

CHAPTER ONE

BASIC ALGEBRA

Addition in Algebra:

$$(1) a + a = 2a$$

$$(2) x + x = 2x$$

$$(3) 2a + a = 2a + 1a = 3a$$

$$(4) 2a + 4a = 6a$$

$$(5) 3y + 2y = 5y$$

$$(6) 7x + x = 7x + 1x = 8x$$

$$(7) 2a + 3a + 4a = 5a + 4a = 9a$$

$$(8) 4x + 2x + x = 6x + x = 6x + 1x = 7x$$

$$(9) 2ab + 4ab = 6ab$$

$$(10) 5xy + 2xy = 7xy$$

$$(11) 2ab + 4ab + 3ab = 6ab + 3ab = 9ab$$

$$(12) 2ab + ab = 2ab + 1ab = 3ab$$

$$(13) 4ab + ab = 4ab + 1ab = 5ab$$

$$(14) xy + 6xy + 3xy = 1xy + 6xy + 3xy = 7xy + 3xy = 10xy.$$

N/B: - From these given examples, we see that in algebra, we can only add if the terms or the letters are the same.

N/B: $ab = ba$, $xy = yx$ and $km = mk$

$\Rightarrow 2ab = 2ba$, $4xy = 4yx$ and $3km = 3mk$.

Examples:

$$(1) 2ab + 4ba = 2ab + 4ab = 6ab$$

$$(2) 5xy + 2yx = 5xy + 2xy = 7xy$$

$$(3) 2ab + ab = 3ab$$

$$(4) 4ab + 2ab + ab = 6ab + 1ab = 7ab$$

N/B: - If the terms or the letters are not the same, then we cannot add.

Examples:

(1) $a + b = a + b.$

(2) $2a + 3ab = 2a + 3ab.$

(3) $x + y = x + y.$

(4) $6x + 2y = 6x + 2y.$

(Q1) Simplify each of the following:

(a) $3a + a + 5x = 4a + 5x.$

(b) $3a + 2a + 5x + 2x = 5a + 7x.$

(c) $3x + 4x + 2y + y = 7x + 3y.$

(d) $2a + 3b + 4a = 2a + 4a + 3b = 6a + 3b.$

(e) $2a + 3b + 4a + 6b = 2a + 4a + 3b + 6b = 6a + 9b.$

(f) $4x + 2b + 3x + 6b = 4x + 3x + 2b + 6b = 7x + 8b.$

(g) $2ab + 5ab + 2a = 7ab + 2a.$

(h) $2ab + 4ab + 3a + 2a = 6ab + 5a.$

(i) $2ab + 5ab + 5a + a = 2ab + 5ab + 6a = 7ab + 6a.$

(j) $2ab + 3y + 7ab + y = 2ab + 7ab + 3y + y = 9ab + 4y.$

(k) $3 + 4y + 2y = 3 + 6y.$

(l) $2 + 4x + 3x + 3 = 2 + 3 + 4x + 3x = 5 + 7x.$

(m) $4x + 5y + 6x + 7xy = 4x + 6x + 5y + 7xy = 10x + 5y + 7xy$

(n) $2ab + 3a + 5ab + 6b = 2ab + 5ab + 3a + 6b = 7ab + 3a + 6b.$

(o) $2ab + 3xy + 4ab + 6xy = 2ab + 4ab + 3xy + 6xy = 6ab + 9xy..$

Subtraction In Algebra:

N/B: - In algebra, we can only subtract when the letters or the terms are the same.

Examples:

(1) $2a - a = a.$

(2) $4a - 2a = 2a.$

(3) $7b - 3b = 4b.$

(4) $6x - 4x = 2x.$

(5) $8y - 2y = 6y.$

(6) $5x - 2y = 5x - 2y.$

(7) $8y - 4b = 8y - 4b.$

(8) $2ab - a = 2ab - a.$

(9) $3xy - 5y = 3xy - 5y.$

(10) $4ab - 2ba = 4ab - 2ab = 2ab.$

(11) $4y - 2a - 2y = 4y - 2y - 2a = 2y - 2a.$

(12) $6a - 3b - 2a = 6a - 2a - 3b = 4a - 3b.$

(13) $4ab - 3b - 3ab = 4ab - 3ab - 3b = 1ab - 3b = ab - 3b.$