

CHAPTER 1
TOOLS OF
GEOMETRY



LESSON 1.1
POINTS, LINES
AND PLANES

1. POINT

A point is an exact location in space with no shape or size. We show points as dots and usually name them with capital letters.
A point cannot be measured.

Example: ● A

 ● B

 ● C

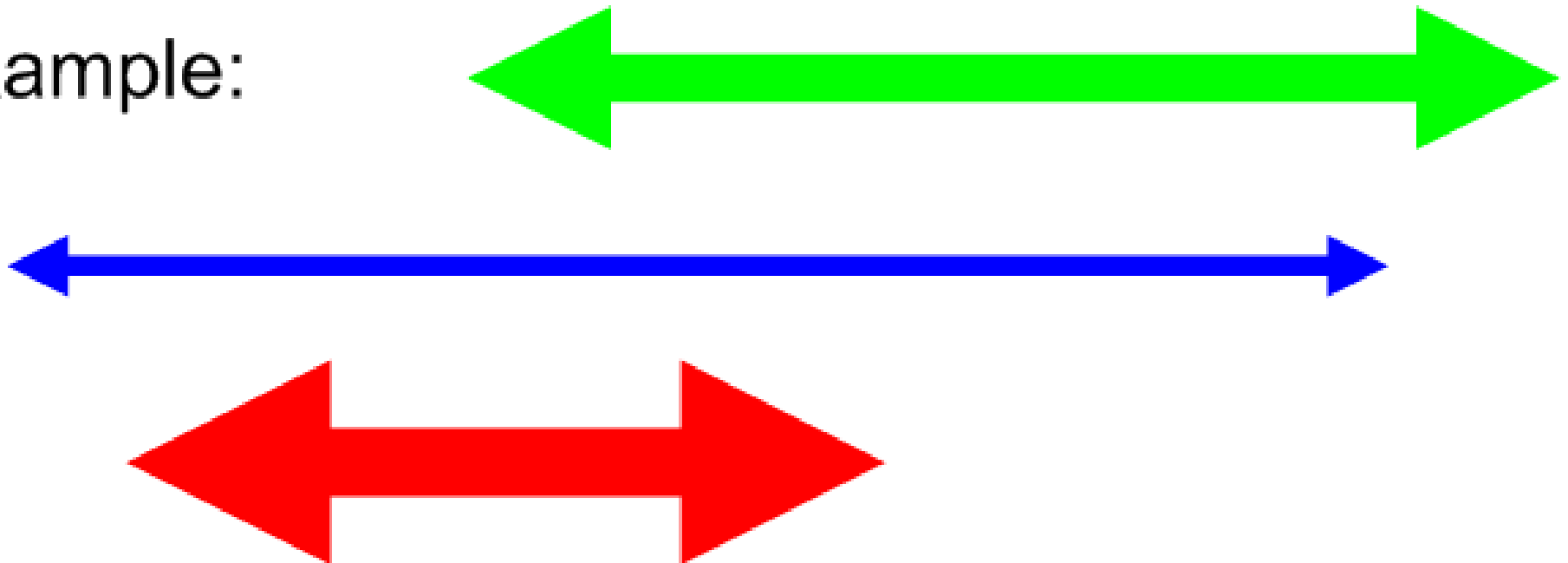
2. LINE

A line is a set of points in a straight path extending in opposite directions without end.

A line has no thickness or width.

A line cannot be measured.

Example:



3. SEGMENT

A segment is part of a straight line that starts and stops at specific points.
A segment can be measured.

Example:

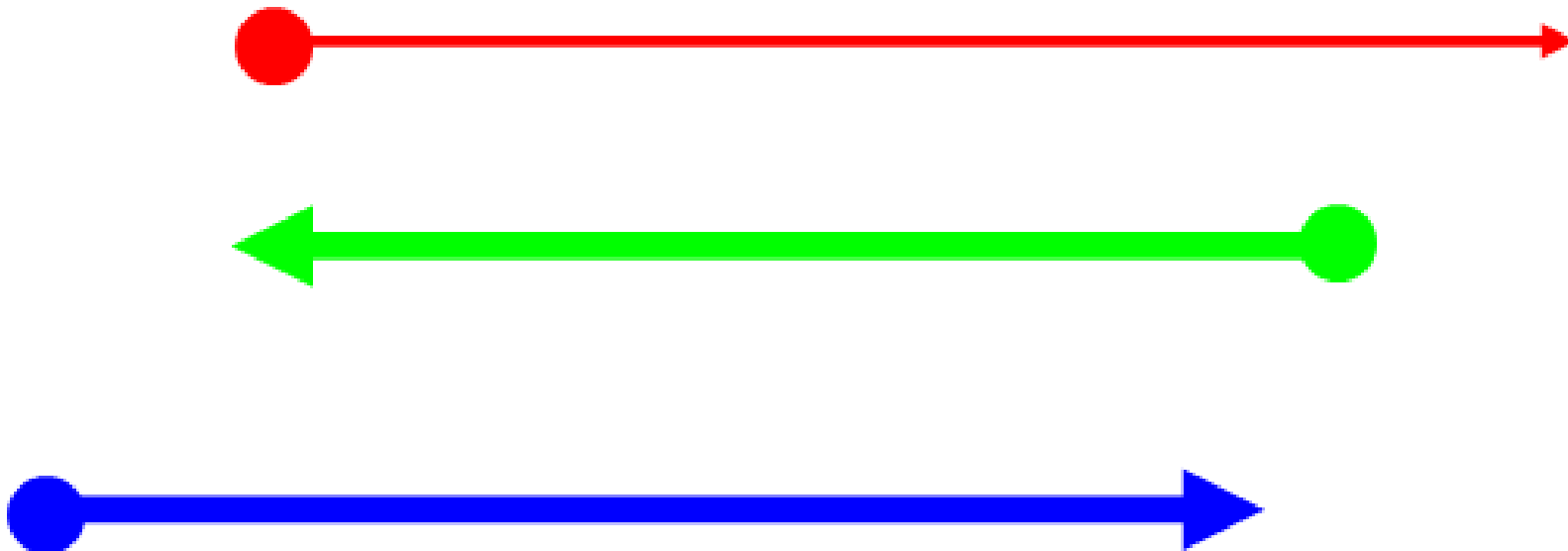


4. RAY

A ray is part of a line that has one endpoint and goes on and on in one direction.

A ray cannot be measured.

Example:



5. OPPOSITE RAYS

Two rays with a common initial point that extend in opposite direction.

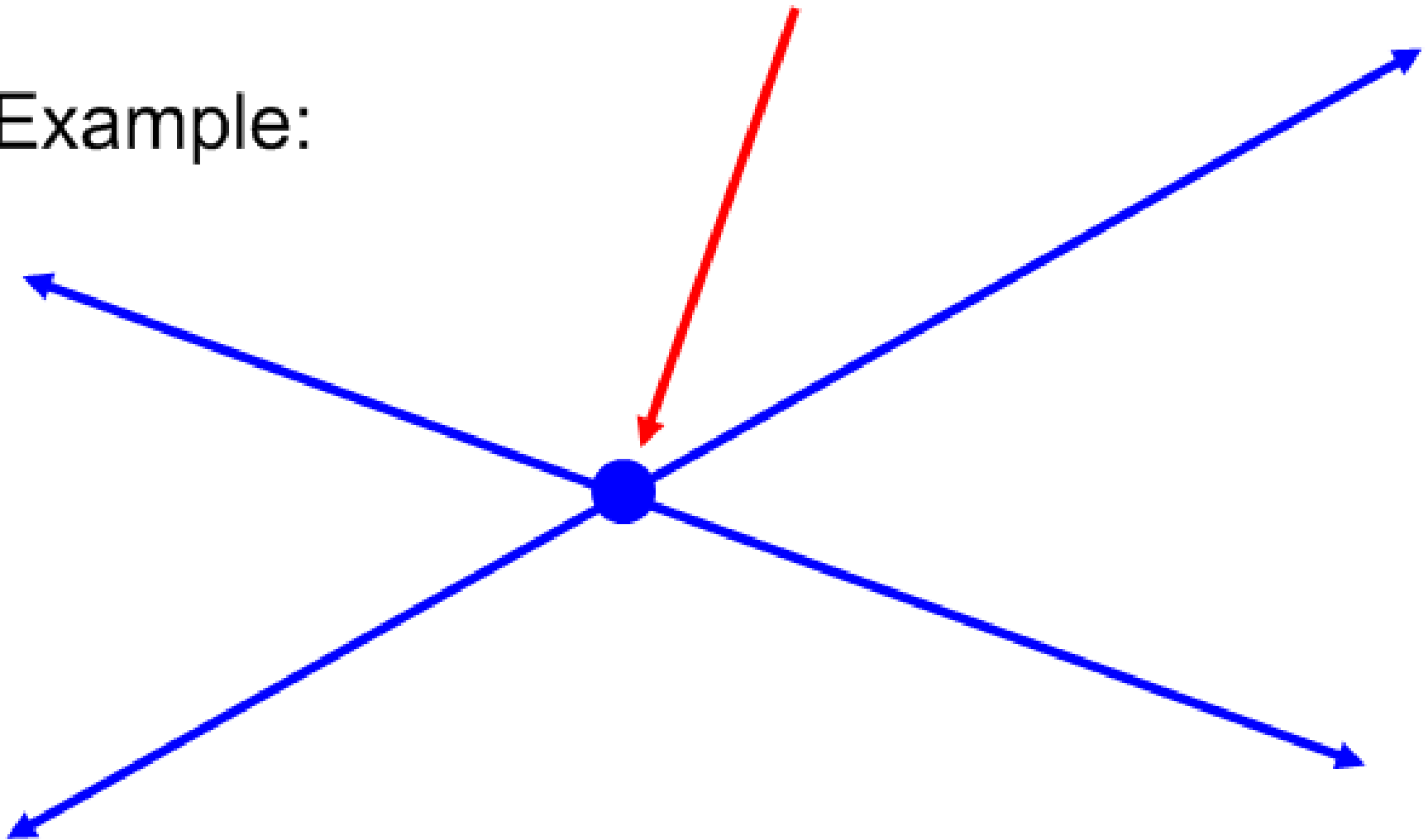
Example:



6. INTERSECTING LINES

Lines that meet (intersect) at only one point.

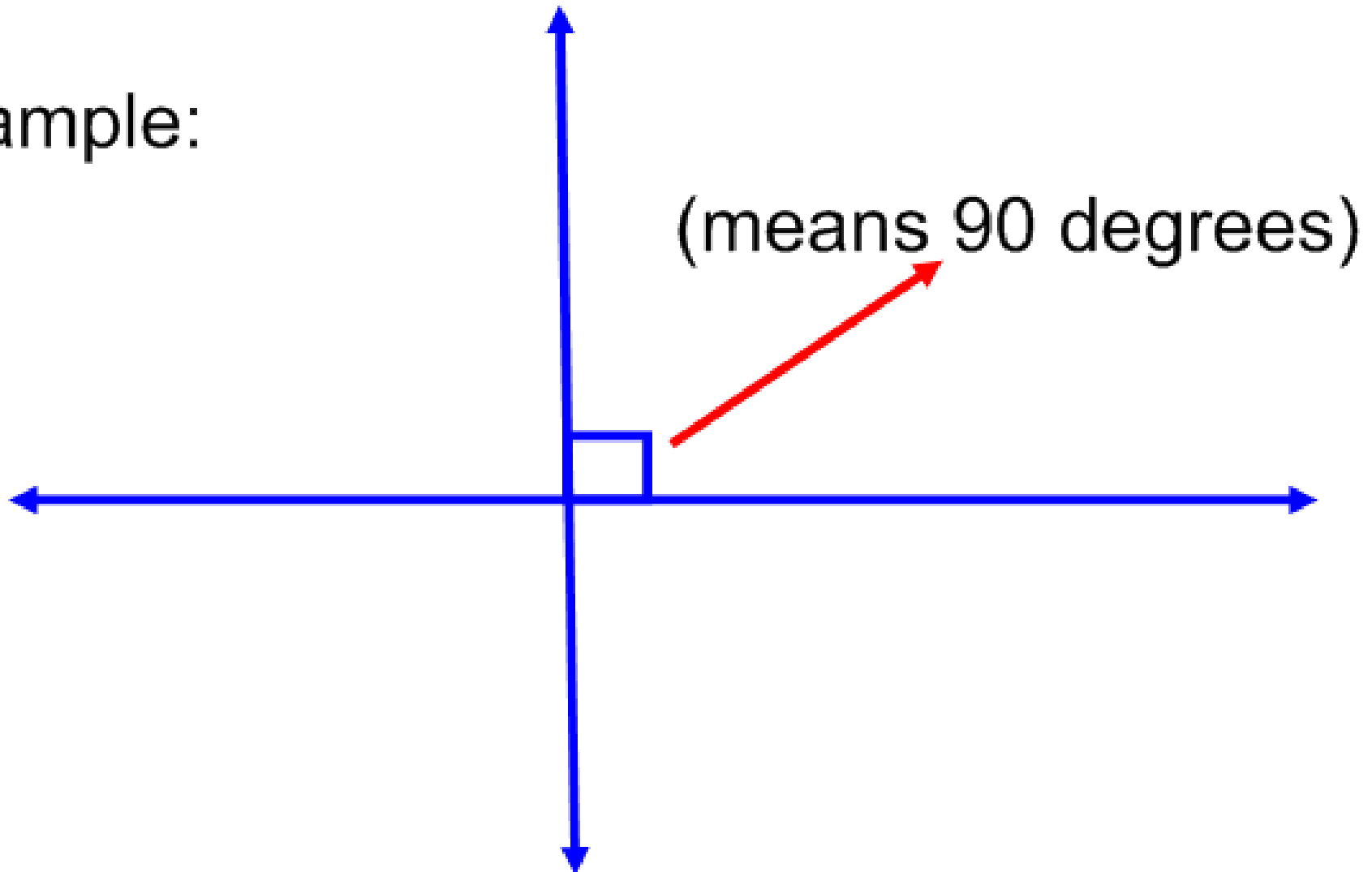
Example:



7. PERPENDICULAR LINES:

Two lines that form right angles.

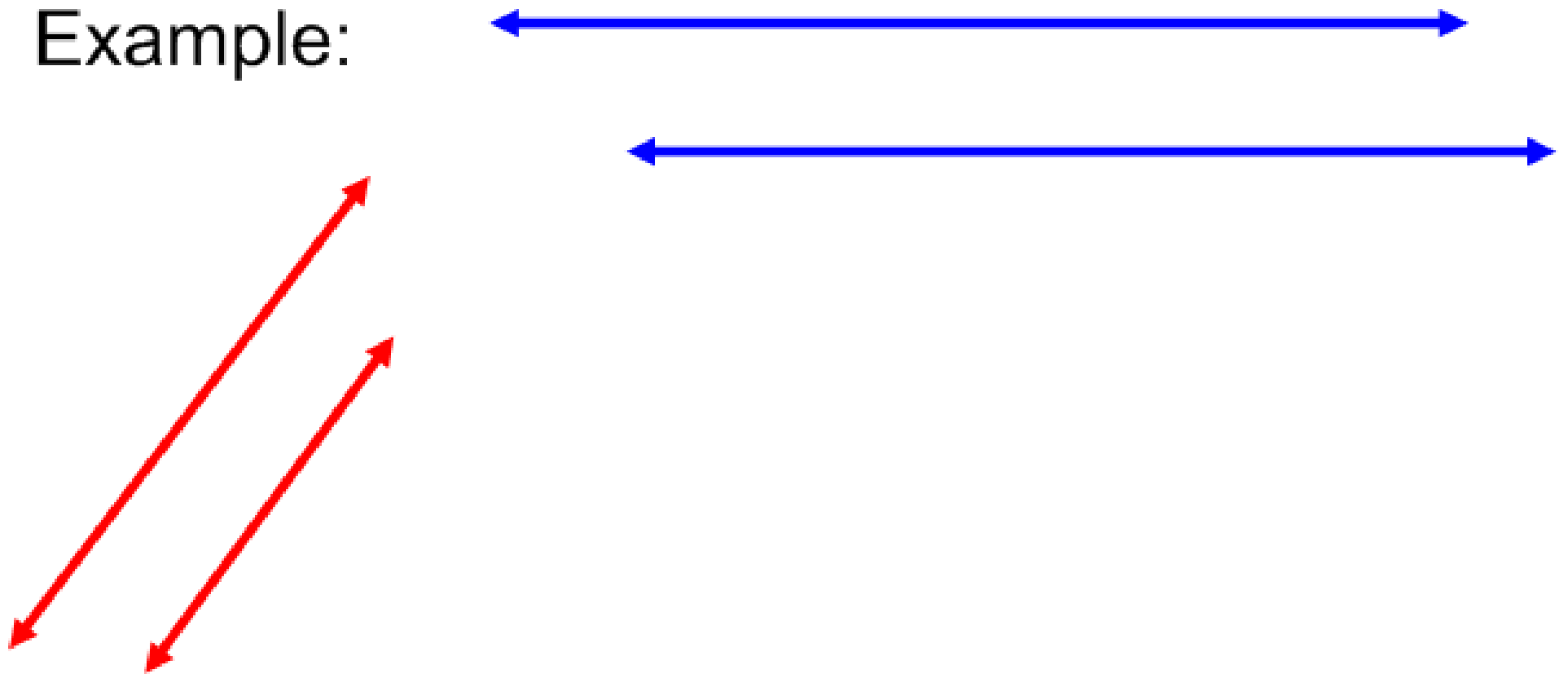
Example:



8. PARALLEL LINES

Two lines on the same plane that do not intersect.

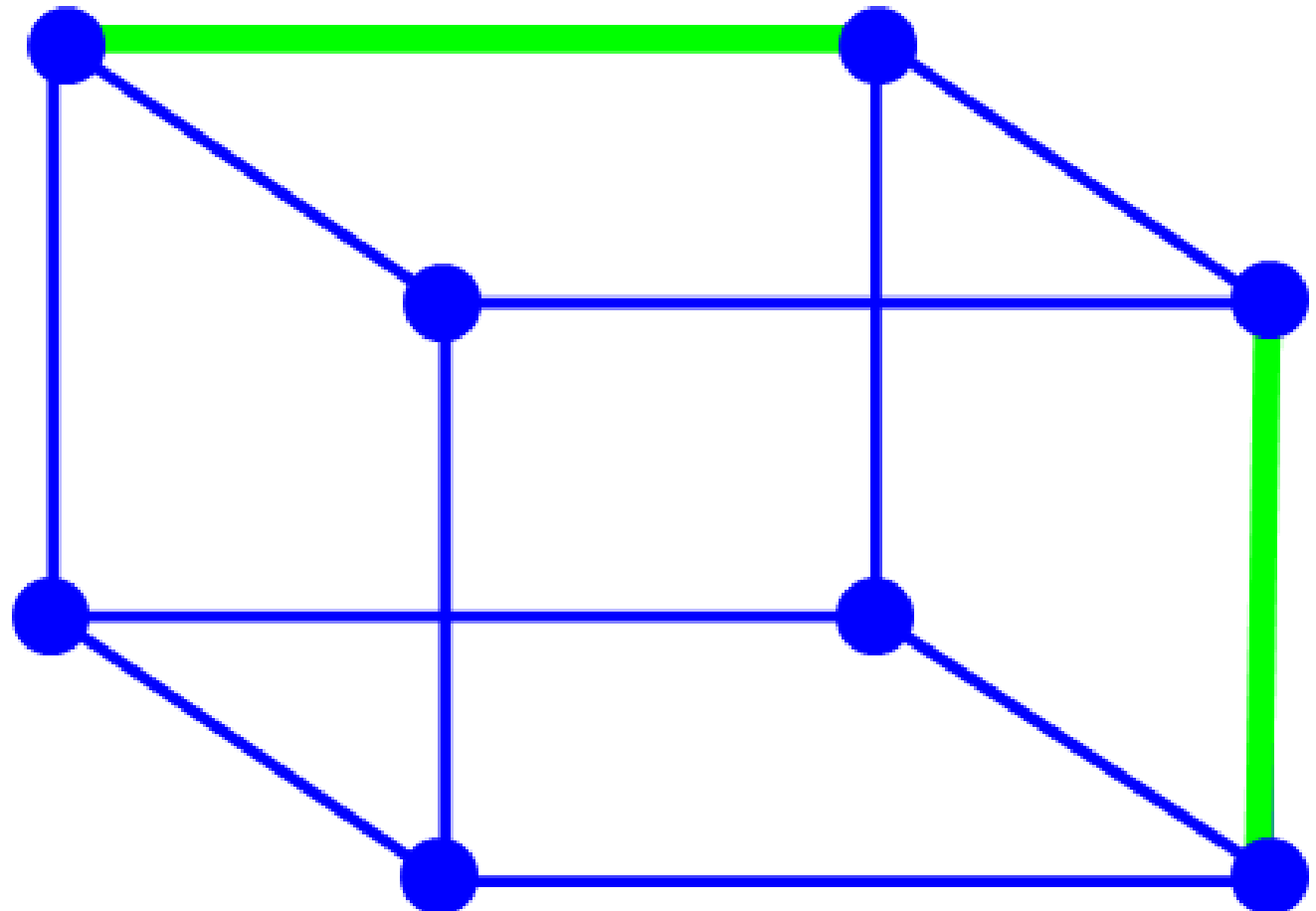
Example:



9. SKEW LINES

Non-coplanar lines which do not intersect.

Example:



10. COLLINEAR POINTS

Points that lie on the same line.

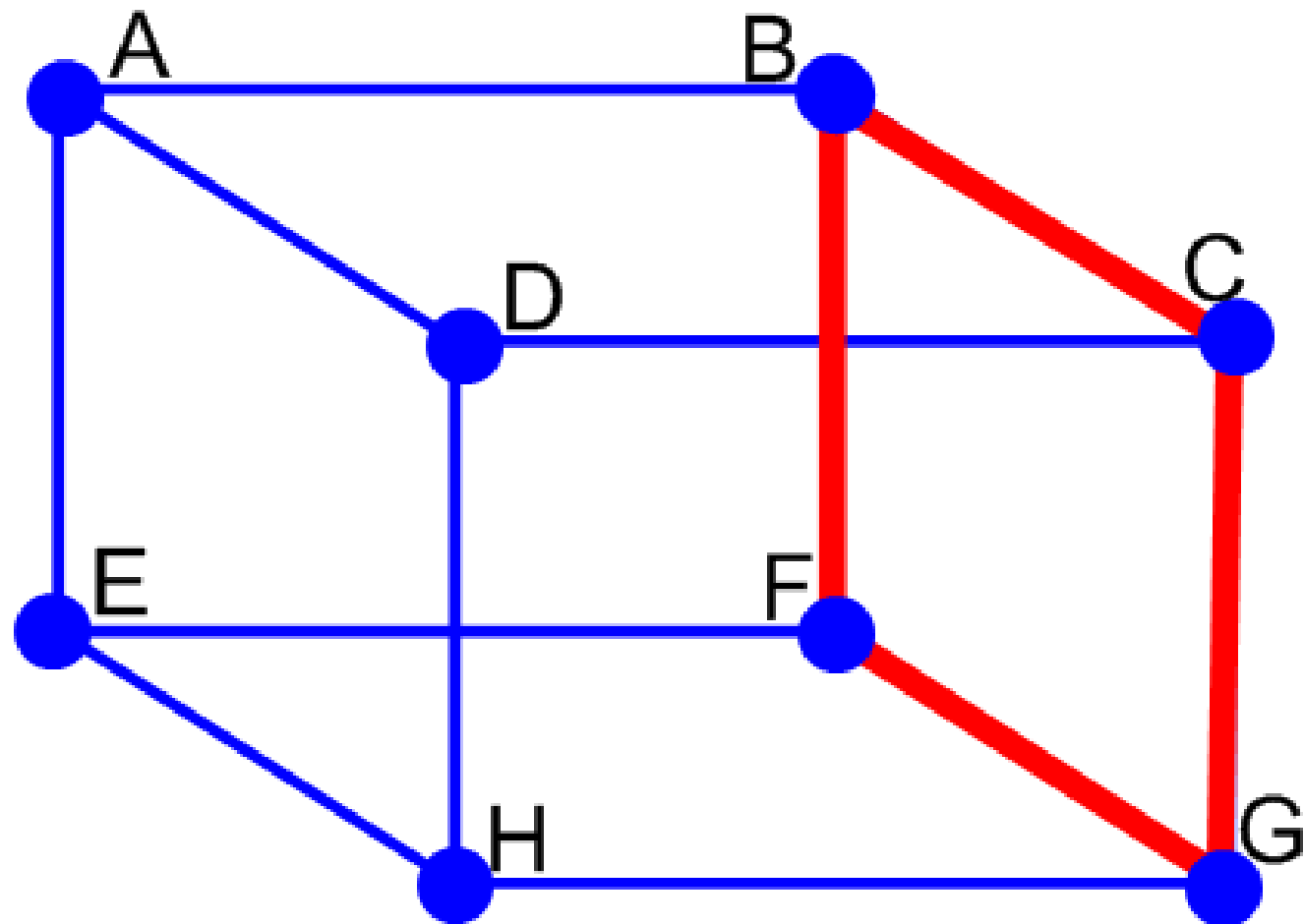
Example:



11. COPLANAR POINTS

Points that lie on the same plane.

Example:



LESSON 1.2

LESSON 1.3

LINEAR MEASURE

DISTANCE AND

MIDPOINT

1. DISTANCE FORMULA

A formula for computing the distance between two points in a coordinate plane.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

2. MIDPOINT FORMULA:

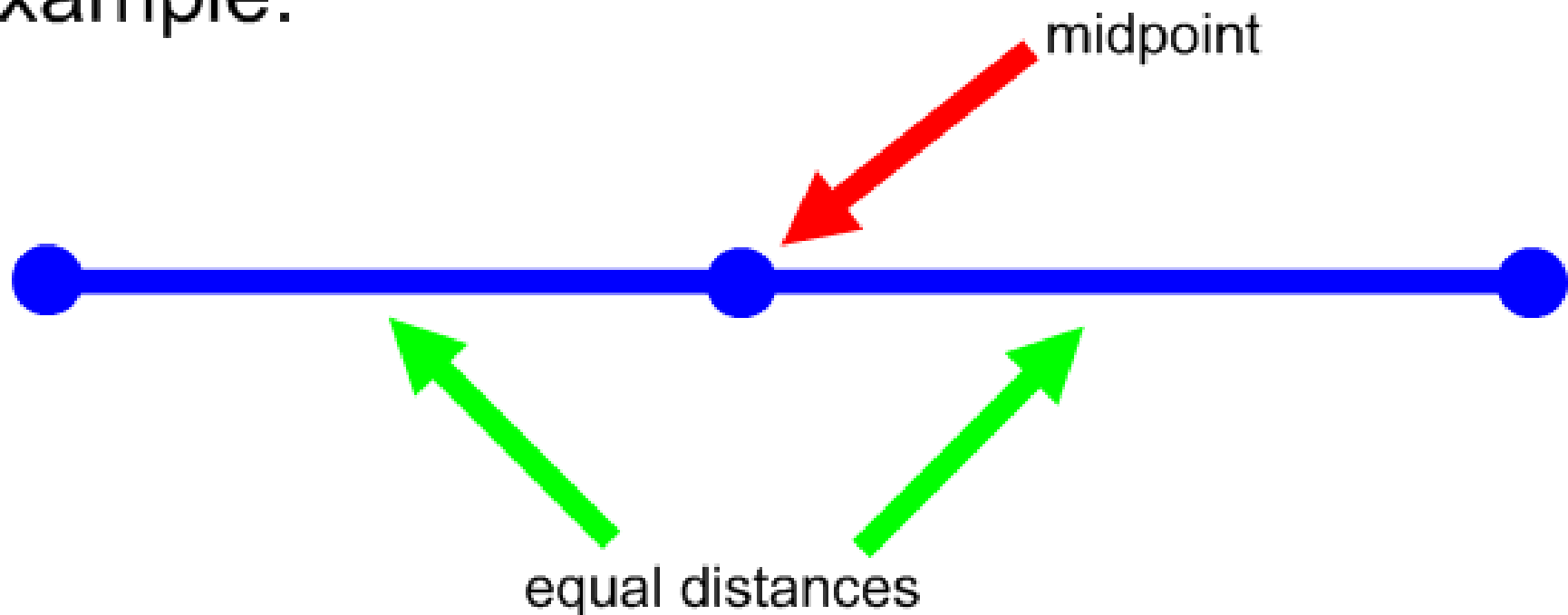
A formula for computing the midpoint of two points on a coordinate plane.

$$M = \left(\frac{(x_1 + x_2)}{2}, \frac{(y_1 + y_2)}{2} \right)$$

3. MIDPOINT

The midpoint is the point that divides, or bisects, the segment into two congruent segments.

Example:



4. CONGRUENT SEGMENTS

The mathematical symbol used to denote congruent is \cong .

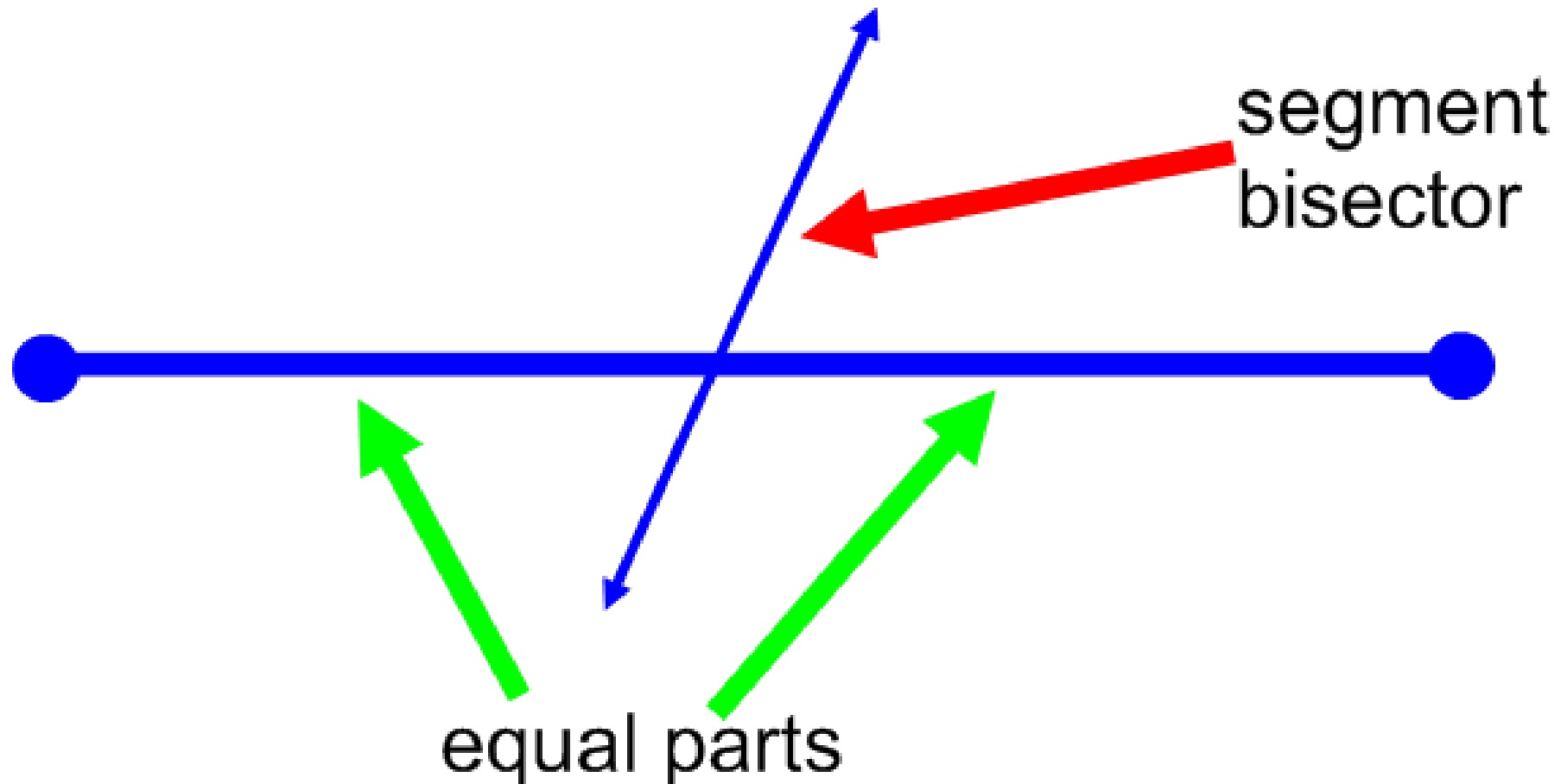
The symbol is made up of two parts:

\sim which means the same shape (similar) and

$=$ which means the same size (equal).

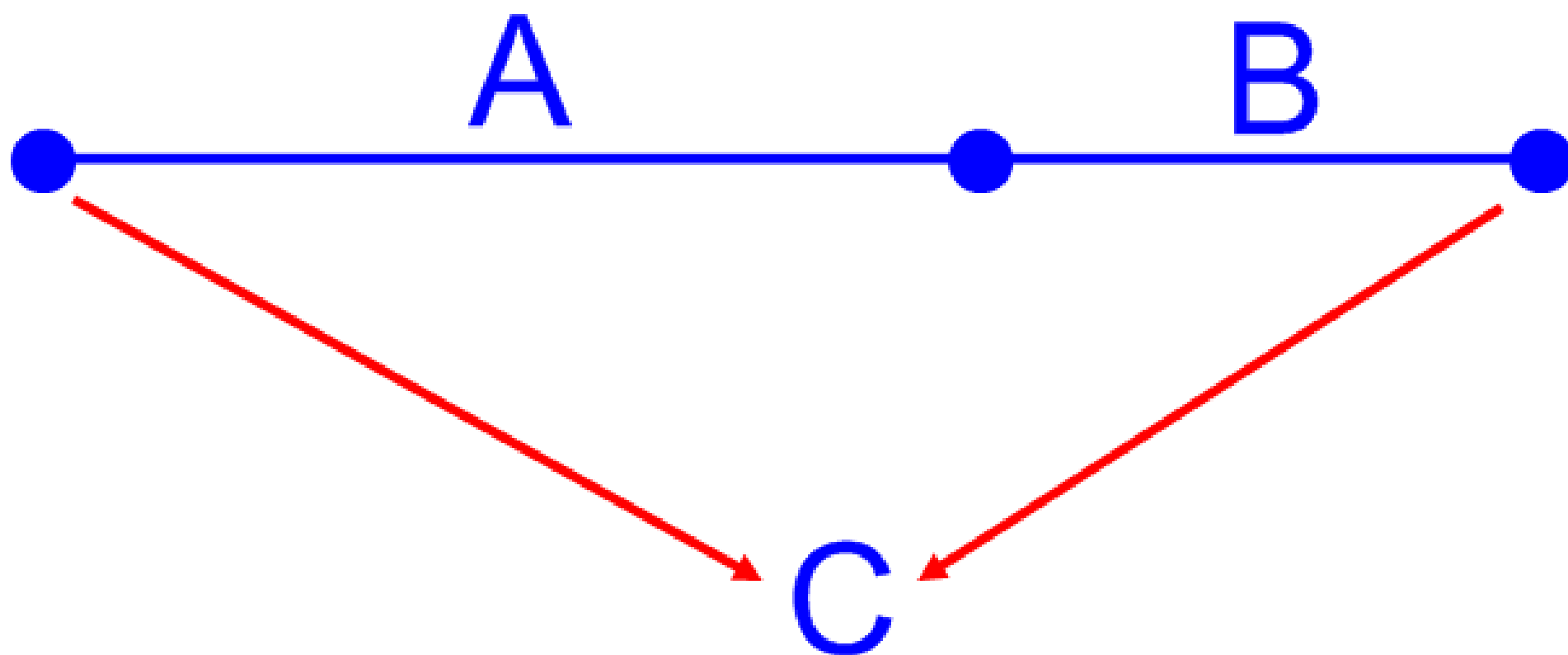
5. SEGMENT BISECTOR

A segment, ray, line, or plane that intersects a segment at its midpoint.



6. SEGMENT ADDITION POSTULATE

$$A + B = C$$



Lesson 1.4

Angle Measure

Lesson 1.5

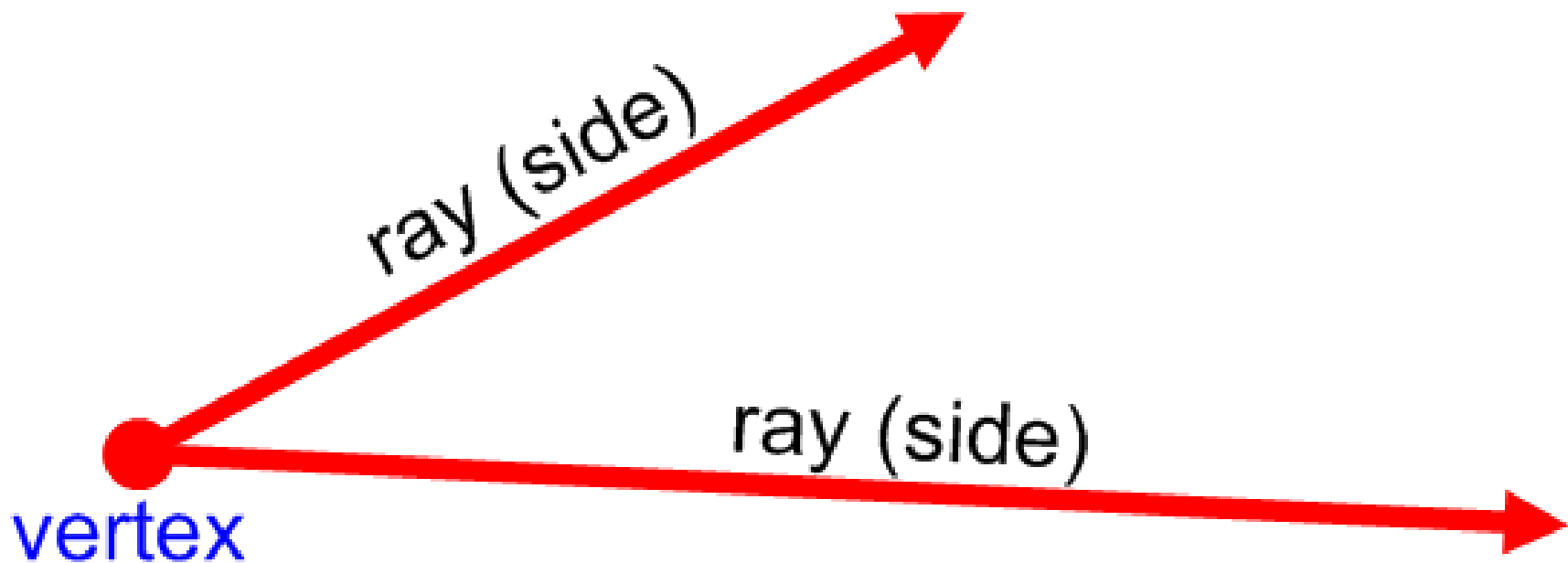
Angle Relationships

1. Angle:

An angle is formed by two rays that have a common endpoint.

The rays are called the sides of the angle.

The common endpoint is called the vertex.

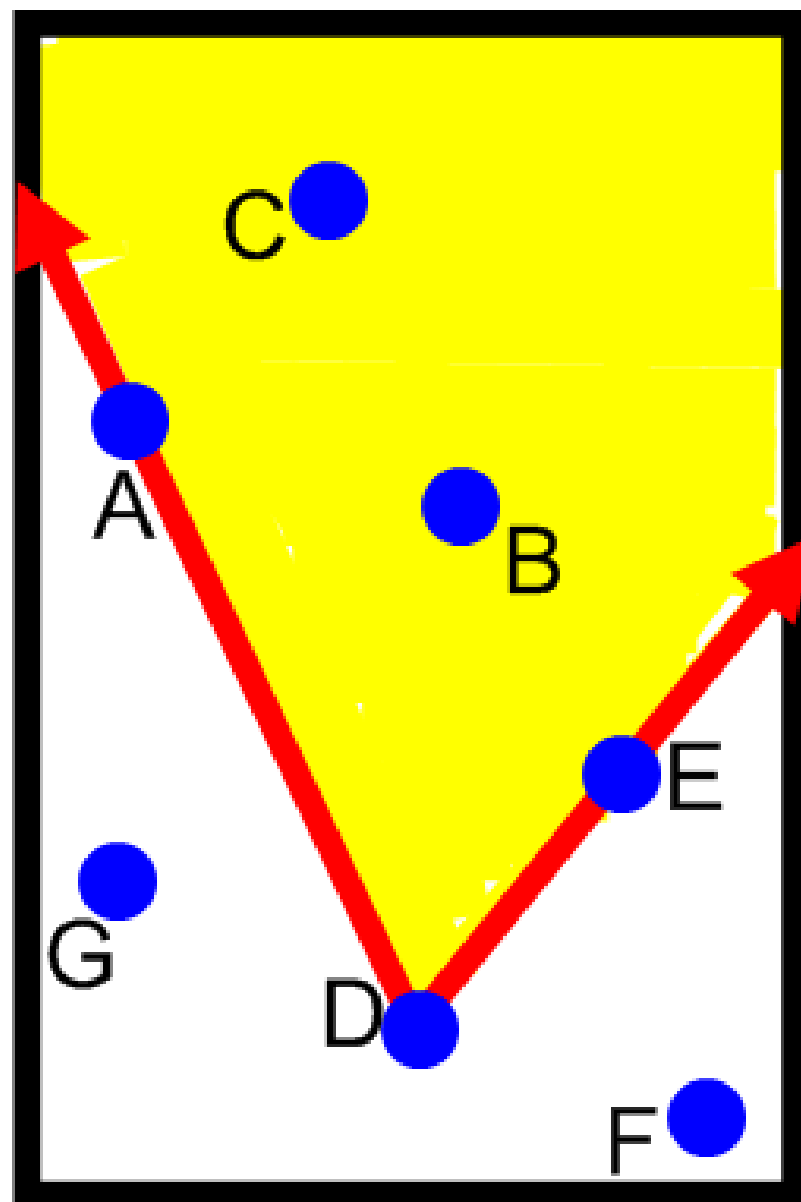


2. An angle divides a plane into three distance parts:

Points A, D, and E lie on the angle.

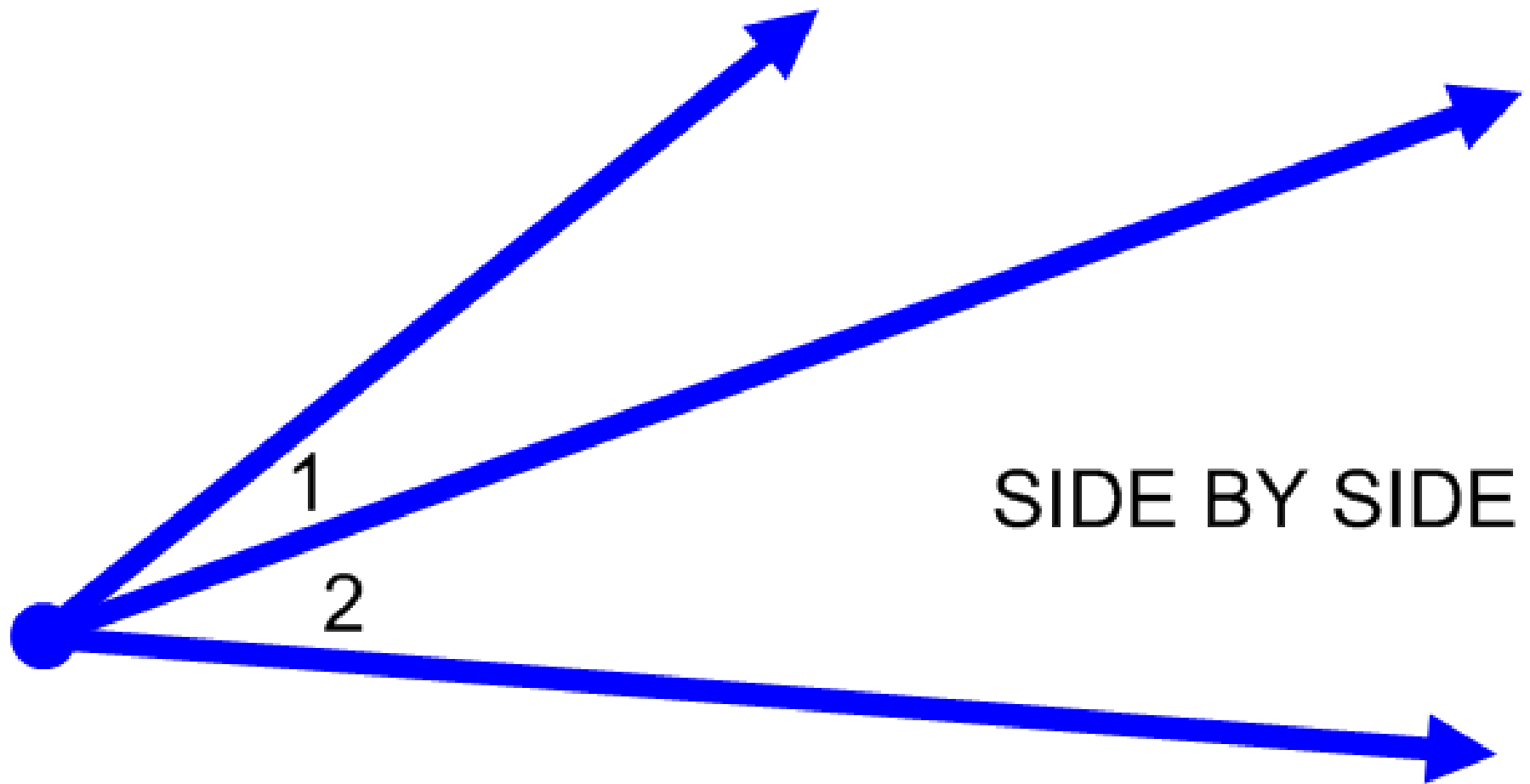
Points C and B lie in the interior of the angle.

Points F and G lie in the exterior of the angle.



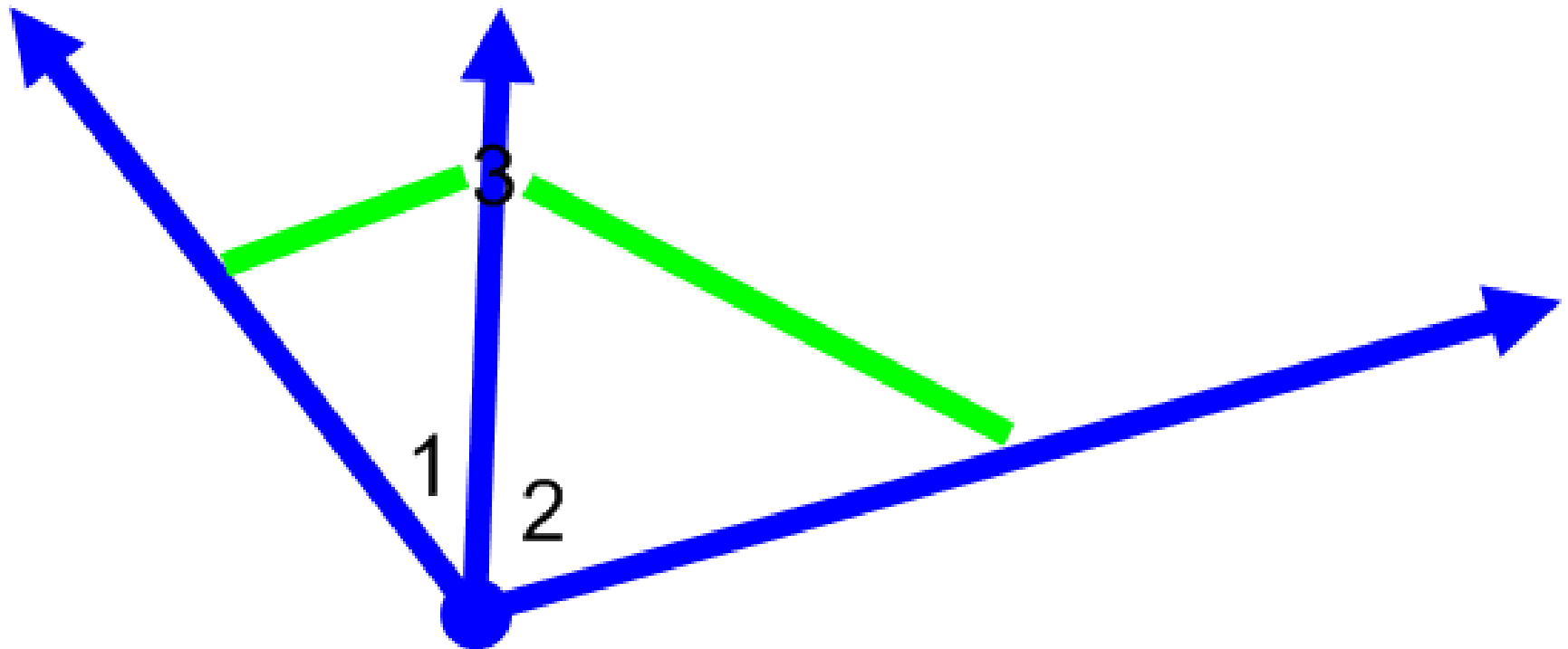
3. Adjacent Angles

Two angles which share a common vertex and side but no common points.



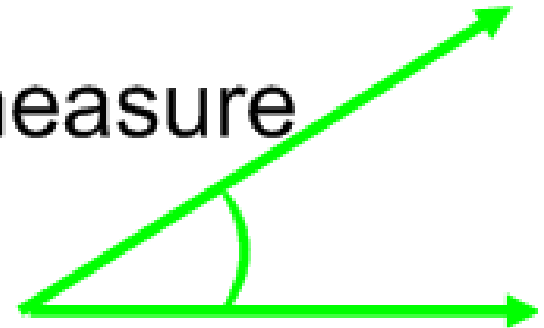
4. Angle Addition Postulate:

$$\text{angle 1} + \text{angle 2} = \text{angle 3}$$

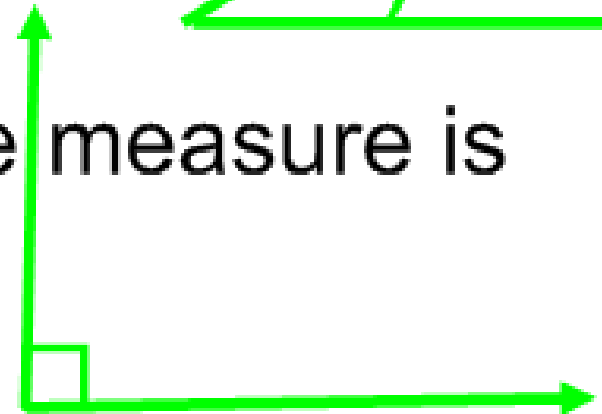


Classify Angles:

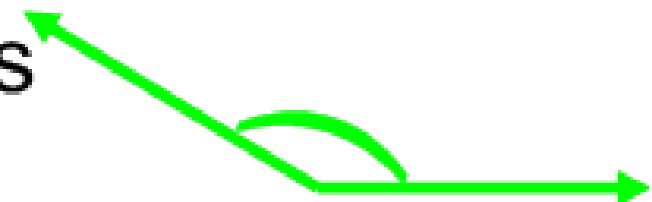
1. acute angle: an angle whose measure is between 0 and 90 degrees



2. right angle: an angle whose measure is exactly 90 degrees



3. obtuse angle: an angle whose measure is between 90 and 180 degrees

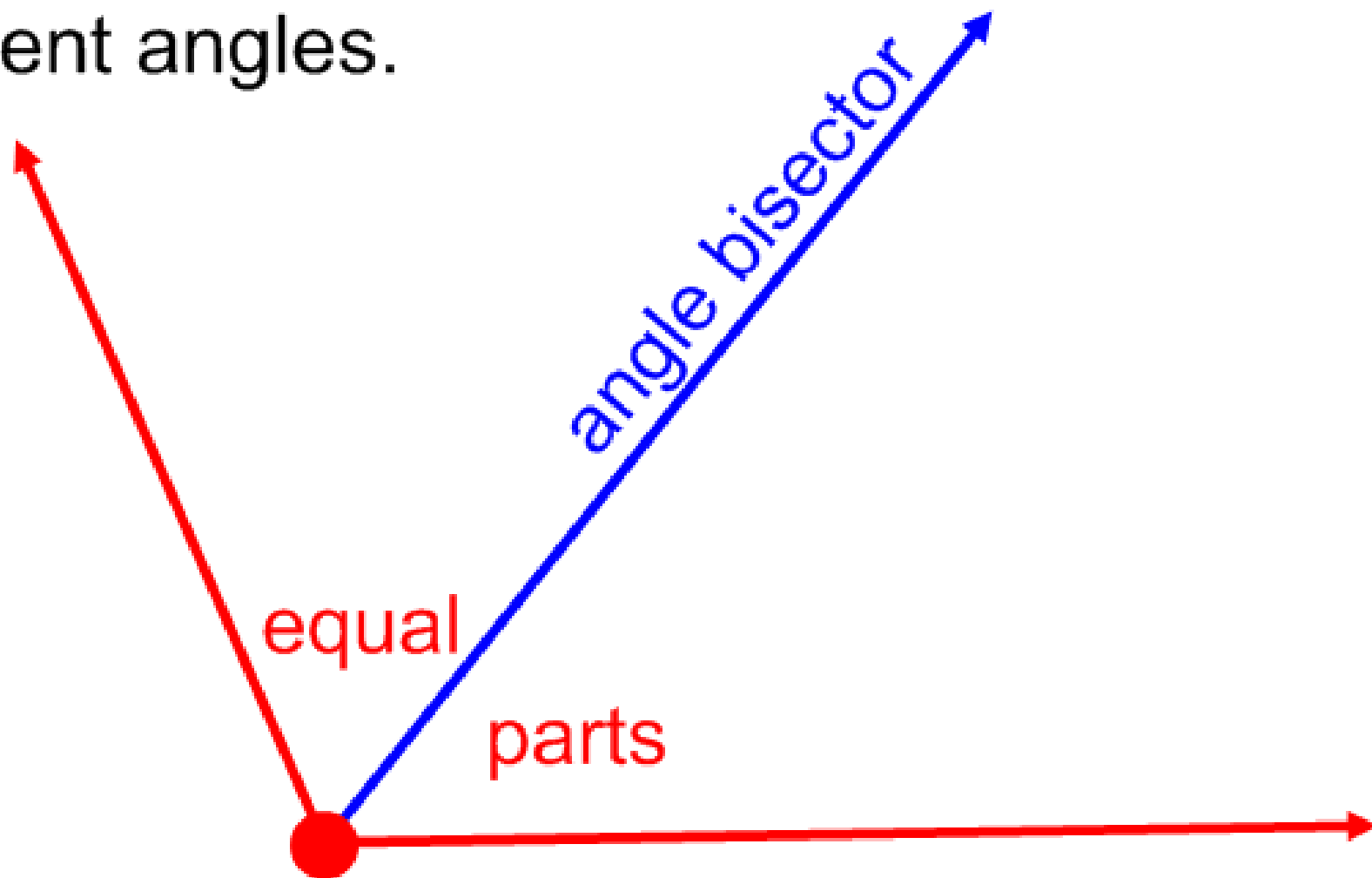


4. straight angle: an angle whose measure is exactly 180 degrees



5. Angle Bisector:

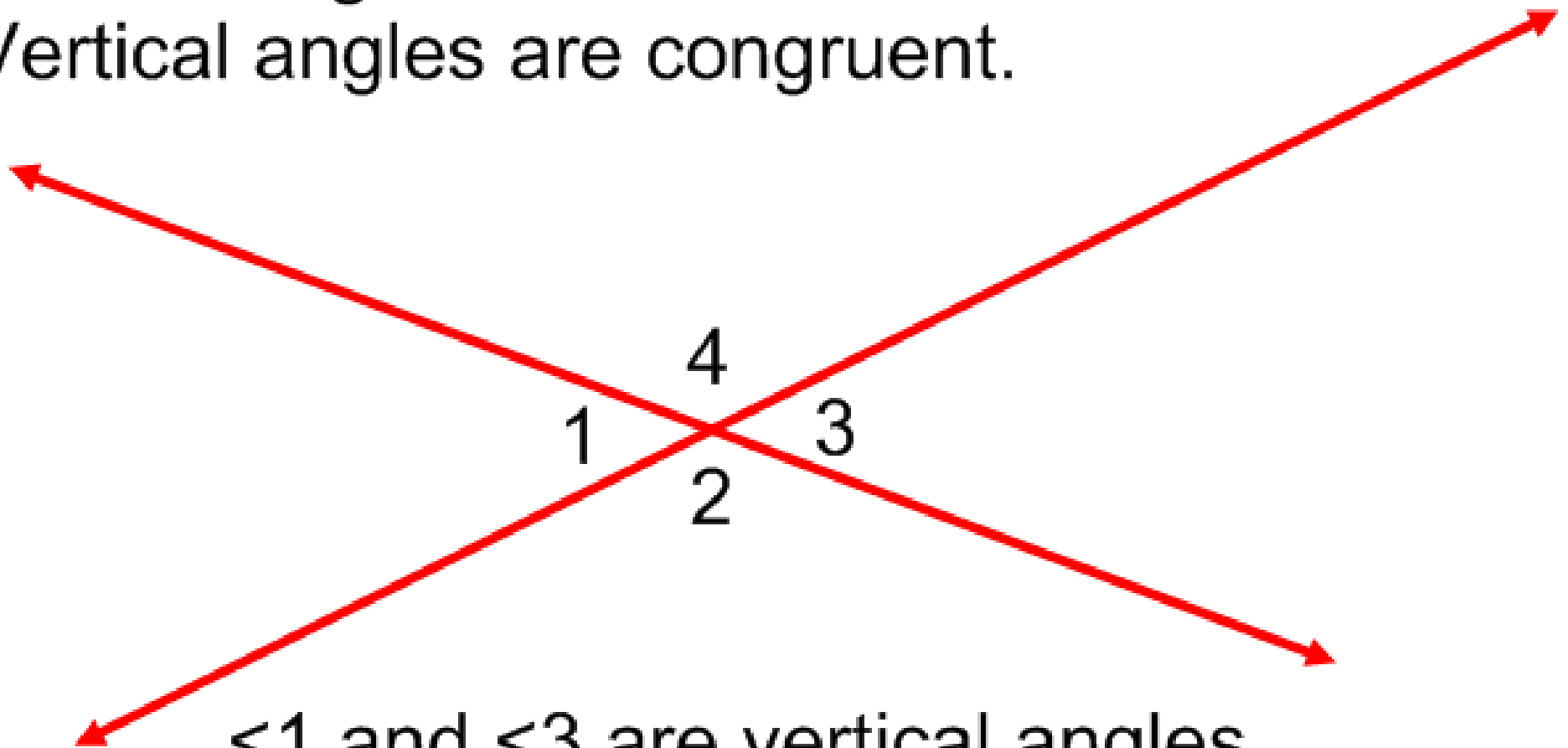
A ray that divides an angle into two congruent angles.



6. Vertical Angles:

Intersecting lines form two pairs of vertical angles.

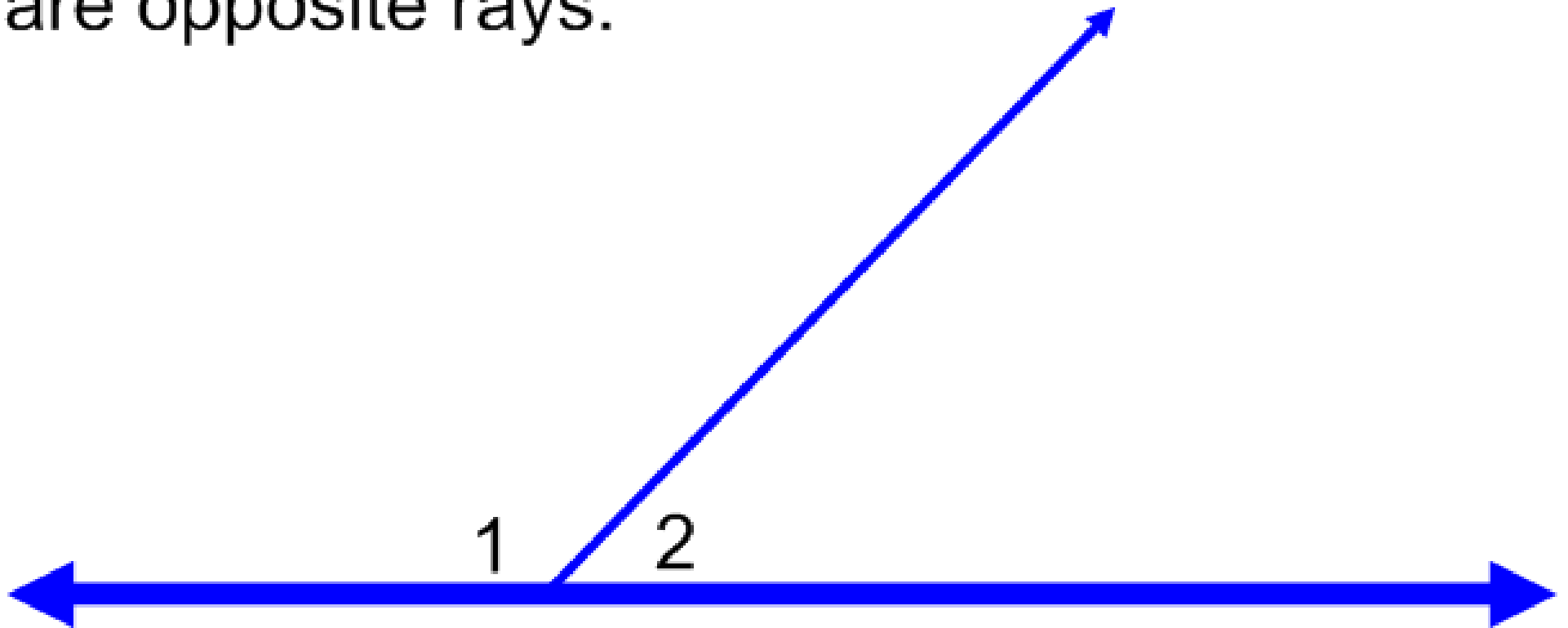
Vertical angles are congruent.



$\angle 1$ and $\angle 3$ are vertical angles
 $\angle 2$ and $\angle 4$ are vertical angles

7. Linear Pair:

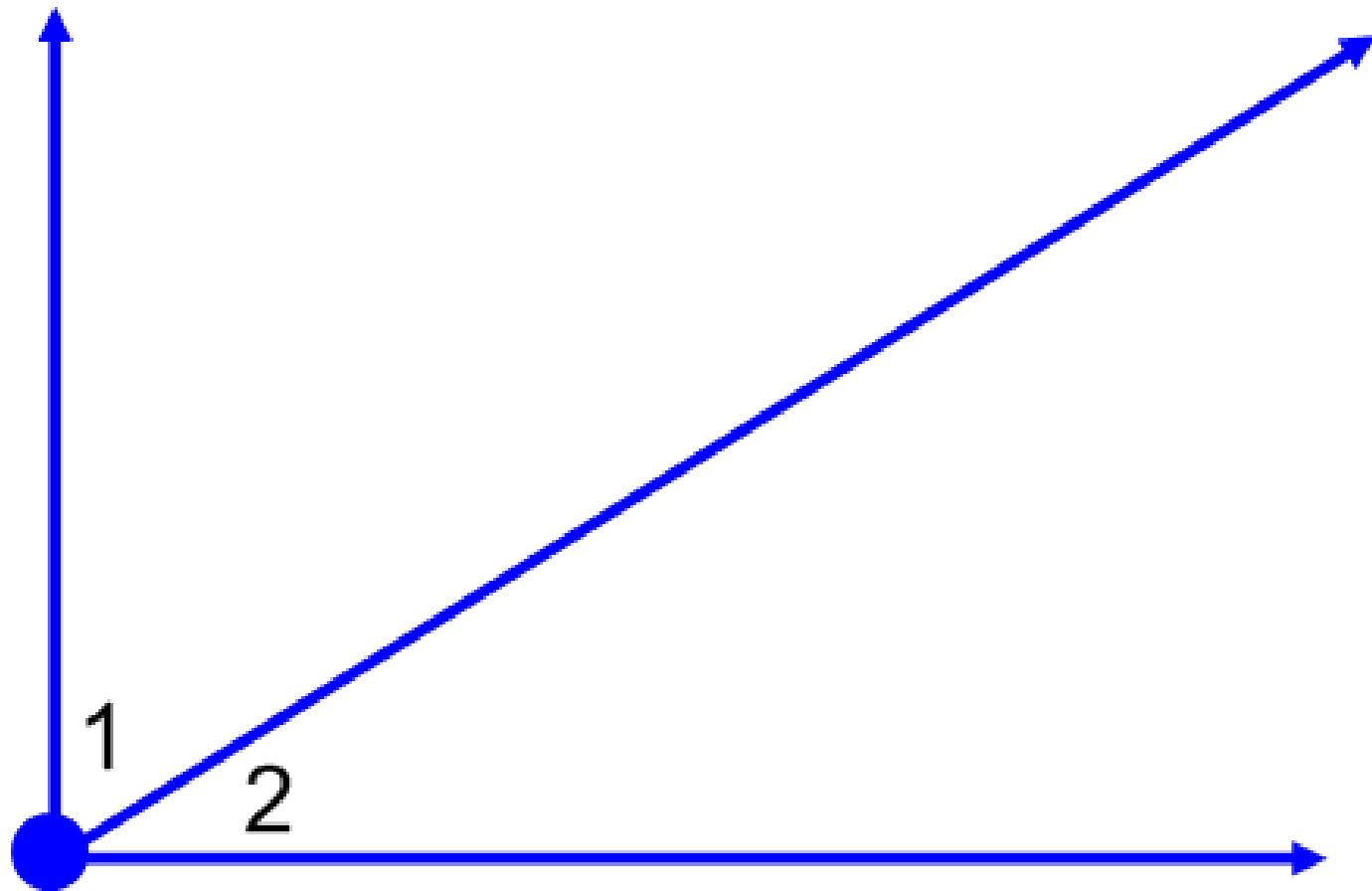
Two adjacent angles whose noncommon sides are opposite rays.



$$\angle 1 + \angle 2 = 180 \text{ degrees}$$

8. Complementary angles:

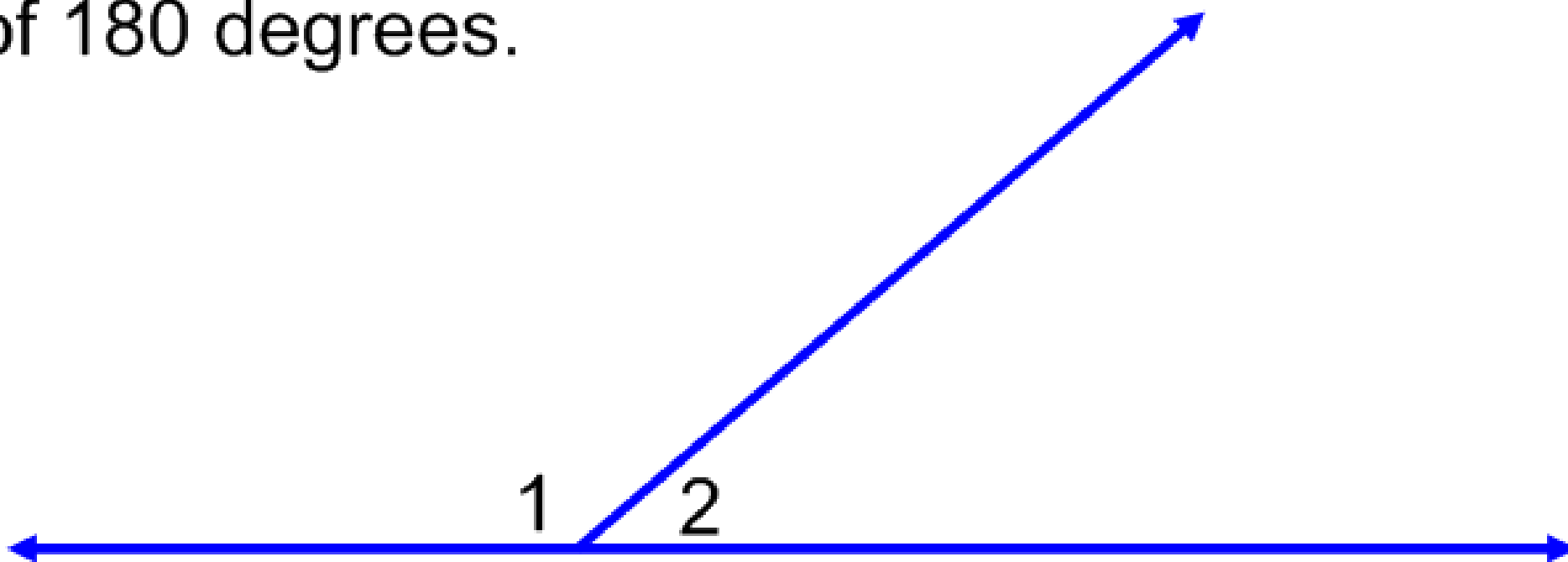
Two angles whose measures has a sum of 90 degrees.



$$\angle 1 + \angle 2 = 90 \text{ degrees}$$

9. Supplementary Angles:

Two angles whose measures have a sum of 180 degrees.



$$\angle 1 + \angle 2 = 180 \text{ degrees}$$