

Rational Functions and Polynomial Division (From OCR 4724)

Q1 (Jun 2005, Q1)

Find the quotient and the remainder when $x^4 + 3x^3 + 5x^2 + 4x - 1$ is divided by $x^2 + x + 1$. [4]

Q2 (Jan 2006, Q1)

Simplify $\frac{x^3 - 3x^2}{x^2 - 9}$. [3]

Q3 (Jun 2009, Q1)

Find the quotient and the remainder when $3x^4 - x^3 - 3x^2 - 14x - 8$ is divided by $x^2 + x + 2$. [4]

Q4 (Jun 2007, Q7)

(i) Find the quotient and the remainder when $2x^3 + 3x^2 + 9x + 12$ is divided by $x^2 + 4$. [4]

(ii) Hence express $\frac{2x^3 + 3x^2 + 9x + 12}{x^2 + 4}$ in the form $Ax + B + \frac{Cx + D}{x^2 + 4}$, where the values of the constants A , B , C and D are to be stated. [1]

Q5 (Jan 2008, Q3)

When $x^4 - 2x^3 - 7x^2 + 7x + a$ is divided by $x^2 + 2x - 1$, the quotient is $x^2 + bx + 2$ and the remainder is $cx + 7$. Find the values of the constants a , b and c . [5]

Q6 (Jun 2008, Q1)

(a) Simplify $\frac{(2x^2 - 7x - 4)(x + 1)}{(3x^2 + x - 2)(x - 4)}$. [2]

(b) Find the quotient and remainder when $x^3 + 2x^2 - 6x - 5$ is divided by $x^2 + 4x + 1$. [4]

Q7 (Jun 2009, Q1)

Find the quotient and the remainder when $x^4 + 11x^3 + 28x^2 + 3x + 1$ is divided by $x^2 + 5x + 2$. [4]

Q8 (Jun 2014, Q1)

Express $x + \frac{1}{1-x} + \frac{2}{1+x}$ as a single fraction, simplifying your answer. [3]

Q9 (Jun 2015, Q1)

(i) Express $\frac{2}{3-x} + \frac{3}{1+x}$ as a single fraction in its simplest form. [2]

(ii) Hence express $\left(\frac{2}{3-x} + \frac{3}{1+x}\right) \times \frac{x^2 + 8x - 33}{121 - x^2}$ as a single fraction in its lowest terms. [3]
