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

(ii) Hence find $\int \frac{x}{(x+1)(x+2)}\,dx$. [2]

(2) (i) Express $\frac{7-2x}{(x-2)^2}$ in the form $\frac{A}{x-2}+\frac{B}{(x-2)^2}$, where A and B are constants. [3]

(ii) Hence find the exact value of $\int_4^5 \frac{7-2x}{(x-2)^2}\,dx$. [4]

(3) (i) Use algebraic division to express $\frac{x^3-2x^2-4x+13}{x^2-x-6}$ in the form $Ax+B+\frac{Cx+D}{x^2-x-6}$, where A, B, C and D are constants. [4]

(ii) Hence find $\int_4^6 \frac{x^3-2x^2-4x+13}{x^2-x-6}\,dx$, giving your answer in the form $a+\ln b$. [7]

(4) (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]

(ii) Hence or otherwise expand $\frac{3x+4}{(1+x)(2+x)^2}$ in ascending powers of x, up to and including the term in x^2. [5]

(iii) State the set of values of x for which the expansion in part **(ii)** is valid. [1]

① i) $\frac{-1}{x+1}+\frac{2}{x+2}$ ii) $-\ln|x+1|+2\ln|x+2|+c$

② i) $A=-2,\ B=3$ ii) $\frac{1}{2}+\ln\frac{4}{9}$

③ i) $A=1,\ B=-1,\ C=1,\ D=7$ ii) $8+\ln\frac{27}{4}$

④ i) $A=1,\ B=-1,\ C=2$ ii) $1-\frac{5}{4}x+\frac{5}{4}x^2$ iii) $-1<x<1$