

Remainder/factor Theorem

- 1 The expression $f(x) = x^3 + ax^2 + bx + c$ leaves the same remainder, R , when it is divided by $x + 2$ and when it is divided by $x - 2$.
- (i) Evaluate b . [2]
- $f(x)$ also leaves the same remainder, R , when divided by $x - 1$.
- (ii) Evaluate a . [2]
- $f(x)$ leaves a remainder of 4 when divided by $x - 3$.
- (iii) Evaluate c . [1]
- (b) Solve the equation $x^3 + 3x^2 = 2$, giving your answers to 2 decimal places where necessary. [5]
- 2 (a) The remainder when the expression $x^3 - 11x^2 + kx - 30$ is divided by $x - 1$ is 4 times the remainder when this expression is divided by $x - 2$. Find the value of the constant k . [4]
- (b) Solve the equation $x^3 - 4x^2 - 8x + 8 = 0$, expressing non-integer solutions in the form $a \pm \sqrt{b}$, where a and b are integers. [5]
- 3 Solve the equation $x^2(2x + 3) = 17x - 12$. [6]
- 4 A function f is such that $f(x) = ax^3 + bx^2 + 3x + 4$. When $f(x)$ is divided by $x - 1$, the remainder is 3. When $f(x)$ is divided by $2x + 1$, the remainder is 6. Find the value of a and of b . [5]
- 5 Given that $f(x) = 2x^3 - 7x^2 + 7ax + 16$ is divisible by $x - a$, find
- (i) the value of the constant a , [2]
- (ii) the remainder when $f(x)$ is divided by $2x + 1$. [2]
- 6 Solve the equation $3x(x^2 + 6) = 8 - 17x^2$. [6]