E/P **6** $f(x) = \dfrac{6 + 3x - x^2}{x^3 + 2x^2}$, $x > 0$

a Express $f(x)$ in partial fractions. **(4 marks)**

b Hence find the exact value of $\int_2^4 \dfrac{6 + 3x - x^2}{x^3 + 2x^2} dx$, writing your answer in the form $a + \ln b$, where a and b are rational numbers to be found. **(5 marks)**

E/P **7** $\dfrac{32x^2 + 4}{(4x + 1)(4x - 1)} \equiv A + \dfrac{B}{4x + 1} + \dfrac{C}{4x - 1}$

a Find the value of the constants A, B and C. **(4 marks)**

b Hence find the exact value of $\int_1^2 \dfrac{32x^2 + 4}{(4x + 1)(4x - 1)} dx$ writing your answer in the form $2 + k \ln m$, giving the values of the rational constants k and m. **(5 marks)**

6 **a** $f(x) = \frac{3}{x^2} - \frac{1}{x + 2}$ **b** $a = \frac{3}{2}, b = \frac{2}{3}$

7 **a** $f(x) = 2 - \frac{3}{4x + 1} + \frac{3}{4x - 1}$, so $A = 2, B = -3$ and $C = 3$

b $k = \frac{3}{4}, m = \frac{35}{27}$