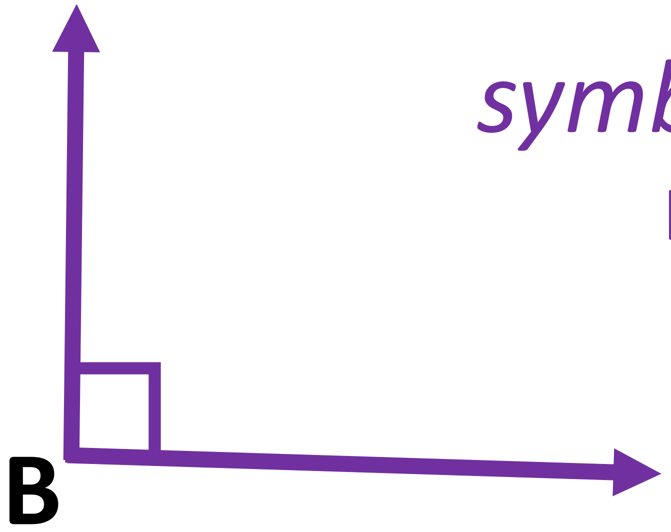
right angle

an angle whose measure is exactly 90°

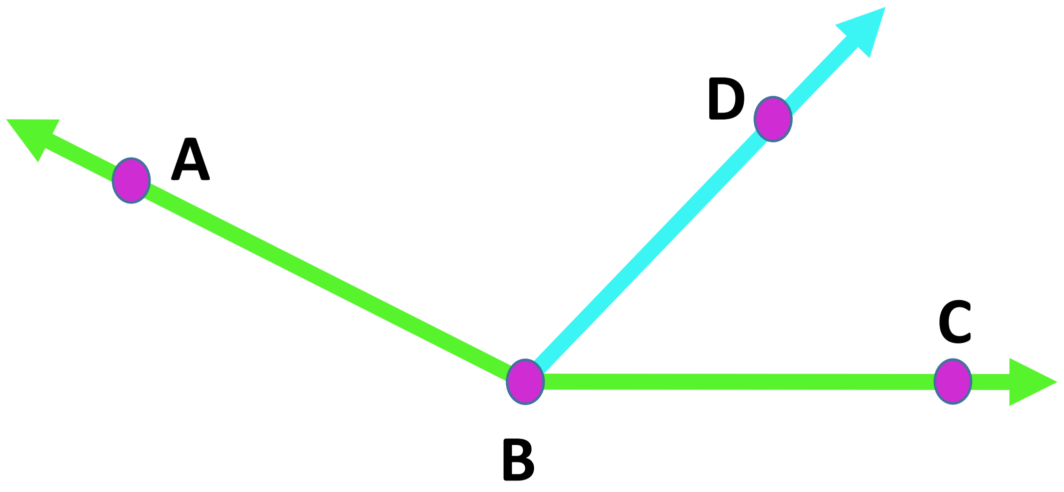


symbolic notation:

$m\angle B = 90^{\circ}$

Adjacent Angles

two angles that share a common ray

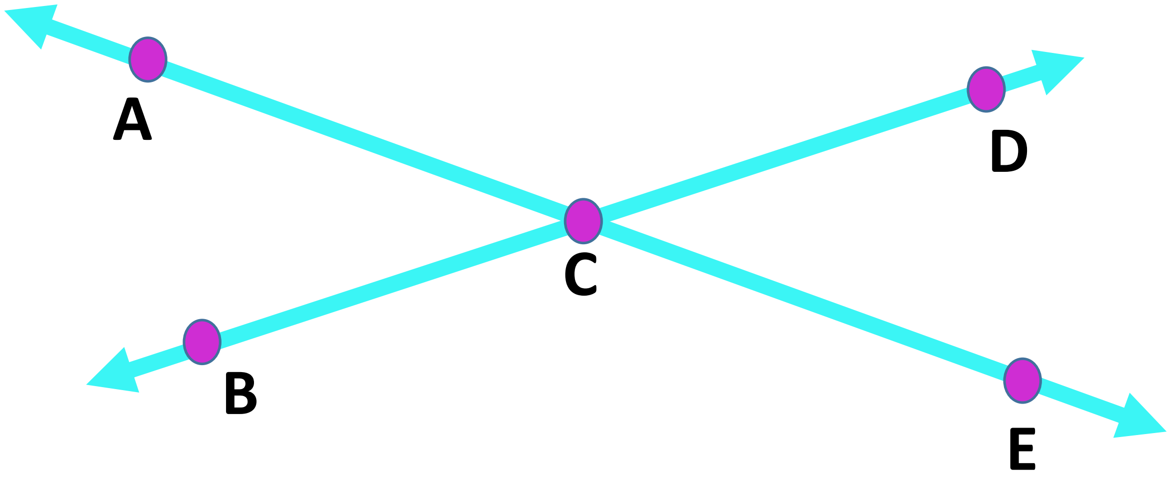


symbolic notation

∠ABD and ∠DBC are adjacent angles

Vertical Angles

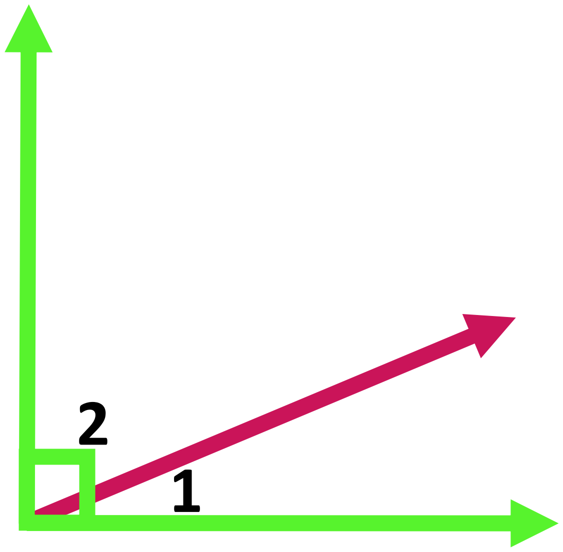
symbolic notation
∠ACB and ∠DCE are vertical angles



two angles that are opposite of each other and share a common vertex

Complementary Angles

two angles whose sum is equal to 90°



$m\angle 1 + m\angle 2 = 90^{\circ}$

symbolic notation

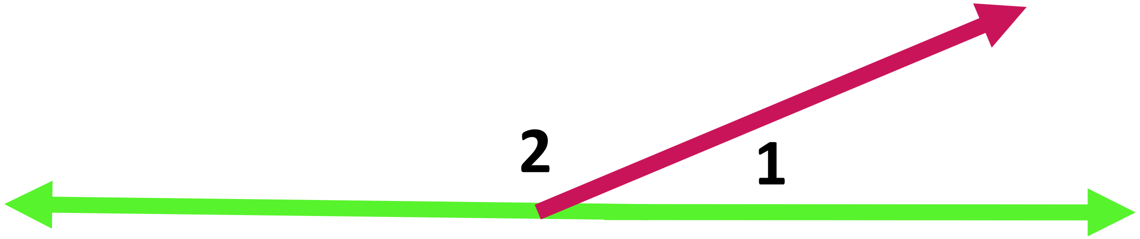
$\angle 1$ and $\angle 2$ are complementary

Supplementary Angles

symbolic notation

∠1 and ∠2 are supplementary

two angles whose sum is equal to 180°

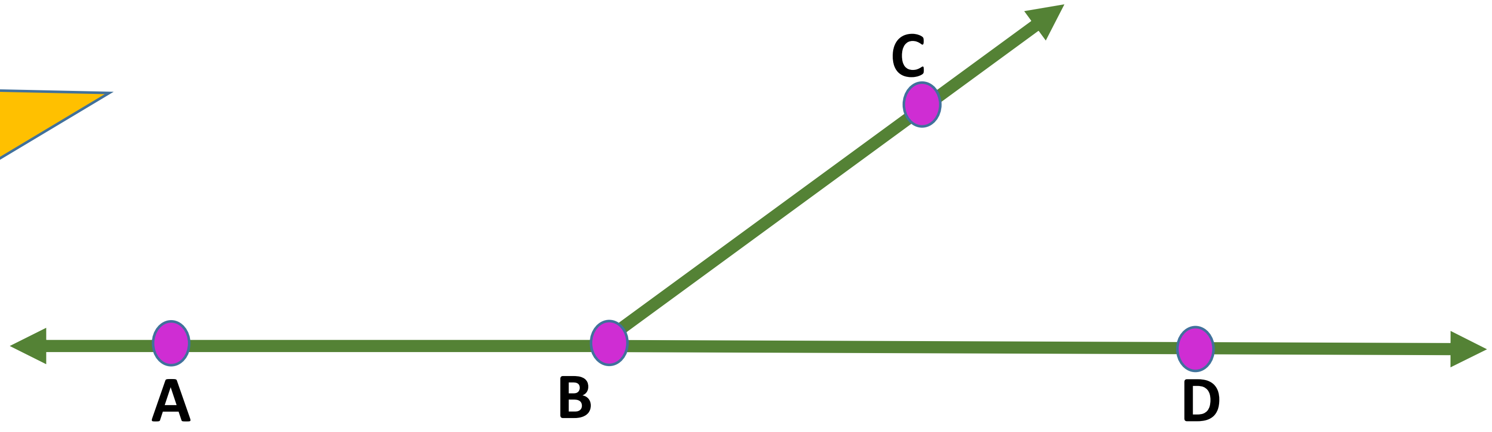


$m\angle 1 + m\angle 2 = 180^{\circ}$

Linear Pair

symbolic notation

None

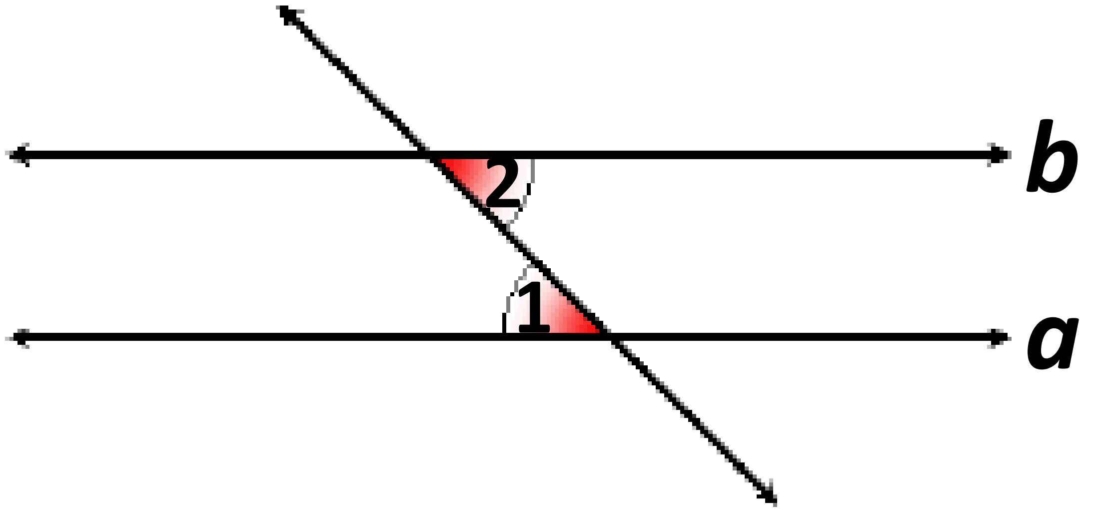


∠ABC and ∠CBD form a linear pair

A pair of adjacent angles whose non-common side form opposite rays

alternate interior angles

angles that are on opposite sides of the transversal and are in between the other two lines



**When the two other lines are parallel, these angles are congruent.*

symbolic notation:

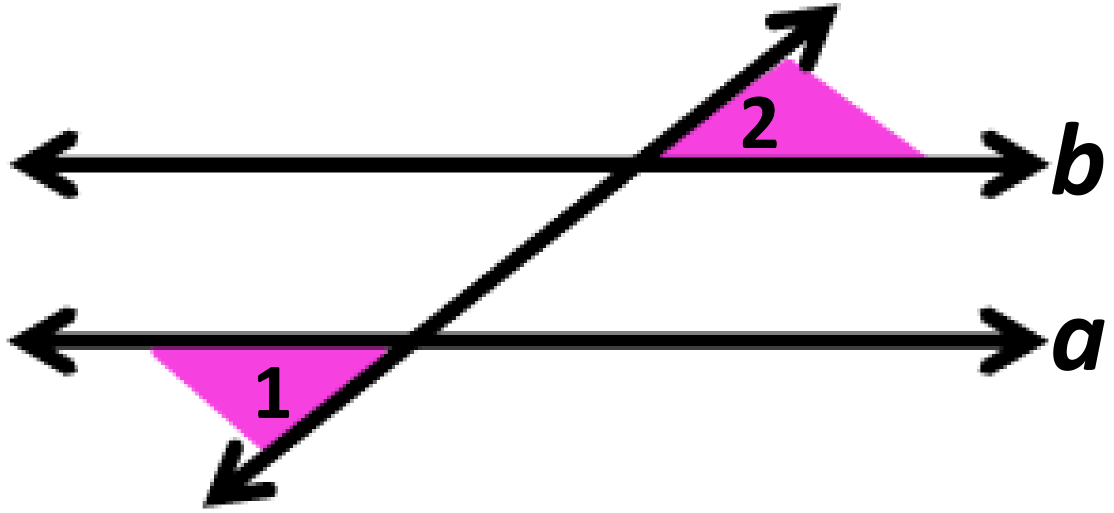
NONE

If $a \parallel b$, then

$\angle 1 \cong \angle 2$

alternate exterior angles

angles that are on opposite sides of the transversal and are on the outside of the other two lines



******When the two other liners are parallel, these angles are congruent.*

symbolic notation:

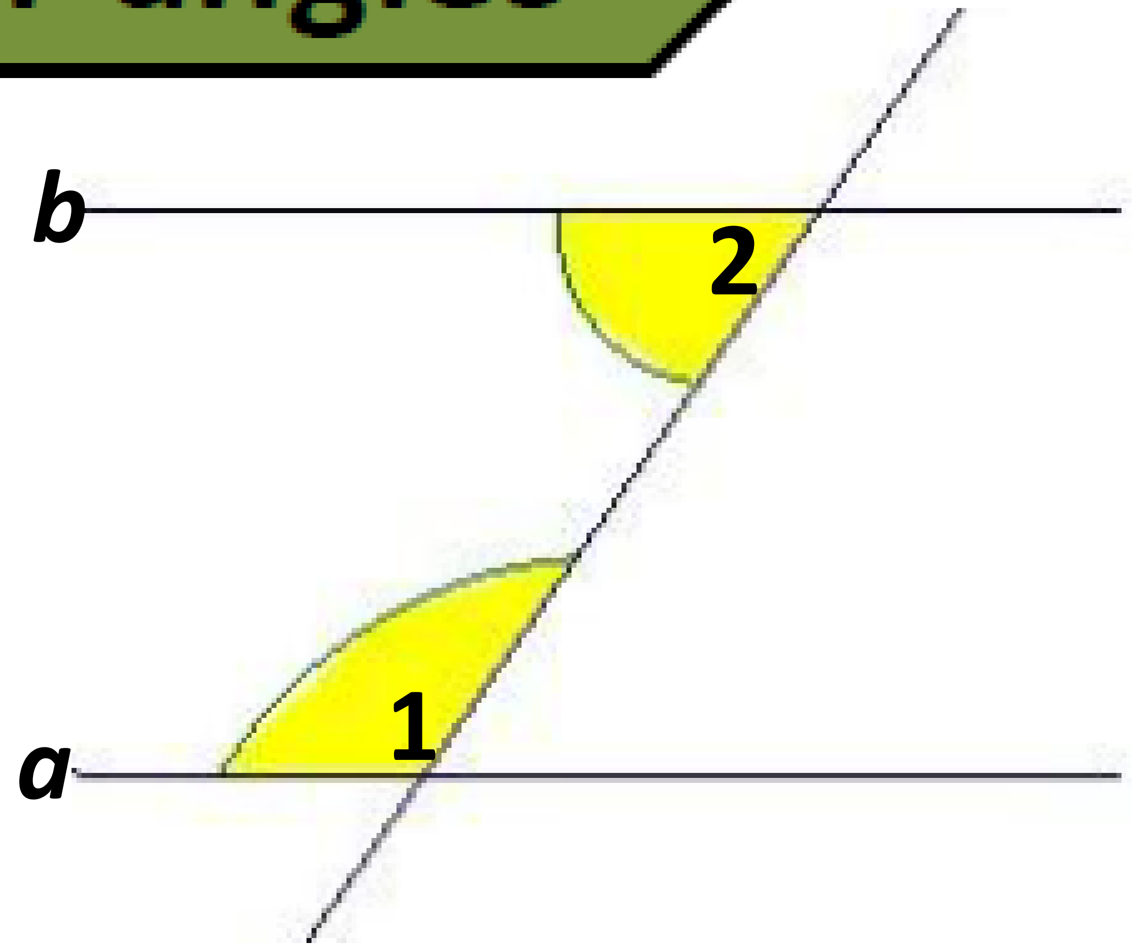
NONE

If $a \| b$, then

$\angle 1 \cong \angle 2$

same-side interior angles

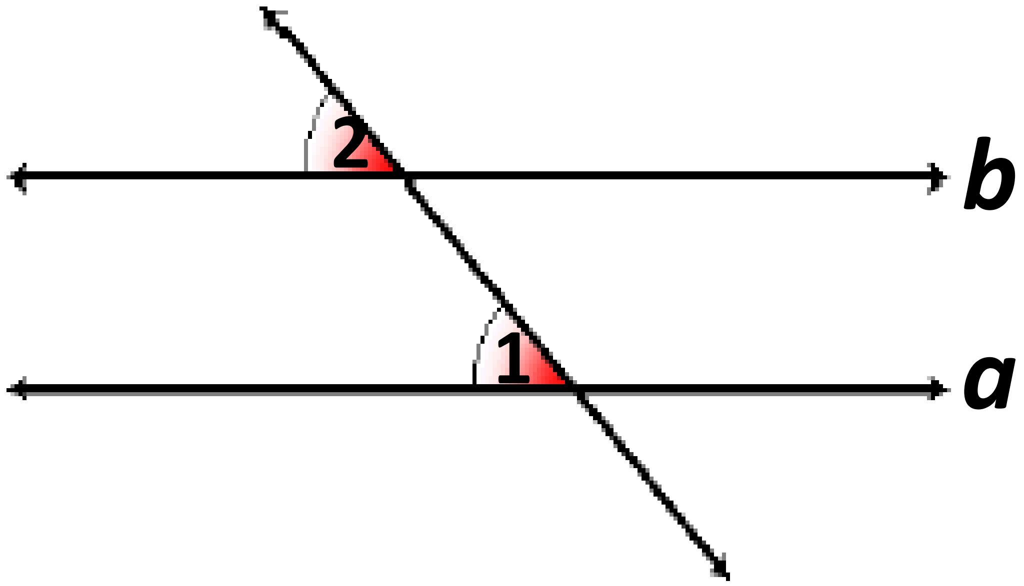
angles that are on the same side of the transversal and are between the other two lines



symbolic notation:
NONE

If $a \parallel b$, then
$m\angle 1 + m\angle 2 = 180^{o}$

corresponding angles



angles that have the same relative position in geometric figures

symbolic notation:
NONE

If $a \| b$, then
$\angle 1 \cong \angle 2$

Conditional Statement

A statement, represented by p and q, in which p is the hypothesis and q is the conclusion: If p, then q.

Hypothesis

If <u>two angles are supplementary</u>,
then <u>the sum of the angles equals 180°</u>.

Conclusion

symbolic notation:

$p \rightarrow q$

Counterexample

An example that disproves a statement

Conditional Statement:

If ∠A and ∠B are complementary, then m∠A = 60° and m∠B = 30°.

Counterexample:

m∠A could equal 20° and m∠B could equal 70°

symbolic notation: None

Converse Statement

A conditional statement in which the hypothesis and conclusion are switched.

symbolic notation:

$q \rightarrow p$

Original Conditional Statement:

If an angle is a vertical angle, then the measure of the angle equals 90^{o}.

Converse:

If the measure of an angle equals 90^{o}, then the angle is a vertical angle.

Inverse Statement

A conditional statement in which the hypothesis and conclusion are negated.

To make a statement opposite in meaning.

symbolic notation:

$\sim p \rightarrow \sim q$

Original Conditional Statement:

If two angles are complementary, then their sum equals 90º.

Inverse:

If two angles are NOT complementary, then their sum is NOT equal to 90º.

Contrapositive Statement

A conditional statement in which the hypothesis and conclusion are negated and switched.

symbolic notation:

~q→~p

Original Conditional Statement:

If two angles are supplementary, then their sum equals 180°.

Contrapositive:

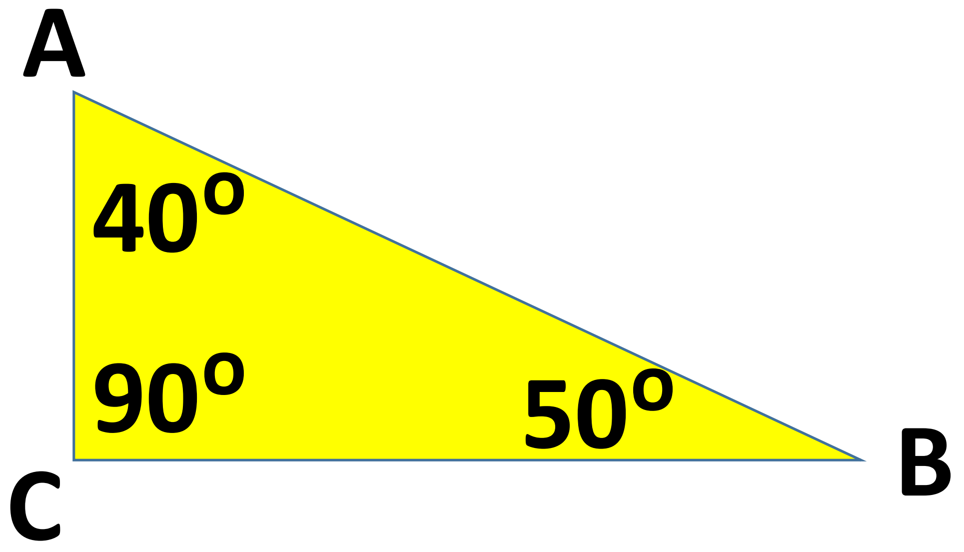
If two angles do NOT have a sum of 180°, then the angles are NOT supplementary.

Triangle Sum Theorem

The sum of three interior angles of a triangle equals 180°

symbolic notation:

m∠A + m∠B + m∠C = 180°

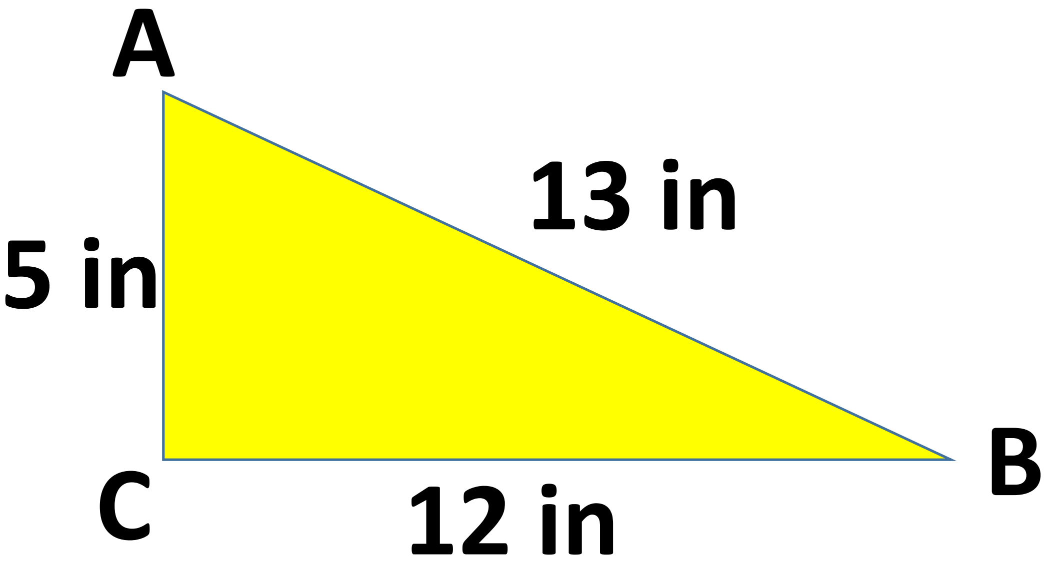


Triangle Inequality Theorem

The sum of any two lengths of a triangle is greater than the third side

symbolic notation:

NONE



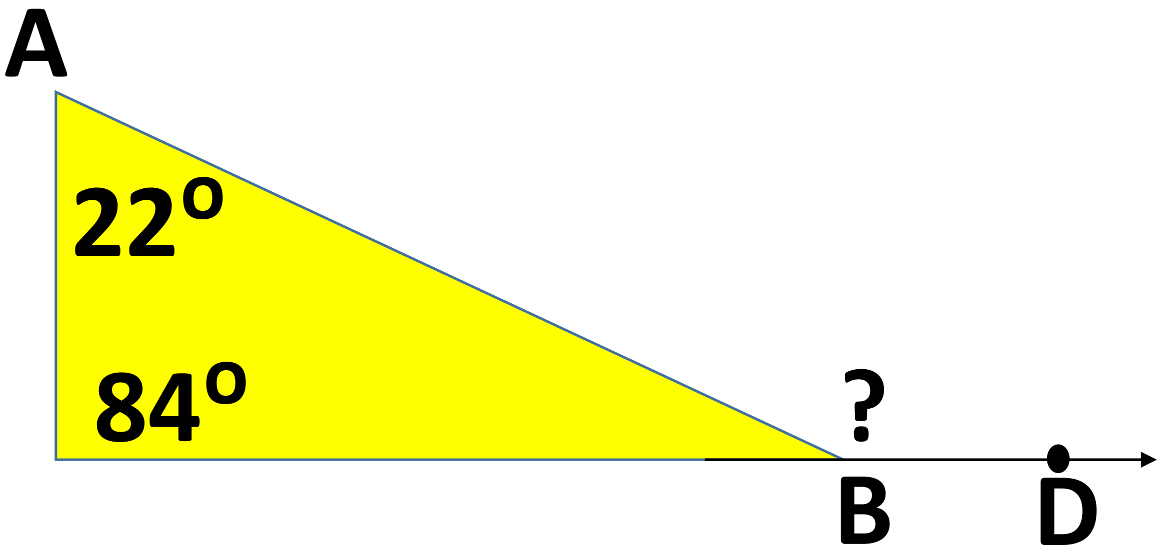
$5 + 12 > 13$ so $AC + BC > AB$

Exterior Angles Theorem

The exterior angle of a triangle is equal to the sum of the two remote interior angles

symbolic notation:

m∠A + m∠B = m∠C



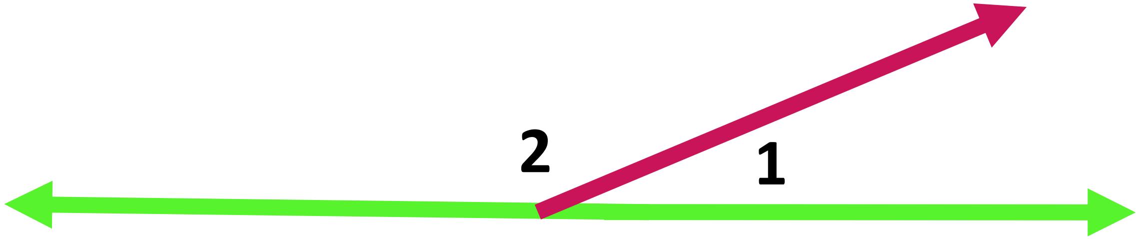
22° + 84° = 106° so m∠ABD = 106°

Linear Pair Theorem

If two angles form a linear pair, then they are supplementary.

symbolic notation:

NONE



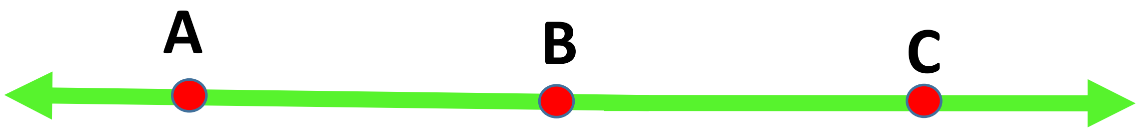
∠1 and ∠2 form a linear pair, so ∠1 and ∠2 are supplementary

Segment Addition Postulate

If collinear Point B lies between Points A and C, then AB + BC = AC.

symbolic notation:

NONE



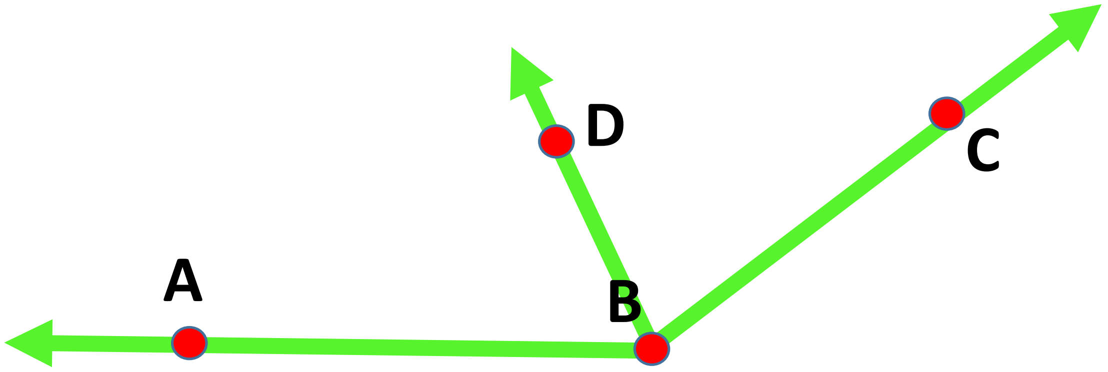
$$AB + BC = AC$$

Angle Addition Postulate

If Point D lies in the interior of ∠ABC, then m∠ABD + m∠DBC = m∠ABC.

symbolic notation:

NONE

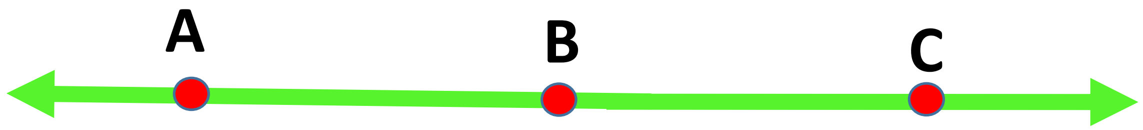


m∠ABD + m∠DBC = m∠ABC

Collinear

Points that lie on the same line

symbolic notation:
NONE

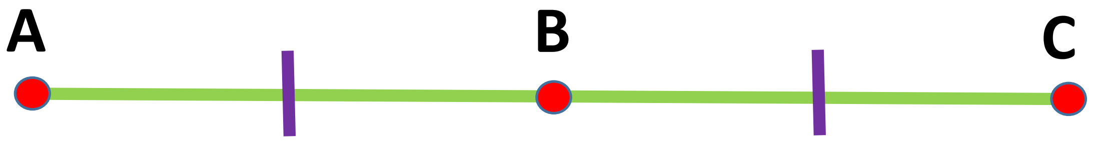


Points A, B, and C are collinear.

Midpoint

The exact middle point on a line segment.

symbolic notation:
NONE



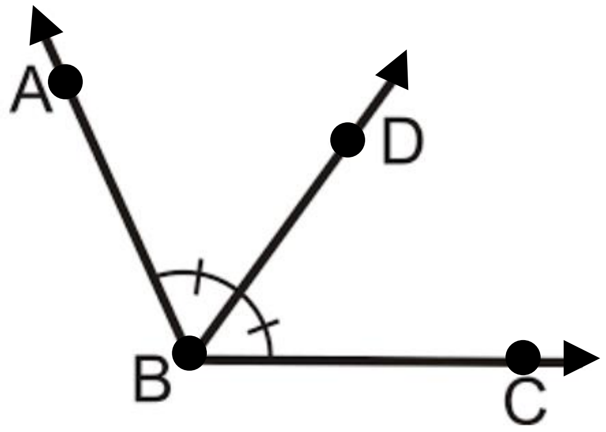
B is the midpoint of $\overline{AC}$ because $\overline{AB} \cong \overline{BC}$.

Bisect

To cut into two equal parts

Hint: If you bisect a segment, you get 2 congruent SEGMENTS.
If you bisect an angle, you get 2 congruent ANGLES.

symbolic notation:
NONE



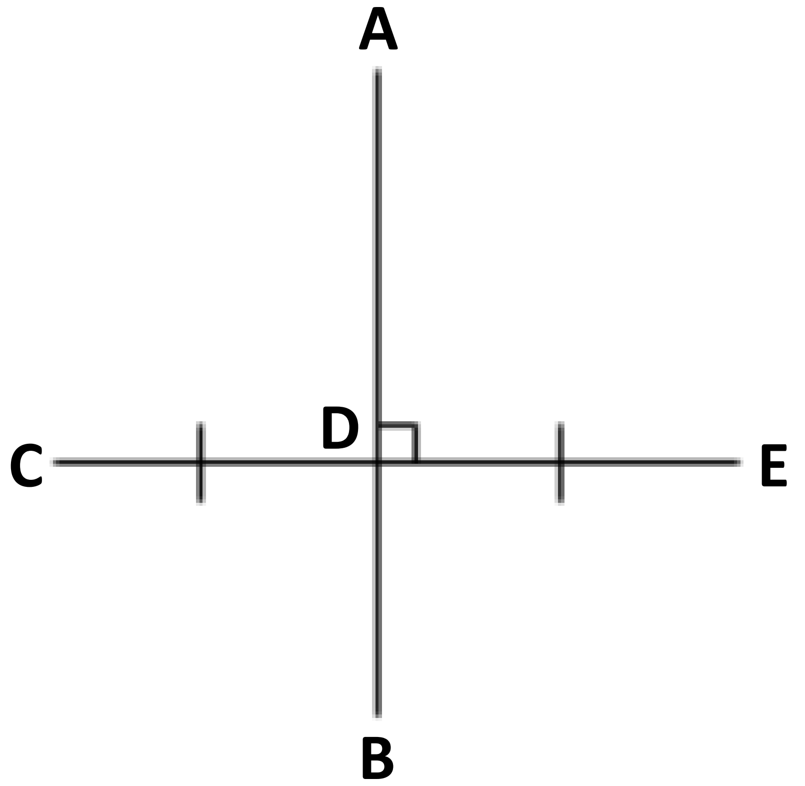
***$\overrightarrow{BD}$ bisects* ∠ABC because ∠ABD ≅ ∠DBC**

Perpendicular Bisector

A line that divides a segment into two congruent segments and forms a right angle at the intersection.

symbolic notation:

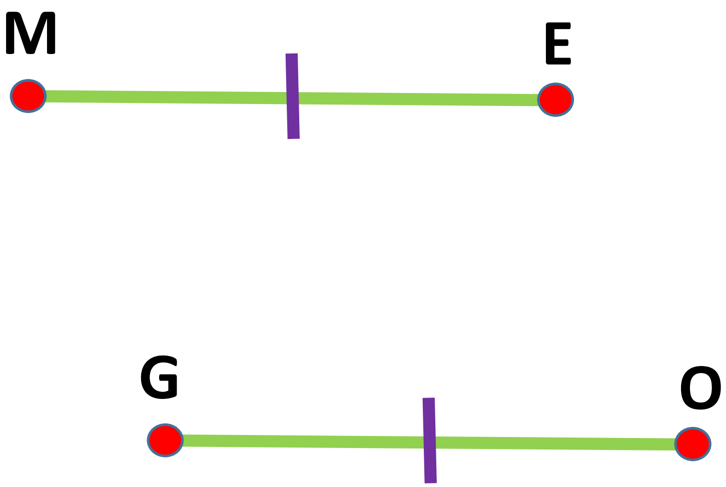
NONE



$\overline{AB}$ is a perpendicular bisector of $\overline{CE}$.

Congruent Segments

If two segments are congruent, then the measures of the segments are the same.

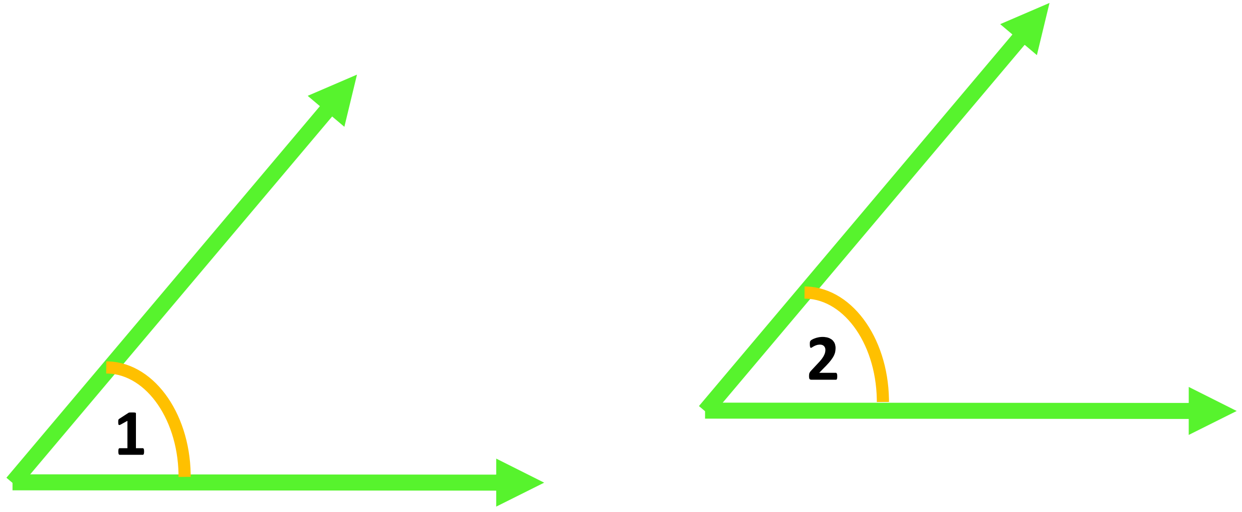


symbolic notation

$$\overline{ME} \cong \overline{GO}$$

Congruent Angles

If two angles are congruent, then the measures of the angles are the same.



symbolic notation

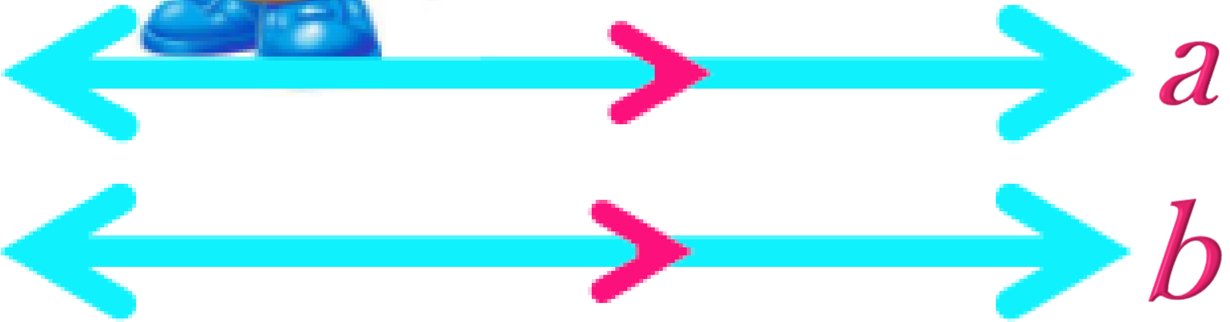
$\angle 1 \cong \angle 2$

Properties

Property	Definition	Example	Symbolic Notation
Reflexive Property of Equality	A value is equal to itself.	$5 = 5$	$m\angle A = m\angle A$ $AB = AB$ or $AB = BA$
Symmetric Property of Equality	If $a = b$, then $b = a$.	If $x = 2$, then $2 = x$. $AB = 8$ so $8 = AB$	$m\angle A = x^{o}$ so $x^{o} = m\angle A$
Transitive Property of Equality	If $a = b$ and $b = c$, then $a = c$.	If $x = y$ and $y = 2$, then $x = 2$.	If $AB = CD$ and $CD = EF$, then $AB = EF$.
Substitution Property of Equality	If a variable is assigned a value, then the value can replace the variable.	Given: $x + y$ $x = 4$ & $y = 2$ Conclusion: $4 + 2$	If $AB = 5$ and $AB + 4$, then $5 + 4$.
Distributive Property of Equality	If $a(b + c)$, then $ab + ac$. If $a(b – c)$, then $ab – ac$.	$4(x – 2) = 4x – 8$	$a(b + c) = ab + bc$ $a(b – c) = ab – ac$

parallel lines

Parallel lines have the same slope but different y-intercepts.

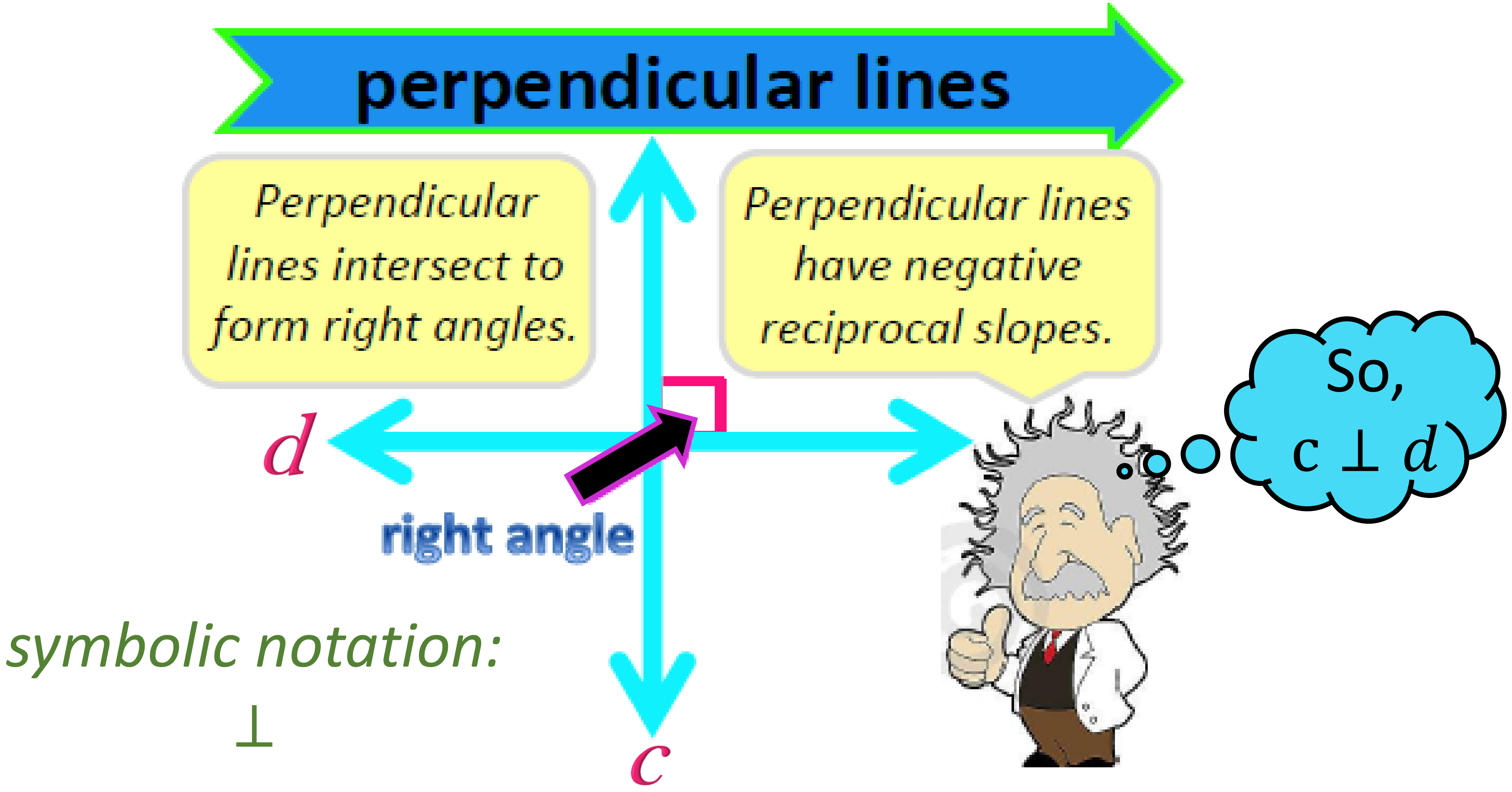


So, $a \parallel b$

Parallel lines lie in the same plane and do not intersect.

symbolic notation:

$\parallel$


perpendicular lines
Perpendicular lines intersect to form right angles.
Perpendicular lines have negative reciprocal slopes.
So, c ⊥ d
d
right angle
c
symbolic notation:
⊥