7.6 Postulates and Proofs in Algebra

Postulate - rule that is accepted as true

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7 Postulates

1. Addition Postulate
   If $a = b$ then $a + c = b + c$
2. Subtraction Postulate
   If $a = b$ then $a - c = b - c$
3. Multiplication Postulate
   If $a = b$ then $ac = bc$
4. Division Postulate
   If $a = b, c \neq 0$, then $\frac{a}{c} = \frac{b}{c}$

	Justification
$y - 3 = 5$	Given
$y = 8$	Add. Pos (3)
$y + 9 = 14$	Given
$y = 5$	Sub Pos (9)
$\frac{x}{5} = 15$	Given
$x = 75$	multi. Pos (5)
$3x = 27$	given
$x = 9$	Div. Pos (3)

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5. Reflexive Postulate
   all things are equal to themselves
   $a = a$
6. Substitution Pos
   If $a = b$, then b can be used for a
   any where a appears in the equation
7. Distributive Postulate
   $a(b + c)$ iff $ab + bc$

$7x + 12$	Given
$x = 4$	Given
$7(4) + 12$	Substitution
$28 + 12$	Simplify
40	Combine like Terms

$$2(x+3) - 4 = 6x - 12$$

$2(x+3) - 4 = 6x - 12$	given
$2x + 6 - 4 = 6x - 12$	Distributive Pos
$2x + 2 = 6x - 12$	Simplify
$2 = 4x - 12$	Subtraction (2x)
$14 = 4x$	Add Pos (12)
$3.5 = x$	Div. Pos (4)