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Partial Fractions Exam Questions (From OCR 4724)

Q1 (Jun 2005, Q8) [Modified]

(i) Given that $\frac{3x+4}{(1+x)(2+x)^2} \equiv \frac{A}{1+x} + \frac{B}{2+x} + \frac{C}{(2+x)^2}$, find A, B and C. [5]

Q2 (Jan 2006, Q7) [Modified]

The expression $\frac{11+8x}{(2-x)(1+x)^2}$ is denoted by $f(x)$.

(i) Express $f(x)$ in the form $\frac{A}{2-x} + \frac{B}{1+x} + \frac{C}{(1+x)^2}$, where A, B and C are constants. [5]

Q3 (Jun 2007, Q1) [Modified]

The equation of a curve is $y = f(x)$, where $f(x) = \frac{3x+1}{(x+2)(x-3)}$.

(i) Express $f(x)$ in partial fractions. [2]

Q4 (Jan 2008, Q2)

(i) Express $\frac{x}{(x+1)(x+2)}$ in partial fractions. [3]

Q5 (Jun 2010, Q3)

Express $\frac{x^2}{(x-1)^2(x-2)}$ in partial fractions. **[5]**

Q6 (Jun 2013, Q1)

Express $\frac{(x-7)(x-2)}{(x+2)(x-1)^2}$ in partial fractions. **[5]**

Q7, (Edexcel 6666, Jan 2013, Q3)

Express $\frac{9x^2+20x-10}{(x+2)(3x-1)}$ in partial fractions. **(4)**

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Q8, (Edexcel IAL, C34, Jun 2016, Q4)

$$g(x) = \frac{x^4 + x^3 - 7x^2 + 8x - 48}{x^2 + x - 12}, \qquad x > 3, \quad x \in \mathbb{R}$$

(a) Given that

$$\frac{x^4 + x^3 - 7x^2 + 8x - 48}{x^2 + x - 12} \equiv x^2 + A + \frac{B}{x - 3}$$

find the values of the constants A and B.

(4)

(b) Hence, or otherwise, find the equation of the tangent to the curve with equation $y = g(x)$ at the point where $x = 4$. Give your answer in the form $y = mx + c$, where m and c are constants to be determined.

(5)

Q9, (Edexcel IAL, C34, Jun 2017, Q5)

$$\frac{6 - 5x - 4x^2}{(2 - x)(1 + 2x)} \equiv A + \frac{B}{(2 - x)} + \frac{C}{(1 + 2x)}$$

(a) Find the values of the constants A, B and C.

(4)

$$f(x) = \frac{6 - 5x - 4x^2}{(2 - x)(1 + 2x)} \qquad x > 2$$

(b) Using part (a), find $f'(x)$.

(3)

(c) Prove that $f(x)$ is a decreasing function.

(1)

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