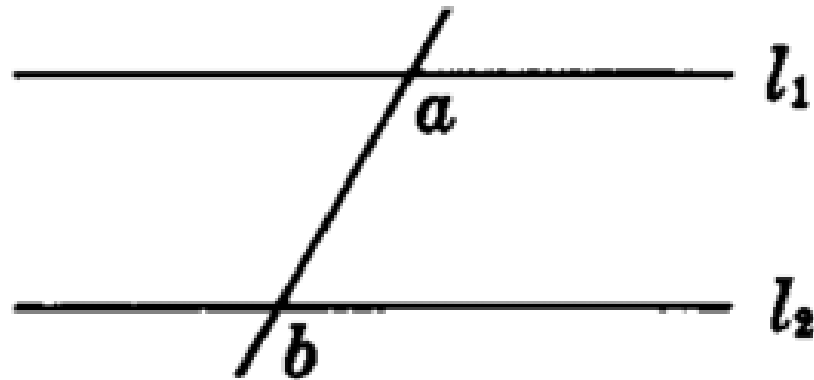


Principles of Parallel Line

Through a given point not on a given line, one and only one line can be drawn parallel to a given line (Parallel-Line Postulate)

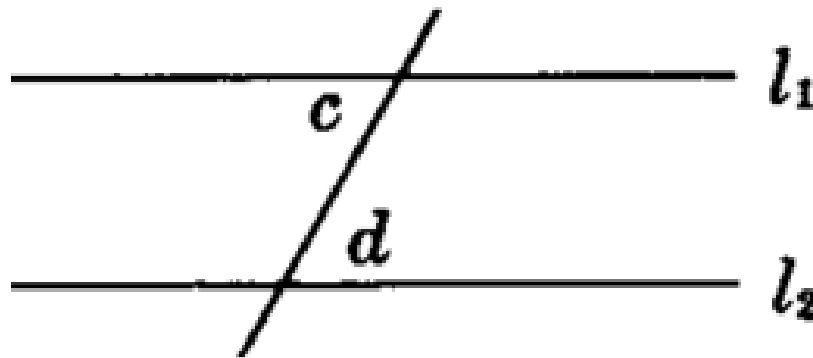
Principle 2

Two lines are parallel if a pair of corresponding angles are congruent.



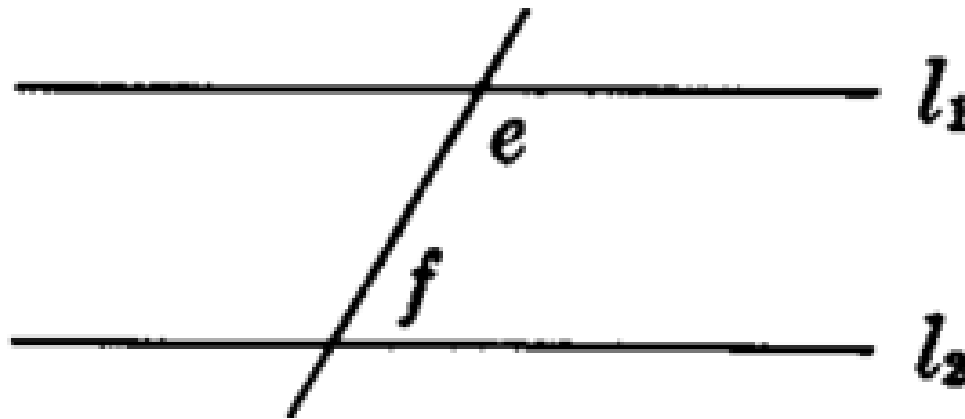
Principle 3

Two lines are parallel if a pair of **alternate interior angles** are congruent



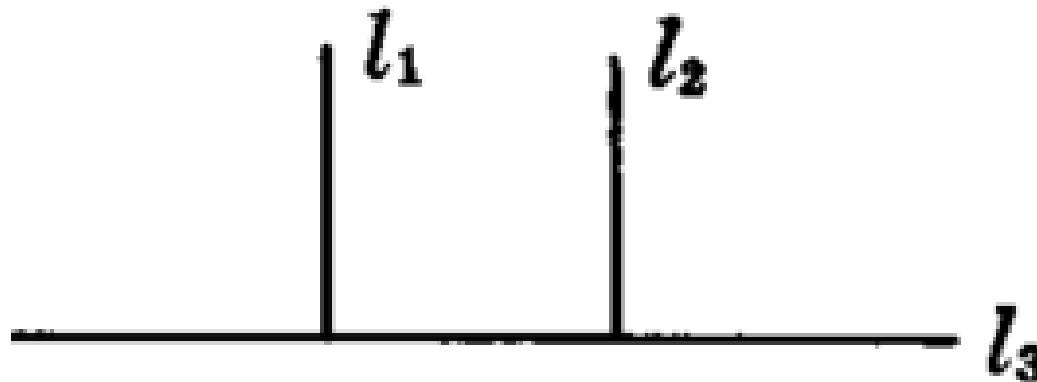
Principle 4

Two lines are parallel if a pair of **interior angles on the same side** of a transversal are supplementary



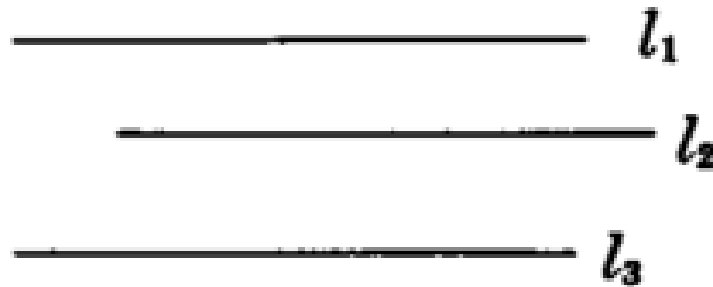
Principle 5

Lines are parallel if they are perpendicular to the same line. (Perpendiculars to the same line are parallel)



Principle 6

Lines are parallel if they are parallel to the same line. (Parallels to the same line are parallel).

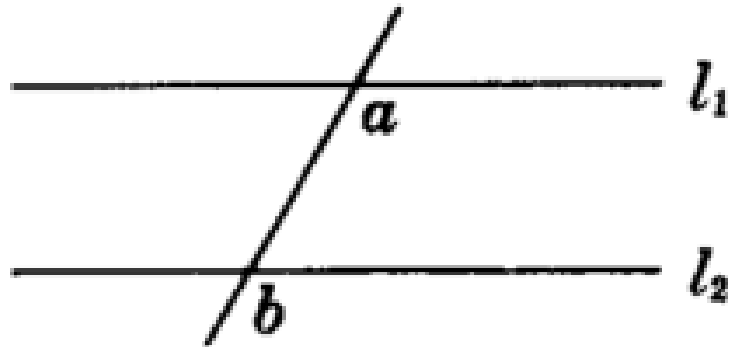


Properties of Parallel Lines

Principle 7

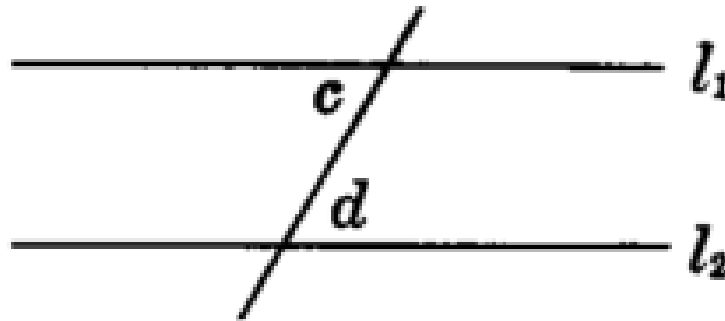
If two lines are parallel, each pair of corresponding angles are congruent.

(Corresponding angles of parallel lines are congruent)



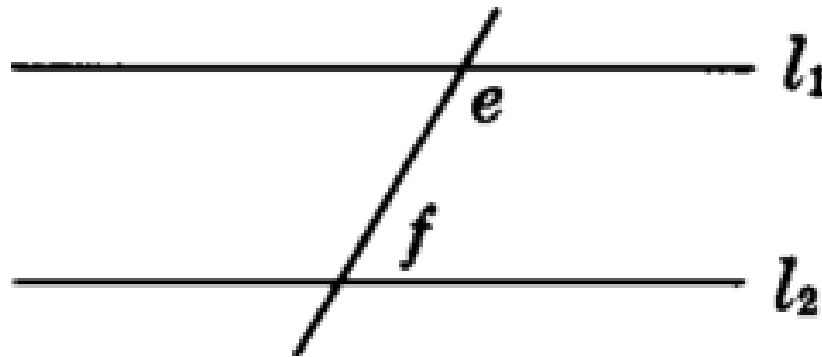
Principle 8

If two lines are parallel, each pairs of **alternate interior angles** are congruent.
(Alternate interior angles of parallel lines are congruent)



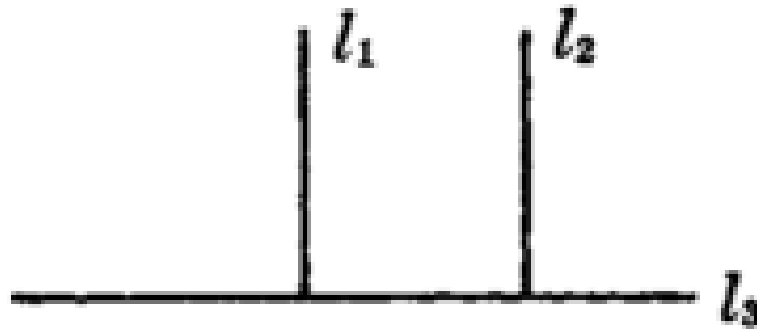
Principle 9

If two lines parallel, each pair of **interior angles on the same side** of the transversal are supplementary



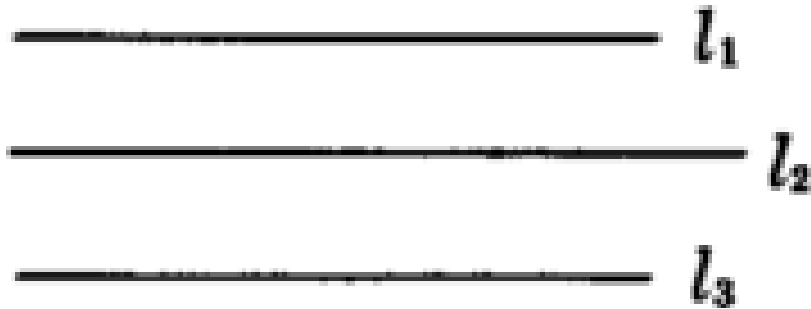
Principle 10

If lines are parallel, a line perpendicular to one of them is perpendicular to the others also



Principle 11

If lines are parallel, a line parallel to one of them is parallel to the others



Principle 12

If the sides of two angles are respectively parallel to each others are either congruent or supplementary

