CHAPTER 3

Expansion and Factorisation of Algebraic Expressions

Key Notes

3.1 Quadratic Expressions

A quadratic expression is an expression in the form of:

$ax^2 + bx + c$, where a, b and c are constants and $a \neq 0$.

When adding or subtracting quadratic expressions, we add and subtract like terms.

For example,
$(4x^2 - 3x + 7) - (-2x^2 + 9x - 16)$
$= 4x^2 - 3x + 7 + 2x^2 - 9x + 16$
$= 4x^2 + 2x^2 - 3x - 9x + 7 + 16$
$= 6x^2 - 12x + 23$

3.2 Expansion and Simplification of Quadratic Expressions

The **Distribution Law** is also used in the expansion of quadratic equations.

For example,
$2x(4 - 3x) = 8x - 6x^2$

Note:
When $2x$ is multiplied by $3x$, the constants are multiplied together and the variables are multiplied together to get $6x^2$.

When we multiply quadratic expressions of the form $(a + b)(c + d)$, the expressions in the second bracket should be multiplied by each term in the first bracket.

For example,
$(3x + 2)(1 - 5x)$
$= 3x(1 - 5x) + 2(1 - 5x)$
$= 3x - 15x^2 + 2 - 10x$
$= -15x^2 - 7x + 2$

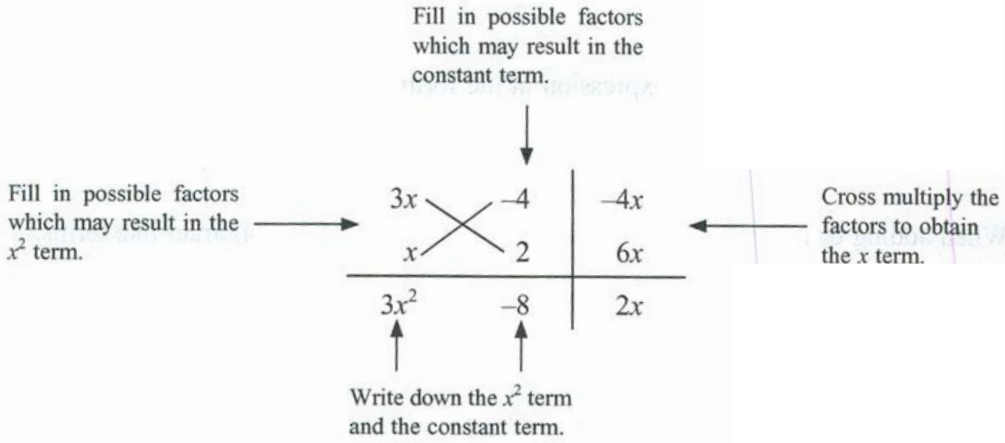
Note:
Remember to simplify the expression.

$(4x - 3)(2x + 5)$
$= 4x(2x) + 4x(5) - 3(2x) - 3(5)$
$= 8x^2 + 20x - 6x - 15$
$= 8x^2 + 14x - 15$

3.3 Factorisation of Quadratic Expressions using Cross Multiplication

Factorisation is the reverse of expansion. Factorisation involves expressing a quadratic expression as a product of two or more algebraic expressions, which are called factors.

For example,
Factorise $3x^2 + 2x - 8$.



Check the terms in the final row with the original expression. Hence, $3x^2 + 2x - 8 = (3x - 4)(x + 2)$.