

Warm Up

What can you conclude from the given true statements?

If you wake up late, then you miss the bus.

If you miss the bus, then you are late for school.

- (A) If you are late for school, then you missed the bus.
- (B) If you wake up late, then you are late for school.
- (C) If you miss the bus, then you woke up late.
- (D) If you are late for school, then you woke up late.

2-5: Reasoning in Algebra and Geometry

Obj - SWBAT connect reasoning in algebra and geometry.

Vocabulary

take note

Key Concept Properties of Equality

Let a , b , and c be any real numbers.

Addition Property

If $a = b$, then $a + c = b + c$.

Subtraction Property

If $a = b$, then $a - c = b - c$.

Multiplication Property

If $a = b$, then $a \cdot c = b \cdot c$.

Division Property

If $a = b$ and $c \neq 0$, then $\frac{a}{c} = \frac{b}{c}$.

Reflexive Property

$a = a$

Symmetric Property

If $a = b$, then $b = a$.

Transitive Property

If $a = b$ and $b = c$, then $a = c$.

Substitution Property

If $a = b$, then b can replace a in any expression.

Take note

Key Concept The Distributive Property

Use multiplication to distribute a to each term of the sum or difference within the parentheses.

Sum:

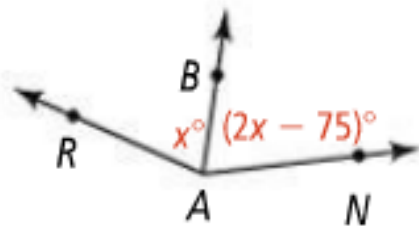
$$a(b + c) = a(b + c) = ab + ac$$

Difference:

$$a(b - c) = a(b - c) = ab - ac$$

Ex. 1: What is the value of x ? Justify each step.

Given: \overrightarrow{AB} bisects $\angle RAN$



take note

Key Concept Properties of Congruence

Reflexive Property	$\overline{AB} \cong \overline{AB} \quad \angle A \cong \angle A$
Symmetric Property	If $\overline{AB} \cong \overline{CD}$, then $\overline{CD} \cong \overline{AB}$. If $\angle A \cong \angle B$, then $\angle B \cong \angle A$.
Transitive Property	If $\overline{AB} \cong \overline{CD}$ and $\overline{CD} \cong \overline{EF}$, then $\overline{AB} \cong \overline{EF}$. If $\angle A \cong \angle B$ and $\angle B \cong \angle C$, then $\angle A \cong \angle C$. If $\angle B \cong \angle A$ and $\angle B \cong \angle C$, then $\angle A \cong \angle C$.

Ex. 2: For each part, name the property of equivalence or congruence that justifies going from the first statement to the second statement.

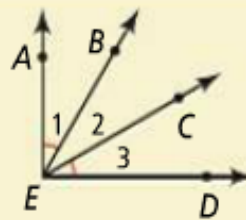
a.) $\overline{AR} \cong \overline{TY}; \overline{TY} \cong \overline{AR}$

b.) $3(x + 5) = 9; 3x + 15 = 9$

c.) $1/4x = 7; x = 28$

Given: $m\angle 1 = m\angle 3$

Prove: $m\angle AEC = m\angle DEB$



The first statement is usually the given statement.

Each statement should follow logically from the previous statements.

The last statement is what you want to prove.

Statements	Reasons
1) $m\angle 1 = m\angle 3$	1) Given
2) ~~~~~	2) ~~~~~
3) ~~~~~	3) ~~~~~
4) ~~~~~	4) ~~~~~
5) $m\angle AEC = m\angle DEB$	5) ~~~~~

Ex. 3: Write a two-column proof.

Given: $\overline{AB} \cong \overline{CD}$

Prove: $\overline{AC} \cong \overline{BD}$



Statements	Reasons

homework

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