MULTIPLE ROOTS OF A POLYNOMIAL EQUATION

1 The polynomial $x^3 - x^2 - 5x - 3$ has a double root at $x = \alpha$. What is the value of α?

A $-\frac{5}{3}$ **B** -1 **C** 1 **D** $\frac{5}{3}$

2 If $P(x) = x^4 - 4x^3 + 6x^2 - 4x + 1$, then:

(a) show that $x = 1$ is a zero of multiplicity 4 **(b)** fully factorise $P(x)$.

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4 If $P(x) = x^3 - x^2 - 8x + 12$, then:

(a) show that $P(x)$ has a zero of multiplicity 2 **(b)** fully factorise $P(x)$ **(c)** solve the equation $P(x) = 0$.

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8 The polynomial $P(x) = ax^3 + bx + c$ has a multiple zero at -1 and has remainder 8 when divided by $(x - 1)$. If a, b and c are real, find their values.

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9 Solve each equation using the properties of polynomials.

(a) $4x^3 - 8x^2 + 5x - 1 = 0$, given that it has a root of multiplicity 2.

(b) $x^4 + 4x^3 - 16x - 16 = 0$, given that it has a root of multiplicity 3.