**Properties of Real Numbers**

Properties of Addition

*Associative property of addition* **(*a + b*) *+ c = a +* (*b + c*)**

 (2 + 3) + 4 = 2 + (3 + 4)

*Commutative property of addition* ***a + b = b + a***

 *2 + 3 = 3 + 2*

*Additive identity property of 0* ***a +* 0 *=* 0 + *a* = *a***

 *3 + 0 = 0 + 3 = 3*

*Existence of additive inverses*

For every *a* there exists –*a* so that ***a* + (–*a*) = (–*a*) + *a* = 0**

 2 +(-2) = (-2) + 2 = 0

Properties of Multiplication

*Associative property of multiplication* **(*a* x *b*) x *c = a* x (*b* x *c*)**

 (2 x 3) x 4 = 2 x (3 x 4)

*Commutative property of multiplication* ***a* x *b = b* x *a***

 *2 x 3 = 3 x 2*

*Multiplicative identity property of 1* ***a* x 1 *=* 1 x *a* = *a***

 *3 x 1 = 1 x 3 = 3*

*Existence of multiplicative inverses*

For every *a* ≠ 0 there exists 1/*a* so that

***a* x 1/*a* = 1/*a* x *a* = 1**

 2 x 1/2 = 1/2 x 2 = 1

Linking multiplication and addition: the ninth property

*Distributive property of multiplication over addition*

**a x (b + c) = (a x b) + (a x c)**

 **a(b+c) = ab + ac**

3(2 + 5) = 3(2) + 5(5)

From Humphreys, C. & Parker, R. (2015). *Making number talks matter: Developing mathematical practices and deepening understanding.* Stenhouse Publishers.