

Name: _____ *Key*

Date: _____

Properties of Equality

Properties of Equality	Property	Example(s)
Addition Property of Equality	If $a = b$, then $a + c = b + c$.	$x - 3 = 7$ $\begin{array}{r} +3 \quad +3 \\ \hline x = 10 \end{array}$
Subtraction Property of Equality	If $a = b$, then $a - c = b - c$	$x + 8 = 12$ $\begin{array}{r} -8 \quad -8 \\ \hline x = 4 \end{array}$
Multiplication Property of Equality	If $a = b$, then $ac = bc$	$x/4 = 16$ $\begin{array}{r} \cdot 4 \quad \cdot 4 \\ \hline x = 64 \end{array}$
Division Property of Equality	If $a = b$, then $a/c = b/c$	$7x = 42$ $\begin{array}{r} \overline{) 42} \\ \underline{42} \\ 0 \end{array}$ $x = 6$

Properties of Operations and Identities

Properties of Operations and Identities	Property	Example(s)
Commutative Property of Addition	$a + b = b + a$	$3 + 5 = 5 + 3$ $8 = 8$
Commutative Property of Multiplication	$a \cdot b = b \cdot a$	$7 \cdot 2 = 2 \cdot 7$ $14 = 14$
Associative Property of Addition	<i>Also combining like terms</i> $a + (b + c) = (a + b) + c$	$(7 + 5) + 3 = 7 + (5 + 3)$ $12 + 3 = 7 + 8$
Associative Property of Multiplication	$a \cdot (b \cdot c) = (a \cdot b) \cdot c$	$2 \cdot (3 \cdot 4) = (2 \cdot 3) \cdot 4$ $2 \cdot 12 = 6 \cdot 4$ $24 = 24$

Distributive Property of Multiplication over Addition	$a \cdot (b + c) = a \cdot b + a \cdot c$	$3(4+6) = 3 \cdot 4 + 3 \cdot 6$ $3(10) = 12 + 18$ $30 = 30$
Additive Identity Property	$a + 0 = a$	$5 + 0 = 5$ $5 = 5$
Multiplicative Identity Property	$a \cdot 1 = a$	$12 \cdot 1 = 12$ $12 = 12$
Additive Inverse Property	$a + (-a) = 0$	$6 + (-6) = 0$ $0 = 0$
Multiplicative Inverse Property	$\frac{a}{b} \cdot \frac{b}{a} = 1$	$\frac{3}{4} \cdot \frac{4}{3} = \frac{12}{12} = 1$
Multiplicative Property of Zero	$a \cdot 0 = 0$	$16 \cdot 2 \times 0 = 0$
Exponential Property of Equality	$a^b = a^c$, then $b = c$	$3^3 = 3^{2+1}$ $27 = 27$

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Equation	Steps
$x + (4x + 32) = 12$	Original equation
$5x + 32 = 12$	Associative property of addition
$5x = -20$	Subtraction Prop. of Eq.
$x = -4$	Division property of equality

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Equation	Steps
$4(x - 6) = 40$	Original equation
$x - 6 = 10$	Division Prop. of Eq.
$x = 16$	Addition Prop. of Eq.

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Equation	Steps
$1.4 - 0.3x + 0.7x = 9.4$	Original equation
$1.4 + 0.4x = 9.4$	Associative Prop. of Add.
$0.4x = 8$	Subtraction Prop. of Eq.
$x = 20$	Division Prop. of Eq.