Commutative, Associative, and Distributive Laws

Commutative Laws
a + b = b + a   ex: 3 + 4 = 4 + 3

a x b = b x a   ex: 2 x 5 = 5 x 2

Does not work for subtraction or division

Associative Laws
(a + b) + c = a + (b + c)   ex: (2 + 3) + 5 = 2 + (3 + 5)

(a x b) x c = a + (b x c)   ex: (1 x 2) x 4 = 1 x (2 x 4)

Does not work for subtraction or division

Sometimes easier to add or multiply in different order
19 + 36 + 4 = 19 + **(36 + 4)** = 19 + **40** = 59

2 x 16 x 5 = **(2 x 5)** x 16 = **10** x 16 = 160

Distributive Laws
a x (b + c) = a x b + a x c

ex: 3 x **(2 + 4)** = 3 x **6** = 18
    (3 x 6)+ (3 x 4)= 6 + 12 = 18

Does not work for division

Sometimes easier to break up difficult multiplication
6 x 24 = 6 x (20 + 4) = (6 x 20) + (6 x 4) = 120 + 24 = 144

Or to combine
16 x 6 + 16 x 4 = 16 x **(6 + 4)** = 16 x **10** = 160

Can use for subtraction
26 x 3 – 24 x 3 = **(26 – 24)** x 3 = **2** x 3 = 6

Can use in long additions
6 x 7 + 2 x 7 + 3 x 7 + 5 x 7 + 4 x 7 = **(6 + 2 + 3 + 5 + 4)** x 7 = 20 x 7 = **140**