

3.3 Properties of Addition and Multiplication

Equivalent Expressions → Expressions with the same value $12+7$, $7+12$

Commutative property → Changing the order of addends or factors does not change the sum or product.

$$5+8 = 8+5 \quad 6 \cdot 2 = 2 \cdot 6$$

Associative Properties → Changing the grouping does not change the product or sum.

$$(7+4)+2 = 7+(4+2) \quad \text{or} \quad (7 \cdot 4) \cdot 2 = 7(4 \cdot 2)$$

① Using Properties to Write Equivalent Expressions

a) $7 + (12+x) = (7+12)+x = 19+x$

b) $(6.1+x)+8.4 = (6.1+8.4)+x = 14.5+x$

c) $5(11y) = (5 \cdot 11)y = 55y$

TRY it! ① $10+(a+9)$ ② $(10+a)+9 = 19+a$

③ $(c+\frac{2}{3})+\frac{1}{2}$ $(\frac{2}{3}+\frac{1}{2})+c = 1\frac{1}{2}+c$

④ $5(4n) = (5 \cdot 4)n = 20n$

Addition Prop of zero

Mult. Prop of zero

a) $(t+15)+0 = (15+0)+t = 15+t$

b) $(4.5+r)+0 = 4.5+r$

a) $12 \cdot b \cdot 0 = 0$

b) $9 \cdot 0 \cdot p = 0$