

Table of Properties

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

	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 $\frac{a}{c} = \frac{b}{c}$	

Name: _____ Date: _____

Regents Review: Solving Linear Equations/Inequalities

Algebra 1

$$w + w = 0$$

$$\text{Add Inv}$$

State the properties being used to solve the following equations.

1.

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

$$4w + 12 = -w - 18$$

$$w + 4w + 12 = -w - 18 + w$$

$$w + 4w + 12 = -w + w - 18$$

$$5w + 12 = 0 - 18$$

$$5w + 12 = -18$$

$$-12 + 5w + 12 = -18 + (-12)$$

$$5w + 12 + (-12) = -18 + (-12)$$

$$5w + 0 = -30$$

$$5w = -30$$

$$\left(\frac{1}{5}\right)5w = -30\left(\frac{1}{5}\right)$$

$$1w = -6$$

$$w = -6$$

Distrib. Prop.
Add. Prop of Equality
Commutative Prop.
Add. Inverse
Add. Identity

2.

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

$$-5n + 9n - 7 = 5n + 5 + (-5n)$$

$$-5n + 9n - 7 = 5n + (-5n) + 5$$

$$4n - 7 = 0 + 5$$

$$4n - 7 = 5$$

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

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

$$4n + 0 = 12$$

$$4n = 12$$

$$\left(\frac{1}{4}\right)4n = 12\left(\frac{1}{4}\right)$$

$$1n = 3$$

$$n = 3$$

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

$$4.6 = 4.2.34$$

9. $\frac{x-2}{3} + \frac{1}{6} = \frac{5}{6}$

10. $4.9x - 5 > \frac{4}{4}(16x + 60)$

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

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

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

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

Multiply all terms by the Common Denominator

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

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

$$4x + 4 = 21x + 42$$

$$-17x - 38 = 0$$

$$\frac{-17}{-17} = \frac{-38}{-17}$$

$$x = \frac{38}{17} = 2.235$$

$$16. \left[\frac{7}{12}x - \frac{1}{4} \geq 2x - \frac{5}{3} \right]$$

$$12 \cdot \frac{7}{12}x - 12 \cdot \frac{1}{4} \geq 12 \cdot 2x - 12 \cdot \frac{5}{3}$$

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

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

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

$$+3 \quad +3$$

$$-17x \geq -17$$

$$x \leq 1$$

flip

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.*

4: 4, 8, 12, 16, 20, 24, 28

7: 7, 14, 21, 28, 35,