Partial Fractions and Integration (From OCR 4726)

Q1, (Jan 2006, Q3)

Express $\dfrac{x+6}{x(x^2+2)}$ in partial fractions. [5]

Q2, (Jun 2007, Q3)

It is given that $\mathrm{f}(x) = \dfrac{x^2+9x}{(x-1)(x^2+9)}$.

(i) Express $\mathrm{f}(x)$ in partial fractions. [4]

(ii) Hence find $\int \mathrm{f}(x)\,\mathrm{d}x$. [2]

Q3, (Jun 2008, Q1)

It is given that $\mathrm{f}(x) = \dfrac{2ax}{(x-2a)(x^2+a^2)}$, where a is a non-zero constant. Express $\mathrm{f}(x)$ in partial fractions. [5]

Q4, (Jun 2009, Q4)

Express $\dfrac{x^3}{(x-2)(x^2+4)}$ in partial fractions. **[6]**

Q5, (Jan 2010, Q6)

(i) Express $\dfrac{4}{(1-x)(1+x)(1+x^2)}$ in partial fractions. **[5]**

(ii) Show that $\displaystyle\int_0^{\frac{1}{\sqrt{3}}} \frac{4}{1-x^4}\,\mathrm{d}x = \ln\left(\frac{\sqrt{3}+1}{\sqrt{3}-1}\right) + \tfrac{1}{3}\pi$. **[4]**

Q6, (Jan 2012, Q3)

Express $\dfrac{2x^3+x+12}{(2x-1)(x^2+4)}$ in partial fractions. **[7]**

Q7, (Jun 2016, Q2)

It is given that $\mathrm{f}(x) = \dfrac{x(x-1)}{(x+1)(x^2+1)}$. Express $\mathrm{f}(x)$ in partial fractions and hence find the exact value of $\displaystyle\int_0^1 \mathrm{f}(x)\,\mathrm{d}x$. **[6]**
