Ch 2.6 Properties of Equality and Congruence

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	Equality	Congruence
Reflexive property	AB = AB m<A = m<A	$\overline{AB} \cong \overline{AB}$ <A ≅ <A
Symmetric property	If AB = CD, then CD = AB. If m<A = m<B, then m<B = m<A	if $\overline{AB} \cong \overline{CD}$, then $\overline{CD} \cong \overline{AB}$ if <A ≅ <B, then <B ≅ <A
Transitive property	if AB = CD and CD = EF, then AB = EF. if m<A = m<B and m<B = m<C then m<A = m<C	if $\overline{AB} \cong \overline{CD}$ and $\overline{CD} \cong \overline{EF}$, then $\overline{AB} \cong \overline{EF}$ if <A ≅ <B, and <B ≅ <C, then <A ≅ <C

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Ex1) Name the properties of Equality or Congruence:

a) If $\overleftrightarrow{ST} \cong \overleftrightarrow{UV}$ and $\overleftrightarrow{UV} \cong \overleftrightarrow{YZ}$, then $\overleftrightarrow{ST} \cong \overleftrightarrow{YZ}$.

b) If FG = HJ, then HJ = FG

c) <C ≅ <C

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Try #1. If DF = FG and FG = GH, then DF = GH.

Try #2. <P ≅ <P

Try #3. if m<S = m<T, then <T = m<S

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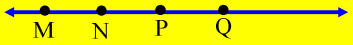
Ex2) Using Properties of Equality



GIVEN:
N is the midpoint of $\overline{MP}$, and P is the midpoint of $\overline{NQ}$, PROVE that MN = PQ

1. MN = NP — Definition of midpoint
2. NP = PQ — Definition of midpoint
3. MN = PQ — Transitive property

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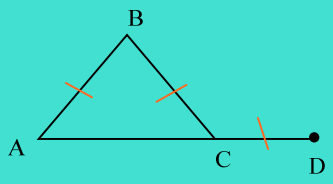
Ex2b)



GIVEN:
$\overline{AB} \cong \overline{BC}$ and $\overline{BC} \cong \overline{CD}$. Prove that AB = CD.

1. AB = BC — Definition of Congruent Segments
2. BC = CD — Definition of congruent segments
3. AB = CD — Transitive property

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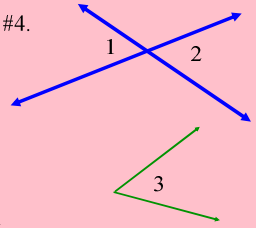
Try #4.



GIVEN:
<1 and <2 are vertical angles, and <2 ≅ <3.
PROVE that <1 ≅ <3.

1. <1 ≅ <2 _____
2. <2 ≅ <3 _____
3. <1 ≅ <3 _____

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Properties of Equality:

Addition Property: $x - 3 = 7$
$+3 \quad +3$
$x = 10$

Subtraction Property: $y + 5 = 11$
$-5 \quad -5$
$y = 6$

Multiplication Property: $\frac{1}{4}a = 6$
$\times 4 \quad \times 4$
$x = 24$

Division Property: $\frac{8x}{8} = \frac{16}{8}$
$x = 2$

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Substitution property - Substitute a number or a variable in an equation to produce a true statement.

$x = 7, \quad 2x + 4 = 2(7) + 4$

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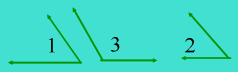
Ex3) Justify the congruent supplements theorem.

Given:
$\angle 1$ and $\angle 2$ are both supplementary to $\angle 3$. Prove that $\angle 1 \cong \angle 2$



4. $m\angle 1 = m\angle 2$

5. $\angle 1 \cong \angle 2$

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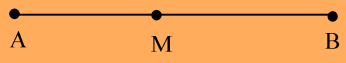
Ex3b) M is the midpoint of AB.
Prove that $\overline{AB} = 2AM$



1. MB = AM

2. AB = AM + MB

3. AB = AM + AM

4. AB = 2AM Distributive property

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