Lesson 2-2

Properties from Algebra

Addition Property

- If $a = b$ and $c = d$, then $a + c = b + d$

- Ex: $3 = 3$ and $5 = 5$ so $3 + 5 = 3 + 5$

Subtraction Property

- If a = b and c = d, then a – c = b – d
- Ex: 10 = 10 and 7 = 7 so 10 – 7 = 10 - 7

Multiplication Property

- If a = b, then ca = cb
- Ex: 2 = 2 so 6 (2) = 6 (2)

Division Property

- If $a = b$ and $c \neq 0$, then $a/c = b/c$
- Ex: $25 = 25$ and $c = 5$ then $25/5 = 25/5$

Substitution Properties

- If a = b, then either a or b may be substituted for the other in any equation or inequality

- Ex: If m< A = m< B and m< A + m< C = 90 then m< B + m< C = 90

Distributive Property

- $a\,(b + c) = ab + ac$
- Ex: $4\,(x + 5) = 4x + 20$

Example 1

- Justify each statement with one of the given properties

- If AB = CD and BC = BC, then AB + BC = CD + BC addition prop.
- If 2(m< 1) = 72, then m< 1 = 36 division prop.
- If m< A= ½(m< X) and ½(m< X)= m< B then m< A= m< B Substitution prop.
- If 2 + YZ = 8, then YZ = 6 Subtraction prop.
- If ½ AC = AB, then AC = 2AB multiplication prop.

Reflexive Property

- $\overline{DE} \cong \overline{DE}$
- $\angle A \cong \angle A$

Symmetric Property

- If $\overline{DE} \cong \overline{FG}$, then $\overline{FG} \cong \overline{DE}$
- If $\angle D \cong \angle E$, then $\angle E \cong \angle D$

Transitive Property

- If $\overline{DE} \cong \overline{FG}$ and $\overline{FG} \cong \overline{JK}$, then $\overline{DE} \cong \overline{JK}$
- If $< D \cong < E$ and $< E \cong < F$, then $< D \cong < F$

Example 2

- Justify each statement with one of the given properties
- If AB = CD, CD = EF, and EF = 23, then AB = 23

transitive prop.

- If RS = TW, then TW = RS

Symmetric prop.

- $\angle ABC \cong \angle ABC$

reflexive prop.