Geometry X – Reasons that can be used to Justify Statements

Name of Postulate, Definition, Property or Theorem	Verbal	Example
Definition of Congruent Segments	Two segments are congruent if and only if they have the same length.	$\overline{AB} \cong \overline{CD} \Leftrightarrow AB = CD$
Definition of Congruent Angles	Two angles are congruent if only if they have the same measure.	$\angle ABC \cong \angle DEF \Leftrightarrow m\angle ABC = m\angle DEF$
Addition Property of Equality	You can add the same thing to both sides of an equation.	$a = c$ $a + b = c + b$
Subtraction Property of Equality	You can subtract the same thing from both sides of an equation.	$a = c$ $a - b = c - b$
Multiplication Property of Equality	You can multiply both sides of an equation by the same thing.	$a = c$ $a \cdot b = c \cdot b$
Division Property of Equality	You can divide both sides of an equation by the same thing.	$a = c$ $\dfrac{a}{b} = \dfrac{c}{b}$
Symmetric Property of Equality/Congruence	The objects on either side of the equals sign can be switched.	$a = b \Leftrightarrow b = a$ $\overline{AB} \cong \overline{CD} \Leftrightarrow \overline{CD} \cong \overline{AB}$
Transitive Property of Congruence/Equality	Two things congruent to the same thing are congruent to each other. BRIDGE	$(a = b \,\&\, b = c) \Rightarrow a = c$ $\overline{AB} \cong \overline{CD} \,\&\, \overline{CD} \cong \overline{FG} \Rightarrow \overline{AB} \cong \overline{FG}$
Reflexive Property of Congruence/Equality	A thing is equal to itself. MIRROR	$a = a$ $\angle ABC \cong \angle CBA$
Definition of Midpoint/ Midpoint Theorem	If B is the midpoint of AC, then AB is congruent to BC	
Definition of Angle Bisector	A ray bisects an angle if and only if it cuts it into two congruent angles.	
Definition of Supplementary/ Supplement Theorem	Two angles are supplementary if and only if their sum is 180 degrees. Angles that form a straight line (Linear Pair) are supplementary.	
Definition of Complementary/ Complement Theorem	Two angles are complementary if and only if their sum is 90 degrees. Angles that create a right angle are complementary.	
Vertical Angles Theorem	Non-adjacent angles that are formed by intersecting lines are vertical and are congruent.	

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Substitution Property	Replacing something in an equation with something else.	If $a = b$ and $b + c = 5$; then $a + c = 5$
Converse	Conclusion implies hypothesis.	$q \rightarrow p$
Inverse	Not Hypothesis implies not conclusion.	$\sim p \rightarrow \sim q$
Contrapositive	Not Conclusion implies not hypothesis.	$\sim q \rightarrow \sim p$
Distributive Property	A number can be multiplied by an expression by multiplying each component of the expression by the number.	$a(b + c) = ab + ac$
Congruent Supplements	Angles supplementary to the same angle are congruent to each other.	$\angle 1 \ and \ \angle 2$ are supplementary and $\angle 2 \ and \ \angle 3$ are supplementary $\Rightarrow \angle 1 \ and \ \angle 3$ are congruent
Congruent Complements	Angles complementary to the same angle are congruent to each other.	$\angle 1 \ and \ \angle 2$ are complementary and $\angle 2 \ and \ \angle 3$ are complementary $\Rightarrow \angle 1 \ and \ \angle 3$ are congruent
Definition of Perpendicular Lines	Perpendicular lines intersect to form 4 right angles.	
Segment Addition Postulate	If point B is between points A and C, then AB + BC = AC	
Angle Addition Postulate	If point B is on the interior of $\angle ACD, then$ $m\angle ACB + m\angle BCD = m\angle ACD$	