

Lesson #8 - Properties of Real Numbers

|   | Property  | Examples   |
|---|---|--|
| 1 | <b>Commutative Property of Addition</b><br>$a + b = b + a$<br>* order switches *  | $1 + 2 = 2 + 1$<br>$3 + 6 = 6 + 3$                 |
| 2 | <b>Commutative Property of Multiplication</b><br>$a \cdot b = b \cdot a$ * order switches *                                       | $8 \cdot 2 = 2 \cdot 8$<br>$6 \cdot 7 = 7 \cdot 6$ |
| 3 | <b>Associative Property of Addition</b><br>$(a + b) + c = a + (b + c)$<br>* order stays, parentheses move *                       | $(1 + 2) + 3 = 1 + (2 + 3)$                        |
| 4 | <b>Associative Property of Multiplication</b><br>$(a \cdot b) \cdot c = a \cdot (b \cdot c)$<br>* order stays, parentheses move * | $(1 \cdot 2) \cdot 3 = 1 \cdot (2 \cdot 3)$        |
| 5 | <b>Distributive Property</b><br>$a(b + c) = a \cdot b + a \cdot c$  | $2(3 + 6) = 2 \cdot 3 + 2 \cdot 6$                 |
| 6 | <b>Additive Identity Property</b><br>$a + 0 = a$  | $3 + 0 = 3$<br>$16 + 0 = 16$                       |
| 7 | <b>Multiplicative Identity Property</b><br>$a \cdot 1 = a$  | $2 \cdot 1 = 2$<br>$-6 \cdot 1 = -6$               |
| 8 | <b>Additive Inverse Property</b><br>$a + (-a) = 0$ * opposites *  | $2 + (-2) = 0$<br>$-72 + (-72) = 0$                |
| 9 | <b>Zero Property of multiplication</b><br>$a \cdot 0 = 0$   | $3 \cdot 0 = 0$<br>$-2 \cdot 0 = 0$                |

**For Questions 1-9, write the property that is represented by the given equation.**

1)  $3 + \frac{1}{2} = \frac{1}{2} + 3$  Commutative property of addition

2)  $0.5 \cdot 1.2 = 1.2 \cdot 0.5$  Commutative property of multiplication

3)  $13 + (-13) = 0$  Additive Inverse Property

4)  $(\frac{2}{3} \cdot 7) \cdot 0.5 = \frac{2}{3} \cdot (7 \cdot 0.5)$  Associative property of multiplication

5)  $1.2 \cdot 0 = 0$  Zero property of multiplication

6)  $4.2 \cdot (6.8 + 1.7) = 4.2 \cdot 6.8 + 4.2 \cdot 1.7$  ~~Associative~~ <sup>Distributive</sup> Property

7)  $(9\frac{1}{6} + 2\frac{1}{2}) + 7 = 9\frac{1}{6} + (2\frac{1}{2} + 7)$  Associative property of addition

8)  $5.7 + 0 = 5.7$  Additive Identity

9)  $7.56 \cdot 1 = 7.56$  Multiplicative Identity

**For questions 10-13, complete each equation to make it a true statement.**

10)  $(6.2 + 7.3) + 9 = 6.2 + (7.3 + \underline{9})$

11)  $-15 + \underline{0} = -15$

12)  $\frac{2}{3} + \frac{4}{5} = \underline{\frac{4}{5}} + \frac{2}{3}$

13)  $1.5 + \underline{(-1.5)} = 0$

**Questions 13-16: Multiple Choice**

↑  
older steps, parenthesis move

13) Which illustrates the associative property?

A)  $3.6 \cdot 0 = 0$

B)  $(5.2 + 2.8) + 3 = 5.2 + (2.8 + 3)$

C)  $6.5 + 7.2 = 7.2 + 6.5$

D)  $(1.2 + 8.6) + 9 = 7 - (2.9 + 4.1)$

14) Which illustrates the **multiplicative identity property**?

A)  $9\frac{1}{5} \cdot 1 = 9\frac{1}{5}$

B)  $8.5 + 0 = 8.5$

C)  $3.6 \cdot 0 = 0$

D)  $4\frac{8}{11} + (-4\frac{8}{11}) = 0$

15) Which property is being illustrated by the equation  $m(a + b) = ma + mb$ ?

A) Associative

B) Commutative

C) Identity

D) Distributive

16) Which property is being illustrated by the equation  $(24 \cdot 9) \cdot 0 = 0$ ?

A) Commutative Property of Multiplication

B) Associative Property of Multiplication

C) Zero Property of Multiplication

D) Identity Property of Multiplication

**Matching Column: Match the EXPRESSION with the correct PROPERTY.**

17)  $a + b = b + a$

• Zero Property of Multiplication

18)  $a \cdot 0 = 0$

• Additive Inverse Property

19)  $a(b + c) = ab + ac$

• Commutative Property

20)  $a + (-a) = 0$

• Distributive Property

