Math 1710 Tutorial 1 (review of integrals)

I. Find the following indefinite integrals

(a) $\int \sqrt{1-5x}\,dx$

(b) $\int \dfrac{x}{(x^2+13)^3}\,dx$

(c) $\int \tan x\,dx$

(d) $\int 2^{2x}e^x\,dx$

(e) $\int x^2 2^{x^3+1}\,dx$

(f) $\int \dfrac{e^{2x}+e^x}{e^x-1}\,dx$

(h) $\int \left(\dfrac{x}{x^5+2}\right)^4\,dx$

II. Evaluate the following definite integrals

(a) $\displaystyle\int_{-1}^{2} \sqrt[3]{x}\,dx$ (b) $\displaystyle\int_{-1}^{1} (x^3-2x^2+x-1)\,dx$ (c) $\displaystyle\int_{0}^{\pi} \sin x\,dx$ (d) $\displaystyle\int_{0}^{\ln 3} e^x\,dx$

(e) $\displaystyle\int_{-4}^{-2} \left(\frac{1}{x}+\frac{1}{x^2}\right)\,dx$ (f) $\displaystyle\int_{1}^{2} \frac{(\sqrt{x}+\sqrt[3]{x^2})^2}{x}\,dx$ (g) $\displaystyle\int_{0}^{2} |1-x|\,dx$

III. Evaluate the following definite integrals using substitution

(a) $\displaystyle\int_{1}^{2} \frac{dx}{2x-1}$ (b) $\displaystyle\int_{e}^{e^2} \frac{\ln x}{x(\ln^2 x+1)}\,dx$ (c) $\displaystyle\int_{0}^{\sqrt{\pi}} x\sin(x^2)\,dx$ (d) $\displaystyle\int_{0}^{4} \frac{dx}{1+\sqrt{x}}$

(e) $\displaystyle\int_{2}^{3} x(x-2)^6\,dx$ (f) $\displaystyle\int_{-1}^{3} \frac{x^2+1}{\sqrt{x^3+3x+8}}\,dx$ (g) $\displaystyle\int_{0}^{3} \frac{x\,dx}{\sqrt{x+1}}$ (h) $\displaystyle\int_{0}^{1} x^3(x^2+1)^{1/3}\,dx$