

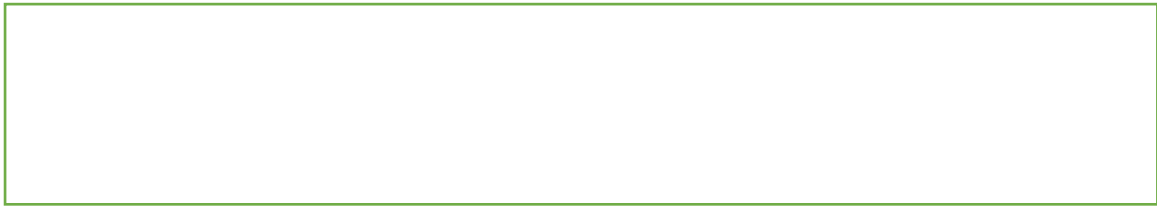
Lower 6 Chapter 7
Algebraic Methods

Chapter Overview

1. Algebraic Fractions
2. Algebraic Long Division
3. Factor Theorem
4. Proof

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| <p>2</p> <p>Algebra and functions</p> <p><i>continued</i></p> | <p>2.6</p> | <p>Manipulate polynomials algebraically, including expanding brackets and collecting like terms, factorisation and simple algebraic division; use of the factor theorem.</p> | <p>Only division by $(ax + b)$ or $(ax - b)$ will be required. Students should know that if $f(x) = 0$ when $x = a$, then $(x - a)$ is a factor of $f(x)$.</p> |
| | | <p>Simplify rational expressions, including by factorising and cancelling, and algebraic division (by linear expressions only).</p> | <p>Students may be required to factorise cubic expressions such as $x^3 + 3x^2 - 4$ and $6x^3 + 11x^2 - x - 6$.</p> |
| | | | <p>Denominators of rational expressions will be linear or quadratic,</p> |
| | | | <p>e.g. $\frac{1}{ax+b}, \frac{ax+b}{px^2+qx+r}, \frac{x^3+a^3}{x^2-a^2}$</p> |
| <p>1</p> <p>Proof</p> | <p>1.1</p> | <p>Understand and use the structure of mathematical proof, proceeding from given assumptions through a series of logical steps to a conclusion; use methods of proof, including:</p> | |
| | | <p>Proof by deduction</p> | <p>Examples of proofs:</p> <p>Proof by deduction</p> <p>e.g. using completion of the square, prove that $n^2 - 6n + 10$ is positive for all values of n or, for example, differentiation from first principles for small positive integer powers of x or proving results for arithmetic and geometric series. This is the most commonly used method of proof throughout this specification</p> |
| | | <p>Proof by exhaustion</p> | <p>Proof by exhaustion</p> <p>This involves trying all the options. Suppose x and y are odd integers less than 7. Prove that their sum is divisible by 2.</p> |
| | | <p>Disproof by counter example</p> | <p>Disproof by counter example</p> <p>e.g. show that the statement "$n^2 - n + 1$ is a prime number for all values of n" is untrue</p> |

Simplifying Algebraic Fractions



Examples

1. $\frac{x^2-1}{x^2+x}$

2. $\frac{x^2+3x+2}{x+1}$

3. $\frac{2x^2+11x+12}{x^2+9x+20}$

4. $\frac{4-x^2}{x^2+2x-8}$