

**Geometry**  
**Notes 3-7**

**Proving Statements in Geometry**  
**Multiplying/Dividing/Powers and Roots**

Multiplication Postulate: If  $a = b$  and  $c = d$ , then  $ac = bd$ .

If equal quantities are multiplied by equal quantities, the products are equal.

Ex. When equal quantities are multiplied by 2, the doubled quantities are equal.

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

If equal quantities are divided by non-zero equal quantities, the quotients are equal.

Ex. If equal quantities are divided by 2, then halves of equal quantities are equal.

Powers Postulate: If  $a = b$ , then  $a^2 = b^2$ .

The square of = quantities are =.

Roots Postulate: If  $a = b$  and  $a > 0$ , then  $\sqrt{a} = \sqrt{b}$ .

Positive square roots of positive equal quantities are equal.

ex 1) Given:  $AB = CD$ ,  $RS = 3AB$ ,  $LM = 3CD$

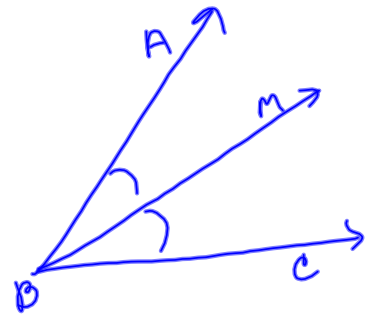
Prove:  $RS = LM$

Statement	Reason
1. $AB = CD$	1. Given
2. $RS = 3AB$	2. given
3. $RS = 3CD$	3. A quantity may be substituted for its equal in any statement of equality.
4. $LM = 3CD$	4. given
5. $RS = LM$	5. If quantities are equal to the same quantity, they are equal to each other
	<u>OR</u>
	Same as #3

ex 2) Given:  $5x + 3 = 38$   
 Prove:  $x = 7$

Statement	Reason
1. $5x + 3 = 38$	1. given
2. $+3 = +3$	2. an quantity is equal to itself.
3. $5x = 35$	3. If equal quantities are subtracted from equal quantities, the differences are =
4. $5 = 5$	4. same as #2
5. $x = 7$	5. If equal quantities are divided by non-zero equal quantities, the quotients =

ex 3) Given:  $m\angle ABM = \frac{1}{2}m\angle ABC$ ,  $m\angle ABC = 2m\angle MBC$   
 Prove:  $\overline{BM}$  bisects  $\angle ABC$



Statement	Reason
1) $m\angle ABM = \frac{1}{2}m\angle ABC$	1. given
2) $m\angle ABC = 2m\angle MBC$	2. given
3) $m\angle ABM = \frac{1}{2}(2m\angle MBC)$	3) Substitution
4) $m\angle ABM = m\angle MBC$	4) Multiplication
5) $\angle ABM \cong \angle MBC$	
6) $\overrightarrow{BM}$ bisects $\angle ABC$	6. If a Ray is bisector...