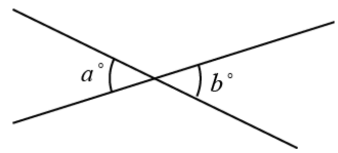
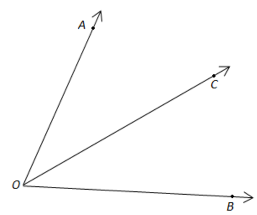
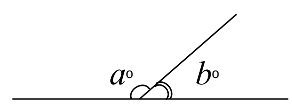
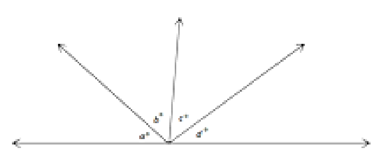
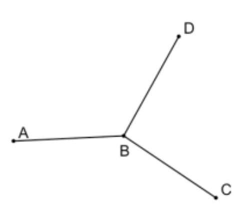
Key Facts and Discoveries from Earlier Grades

Facts (With Abbreviations Used in Grades 4–9)	Diagram/Example	How to State as a Reason in an Exercise or a Proof
Vertical angles are equal in measure. (vert. ∠s)	 $a° = b°$	"Vertical angles are equal in measure."
If C is a point in the interior of $\angle AOB$, then $m\angle AOC + m\angle COB = m\angle AOB$. (∠s add)	 $m\angle AOB = m\angle AOC + m\angle COB$	"Angle addition postulate"
Two angles that form a linear pair are supplementary. (∠s on a line)	 $a° + b° = 180$	"Linear pairs form supplementary angles."
Given a sequence of n consecutive adjacent angles whose interiors are all disjoint such that the angle formed by the first $n - 1$ angles and the last angle are a linear pair, then the sum of all of the angle measures is $180°$. ($\angle s$ on a line)	 $a° + b° + c° + d° = 180$	"Consecutive adjacent angles on a line sum to $180°$."
The sum of the measures of all angles formed by three or more rays with the same vertex and whose interiors do not overlap is $360°$. (∠s at a point)	 $m\angle ABC + m\angle CBD + m\angle DBA = 360°$	"Angles at a point sum to $360°$."

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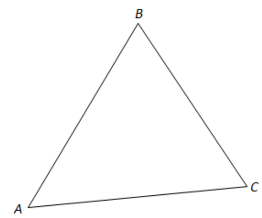
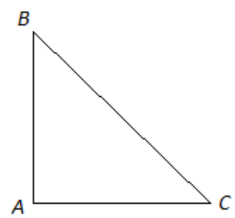
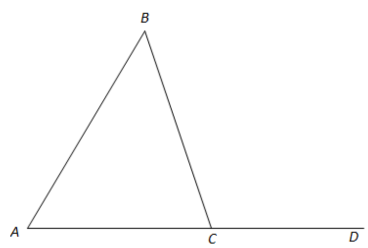
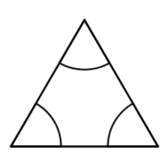
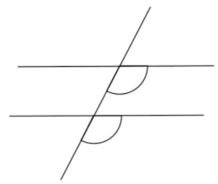
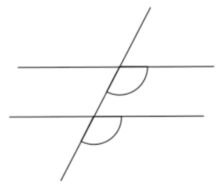
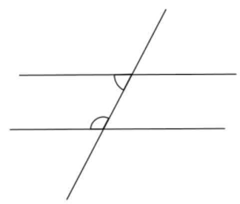
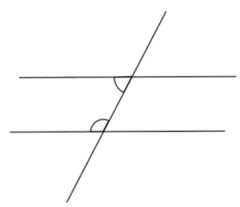
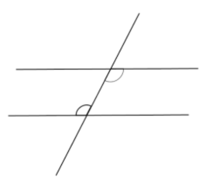
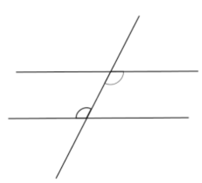
The sum of the 3 angle measures of any triangle is 180°. (∠ sum of △)	 $m\angle A + m\angle B + m\angle C = 180°$	“The sum of the angle measures in a triangle is 180°.”
When one angle of a triangle is a right angle, the sum of the measures of the other two angles is 90°. (∠ sum of rt. △)	 $m\angle A = 90°;\ m\angle B + m\angle C = 90°$	“Acute angles in a right triangle sum to 90°.”
The sum of each exterior angle of a triangle is the sum of the measures of the opposite interior angles, or the remote interior angles. (ext. ∠ of △)	 $m\angle BAC + m\angle ABC = m\angle BCD$	“The exterior angle of a triangle equals the sum of the two opposite interior angles.”
Base angles of an isosceles triangle are equal in measure. (base ∠s of isos. △)		“Base angles of an isosceles triangle are equal in measure.”
All angles in an equilateral triangle have equal measure. (equilat. △)		“All angles in an equilateral triangle have equal measure."

Facts (With Abbreviations Used in Grades 4–9)	Diagram/Example	How to State as a Reason in an Exercise or a Proof
If two parallel lines are intersected by a transversal, then corresponding angles are equal in measure. (corr. $\angle$s, $\overline{AB} \parallel \overline{CD}$)		"If parallel lines are cut by a transversal, then corresponding angles are equal in measure."
If two lines are intersected by a transversal such that a pair of corresponding angles are equal in measure, then the lines are parallel. (corr. $\angle$s converse)		"If two lines are cut by a transversal such that a pair of corresponding angles are equal in measure, then the lines are parallel."
If two parallel lines are intersected by a transversal, then interior angles on the same side of the transversal are supplementary. (int. $\angle$s, $\overline{AB} \parallel \overline{CD}$)		"If parallel lines are cut by a transversal, then interior angles on the same side are supplementary."
If two lines are intersected by a transversal such that a pair of interior angles on the same side of the transversal are supplementary, then the lines are parallel. (int. $\angle$s converse)		"If two lines are cut by a transversal such that a pair of interior angles on the same side are supplementary, then the lines are parallel."
If two parallel lines are intersected by a transversal, then alternate interior angles are equal in measure. (alt. $\angle$s, $\overline{AB} \parallel \overline{CD}$)		"If parallel lines are cut by a transversal, then alternate interior angles are equal in measure."
If two lines are intersected by a transversal such that a pair of alternate interior angles are equal in measure, then the lines are parallel. (alt. $\angle$s converse)		"If two lines are cut by a transversal such that a pair of alternate interior angles are equal in measure, then the lines are parallel."

Basic Properties Reference Chart

Property	Meaning	Geometry Example	Diagram
Reflexive Property	A quantity is equal to itself.	$AB = AB$	
Transitive Property	If two quantities are equal to the same quantity, then they are equal to each other.	If $AB = BC$ and $BC = EF$, then $AB = EF$.	
Symmetric Property	If a quantity is equal to a second quantity, then the second quantity is equal to the first.	If $OA = AB$ then $AB = OA$.	
Addition Property of Equality	If equal quantities are added to equal quantities, then the sums are equal.	If $AB = DF$ and $BC = CD$, then $AB + BC = DF + CD$.	
Subtraction Property of Equality	If equal quantities are subtracted from equal quantities, the differences are equal.	If $AB + BC = CD + DE$ and $BC = DE$, then $AB = CD$.	
Multiplication Property of Equality	If equal quantities are multiplied by equal quantities, then the products are equal.	If $m\angle ABC = m\angle XYZ$ then $2(m\angle ABC) = 2(m\angle XYZ)$.	
Division Property of Equality	If equal quantities are divided by equal quantities, then the quotients are equal.	If $AB = XY$ then $\frac{AB}{2} = \frac{XY}{2}$.	
Substitution Property of Equality	A quantity may be substituted for its equal.	If $DE + CD = CE$ and $CD = AB$, then $DE + AB = CE$.	
Partition Property (includes "Angle Addition Postulate," "Segments add," "Betweenness of Points," etc.)	A whole is equal to the sum of its parts.	If point C is on $\overline{AB}$, then $AC + CB = AB$.	