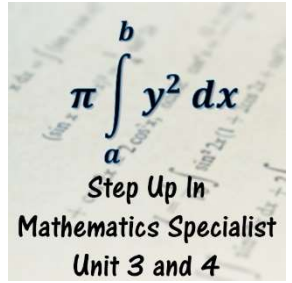


1.5 Factorisation of Polynomials

Problems Worksheet



1.
 - a. State and prove the remainder theorem.

- b. State and prove the factor theorem.

2. Evaluate the following functions without the use of a calculator and without substitution.

a. $f(2)$ where $f(x) = x^3 - 2x + 1$.

b. $g(-3)$ where $g(x) = -x^3 + 5x^2 - 10$.

c. $h(-2)$ where $h(x) = -2x^3 + 2x^2 - 5x - 9$.

3. Rewrite $\frac{x^5-2x^2+15}{x^2-3}$ as a proper algebraic fraction.

4. Fully factorise the following functions, without the use of a calculator.

a. $f(z) = z^3 - 3z^2 + z - 3$

b. $g(z) = z^3 - 2z^2 + 4z - 8$

c. $h(z) = z^3 + z + 10$

5. Find the equation of the quadratic $f(z)$ with real coefficients, given $-3 + i$ is a root of $f(z)$.
6. Find the equation of the cubic $f(z)$ with real coefficients, given that $f(1) = -10$, $f(2) = 13$ and that $3i$ is a root of $f(z)$.
7. Fully factorise the following functions, without the use of a calculator.
- a. $f(z) = 2z^3 + z^2 - 9z + 4$, given that $f\left(\frac{1}{2}\right) = 0$.
- b. $g(z) = 4z^3 - 12z^2 + z - 3$