

Notes T2-19, Algebraic Proofs

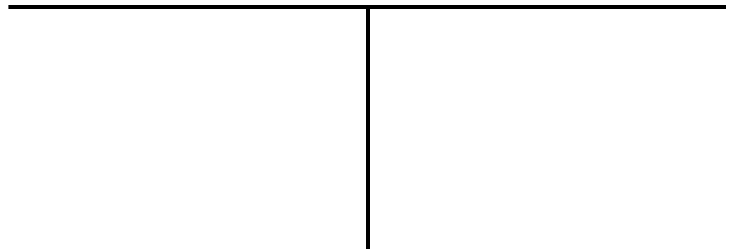
Ex 1) Name each property in the statements below.

- a. If $3x + 7 = 28$, then $x = 21$ _____
- b. If $.4x - .5 = 3$, then $4x - 5 = 30$ _____
- c. If $5(x - 4) = 2x + 5$, then $5x - 20 = 2x + 5$ _____
- d. If $15 = 3x$, then $3x = 15$ _____
- e. If $y = 2x - 1$ and $y = x + 3$, then $2x - 1 = x + 3$ _____
- f. If $4x - 8 = 12$, then $x - 2 = 3$ _____

Ex 2) Given: $5x - 18 = 3x + 2$

Prove: $x = 10$

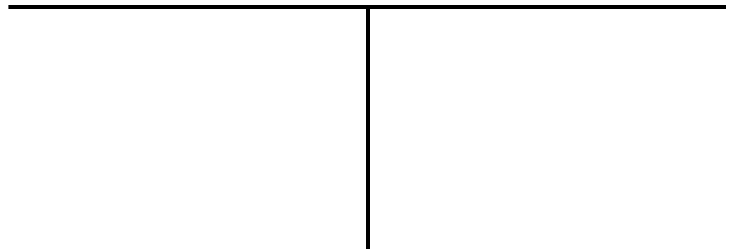
- 1. $5x - 18 = 3x + 2$
- 2. $2x - 18 = 2$
- 3. $2x = 20$
- 4. $x = 10$



Ex 3) Given: $55z - 3(9z + 12) = -64$

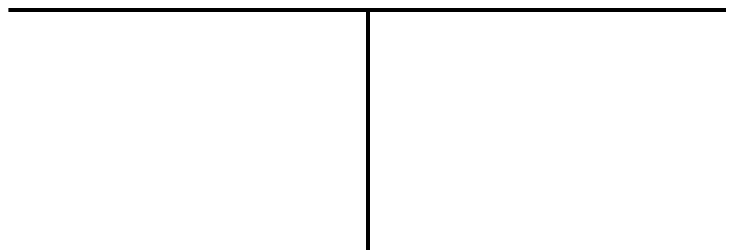
Prove: $z = -1$

- 1. $55z - 3(9z + 12) = -64$
- 2. $55z - 27z - 36 = -64$
- 3. $28z - 36 = -64$
- 4. $28z = -28$
- 5. $z = -1$



Ex 4) Given: $139 = x + 2x + 10$

Prove: $x = 43$



Algebra Properties

Addition Property of Equality	If the same number is added to equal numbers, the sums are equal.	$a = b$ $a + c = b + c$
Subtraction Property of Equality	If the same number is subtracted from equal numbers, the differences are equal.	$a = b$ $a - c = b - c$
Multiplication Property of Equality	If equal numbers are multiplied by the same number, the products are equal.	$a = b$ $ac = bc$
Division Property of Equality	If equal numbers are divided by the same nonzero number, the quotients are equal.	$a = b$ $c \neq 0$ $a/c = b/c$
Reflexive Property of Equality	A number is equal to itself.	$a = a$
Substitution Property	If values are equal, one value may be substituted for the other.	$a = b \rightarrow a$ may be substituted for b .
Distributive Property	An expression of the form $a(b + c)$ is equivalent to $ab + ac$.	$a(b + c) = ab + ac$
Transitive Property of Equality	For 1 values equals a 2 nd value, and the 2 nd value equals a 3 rd value, then the 1 st value equals the 3 rd value.	If $a = b$, AND $b = c$, then $a = c$
Symmetric Property of Equality	If one value equals a 2 nd , then the 2 nd value equals the 1 st .	If $a = b$, then $b = a$
Combine Like Terms	If two terms are on one side of an equation are have the same variable to the same power	If $3x + 4 + 2x = 9$ then $6x + 4 = 9$

3 Types of Proofs

- 2 Column Proofs
- Flow Proof
- Paragraph Proof

Reasons for Proofs

- Given
- Properties
- Definitions
- Postulates
- Conjectures