SC Honors Geometry - Nappier
2.4 – Algebraic Reasoning

Speak **L**ike **A** **M**athematician:

Reflexive Property (= and ≅):

Symmetric Property (= and ≅):

Transitive Property (= and ≅):

Properties of Equality — fill in each rule

Addition POE: If a = b, then a + c = _____

Subtraction POE: If a = b, then a – c = _____

Multiplication POE: If a = b, then ac = _____

Division POE: If a = b and c ≠ 0, then a/c = _____

Substitution POE: If a = b, then b can

_____

Distributive Property: a(b + c) = _____

Example 1 – Identify the Property

a) ∠XYZ ≅ ∠XYZ

b) m∠5 = m∠6, so m∠6 = m∠5.

c) JK = LM and LM = NP, so JK = NP.

d) 47° = 47°

Example 2 – Identify the Property

a) PQ = RS, so RS = PQ.

b) 68° = 68°

c) x = 7 and 7 = y, so x = y.

d) ∠B ≅ ∠K, so ∠K ≅ ∠B.

Example 3 – Justify Each Step

Solve 2x + 5 = 33 – 5x. Justify each step.

Statements	Reasons
1. 2x + 5 = 33 – 5x	**1.** Given
2.	**2.**
3.	**3.**
4.	**4.**

Example 4 – Justify Each Step

Solve –4(6w + 3) = 36. Justify each step.

Statements	Reasons
1. –4(6w + 3) = 36	**1.** Given
2.	**2.**
3.	**3.**
4.	**4.**

Example 5 – Justify Each Step

Solve 8 = –7b + 5(4 – b). Justify each step.

Statements	Reasons
1. 8 = –7b + 5(4 – b)	**1.** Given
2.	**2.**
3.	**3.**
4.	**4.**
5.	**5.**

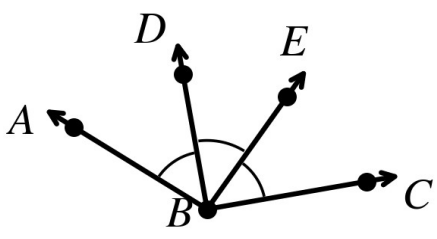
Example 6 – Real-World Formula

) Your raise can be written as p(r + 1) = n, where p is your previous wage, r is the percent increase (as a decimal), and n is your new wage. Solve the formula for r. Then find your raise as a percent when your wage increases from $8.50 to $9.18 per hour.

Example 7 – Angle Addition Proof

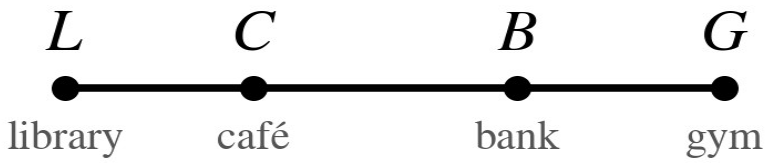
Given: m∠ABE = m∠DBC. Prove: m∠ABD = m∠EBC.

Statements	Reasons
1. m∠ABE = m∠DBC	**1.** Given
2.	**2.**
3.	**3.**
4.	**4.**



Example 8 – Distances on a Street

A library, a café, a bank, and a gym lie in order along a straight road. The distance from the library to the café equals the distance from the bank to the gym. Show that the distance from the library to the bank equals the distance from the café to the gym.



Statements	Reasons
1. LC = BG	**1.** Given
2.	**2.**
3.	**3.**
4.	**4.**