O Level A Maths Tutorial 4: Polynomials and Partial Fractions

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Syllabus :
• Multiplication and division of polynomials

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1. (a) Multiply $2x^2 + 5x + 6$ by $x+2$.

(b) Divide $2x^2 + 5x + 6$ by $x+2$.

• Use of remainder and factor theorems, including factorising polynomials and solving cubic equations

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2. (a) Use the remainder theorem to find the remainder in equation 1(b).

(b) Subtract the remainder from the quadratic expression in 1(b). State why $x+2$ is a factor of the resulting expression.

(c) Factorise the resulting expression.

• Use of:
- $a^3 + b^3 = (a + b)(a^2 – ab + b^2)$
- $a^3 – b^3 = (a – b)(a^2 + ab + b^2)$

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3 (a) Factorise $x^3 + 8$.

(b) Factorise $x^3 - 8$.

• Partial fractions with cases where the denominator is no more complicated than:
  - $(ax + b)(cx + d)$
  - $(ax + b)(cx + d)^2$
  - $(ax + b)(x^2 + c^2)$

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4. Express the following in partial fractions.

(i) $\dfrac{1}{(x+1)(x+2)}$

(ii) $\dfrac{1}{(x+1)(x+2)^2}$

(iii) $\dfrac{1}{(x+1)(x^2+2)^2}$