6 MUST KNOW QUESTIONS TO <u>CONQUER</u> **POLYNOMIALS**

 (i) Given that x - 1 is a factor of f(x), find the value of p. (ii) Using the value of p found in (i), (a) find the remainder when f(x) is divided by 2x - 3, (b) factorise f(x) completely, (c) hence solve the equation 4(y - 1)³ + p(y - 1)² + 5y - 3 = 0. Answers: (i) p = -11 (ii)(a) Remainder =-1.75 (b) (x - 1)(4x + 1)(x - 2) (c) y = 2, 3 or ³/₄ ² (a) (i) Factorise 8x³ + 27. (ii) Hence determine, showing all necessary working, the number of real roots of the equation 8x³ + 27 = 0. (b) The coefficient of x³ of a cubic polynomial, f(x), is 4 and that the roots of the equation f(x) = 0 are -1, 3 and k. Given that f(x) has a remainder of 60 when divided by -2 find the value of k. Ans: (a) (2x + 3)(4x² - 6x + 9) (ii) 1 real roots (iii) k = 7 ³ A function f defined by f(x) = 2x³ + px² + qx + 15, where p and q are constants, has a factor of x - 5 and leaves a remainder of 12 when divided by x + 1. (i) Find the value of p and of q. (ii) Find the remainder when f(x) is divided by 2x - 3. Ans: (i) q = -8, p = -9 (ii) -10.5 ⁴ The polynomials 6x - x³ and 8 - 3x² leave the same remainder when divided by (x - m). Find the three possible values of m. Ans: m = -2, 1, 4 ⁵ (i) By using long division, divide 2x⁴ + 5x³ - 8x² - 8x + 3 by x² + 3x - 1. (ii)Factorise 2x⁴ + 5x³ - 8x² - 8x + 3 completely. (iii)Hence find the exact solutions to the equation 32p⁴ + 40p³ - 32p² - 16p + 3 = 0. Ans: (i) Long Division, (ii) (x² + 3x - 1)(2x - 3)(x + 1) (iii) p = ³/₄, p = -¹/₂, p = ^{-3±\sqrt{13}/4} 	1	The function f is defined by $f(x) = 4x^3 + px^2 + 5x + 2$, where p is a constant.
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6 The polynomial $f(x)$ leaves a remainder of -5 and 7 when divided by $x + 1$ and $x - 2$	6	The polynomial $f(x)$ leaves a remainder of -5 and 7 when divided by $x + 1$ and $x - 2$
respectively. Find the remainder when $f(x)$ is divided by $x^2 - x - 2$.		respectively. Find the remainder when $f(x)$ is divided by $x^2 - x - 2$.
Ans: $4x - 1$		Ans: $4x - 1$