

## Table of Properties

Let  $a$ ,  $b$ , and  $c$  be real numbers, variables, or algebraic expressions.  
(These are properties you need to know.)

Equality  
Inverse  
Identity

	Property	Example
1.	Commutative Property of Addition $a + b = b + a$	$2 + 3 = 3 + 2$
2.	Commutative Property of Multiplication $a \cdot b = b \cdot a$	$2 \cdot 3 = 3 \cdot 2$
3.	Associative Property of Addition $a + (b + c) = (a + b) + c$	$2 + (3 + 4) = (2 + 3) + 4$
4.	Associative Property of Multiplication $a \cdot (b \cdot c) = (a \cdot b) \cdot c$	$2 \cdot (3 \cdot 4) = (2 \cdot 3) \cdot 4$
5.	Distributive Property $a \cdot (b + c) = ab + ac$ $a \cdot (b - c) = ab - ac$	$2 \cdot (3 + 4) = 2 \cdot 3 + 2 \cdot 4$
6.	Additive Identity Property $a + 0 = a$	$3 + 0 = 3$
7.	Multiplicative Identity Property $a \cdot 1 = a$	$3 \cdot 1 = 3$
8.	Additive Inverse Property $a + (-a) = 0$	$3 + (-3) = 0$
9.	Multiplicative Inverse Property $a \left(\frac{1}{a}\right) = 1$	$3 \left(\frac{1}{3}\right) = 1$
10.	Zero Property $a \cdot 0 = 0$	$5 \cdot 0 = 0$
11.	Multiplicative Property of -1 (Division Property of -1) $a \cdot -1 = -a$ $\frac{a}{-1} = -a$	$4 \cdot -1 = -4$
12.	Property of Equality Addition: If $a = b$ , then $a + c = b + c$ Subtraction: If $a = b$ , then $a - c = b - c$ Multiplication: If $a = b$ , then $ac = bc$ Division: If $a = b$ , then $\frac{a}{c} = \frac{b}{c}$	



$$\textcircled{4} \quad \frac{P_1 \cdot V_1}{V_2} = \frac{P_2 \cdot V_2}{V_2}$$

$$P_2 = ?$$

$$\textcircled{9} \quad D = 280 - 59t$$

↑  
Slope

$$\left( \frac{\Delta y}{\Delta x} \quad \frac{\Delta d}{\Delta t} \right)$$

Speed

Solve the following equations/inequalities. **Remember, “Clearing” the denominators is often helpful.**

3.  $4(w + 3) = -w - 18$

4.  $9n - 7 = 5n + 5$

5.  $3(x + 3) \leq 5x - 3$

6.  $0.25(8z - 4) = z + 8 - 2z$

7.  $7 - \frac{2}{3}x < x - 8$

8.  $\frac{7}{3}\left(x + \frac{9}{28}\right) = 20$

$$9. \quad \frac{x-2}{2} + \frac{1}{6} = \frac{5}{6} \cdot 6$$

$$\frac{2(x-2)}{2} \\ 2x-4$$

$$10. \quad 9x - 5 > \frac{1}{4}(16x + 60)$$

$$11. \quad \frac{3}{2} + \frac{3}{4}a = \frac{1}{4}a - \frac{1}{2}$$

$$12. \quad \frac{2}{3} = \frac{4x+4}{2x-14}$$

"Cross  
Multiply"

$$13. \quad \frac{x}{2} + \frac{x}{3} = \frac{5}{6}$$

$$14. \quad \frac{2x}{5} - 4 = \frac{2x}{3}$$

Excluded values make the denominator equal to 0.

$$15. \frac{x+1}{4} = \frac{3x+6}{7}$$

$$7(x+1) = 4(3x+6)$$

$$7x+7 = 12x+24$$

$$-7x \quad -7x$$

$$7 = 5x+24$$

$$-24 \quad -24$$

$$-17 = 5x$$

$$\frac{-17}{5} = \frac{5x}{5}$$

$$x = -\frac{17}{5}$$

Excluded values:  $x = -7$ ,  $x = -4$

$$x+4 = 0 \Rightarrow x = -4$$

$$x-7 = 0 \Rightarrow x = 7$$

16.  $\frac{7}{12}x - \frac{1}{3} \geq 2x - \frac{5}{3}$

$$7x - 3 \geq 24x - 20$$

$$-24x \quad -24x$$

$$-17x - 3 \geq -20$$

$$+3 \quad +3$$

$$-17x \geq -17$$

$$\frac{-17x}{-17} \geq \frac{-17}{-17}$$

$$x \leq 1$$

17. If the perimeter of a rectangle is  $16\frac{1}{2}$  ft. and its width is one third of its length, find the width and length of the rectangle. *Only an algebraic solution will receive full credit.*

