Assignment #3 U-Substitution

Do Question#3 right column (b,d,f,h,j,l,n,p,r)
Question #4 (a,c)

Answers are provided so show all work!

B **2.** Evaluate each integral by making the given substitution

(a) $\int x(1 - x^2)^{10}\,dx,\ u = 1 - x^2$

(b) $\int e^{5x}\,dx,\ u = 5x$

(c) $\int \sqrt{x - 1}\,dx,\ u = x - 1$

(d) $\int \dfrac{x + 1}{x^2 + 2x - 6}\,dx,\ u = x^2 + 2x - 6$

3. Evaluate the following indefinite integrals.

(a) $\int x(x^2 + 4)^8\,dx$

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

(c) $\int (x + 6)^{10}\,dx$

(d) $\int \dfrac{1}{(3x - 1)^2}\,dx$

(e) $\int \sec^2 3x\,dx$

(f) $\int (1 + 2x^4)x^3\,dx$

(g) $\int \sin^2 x \cos x\,dx$

(h) $\int \dfrac{\sqrt{\ln x}}{x}\,dx$

(i) $\int t^2 e^{t^3}\,dt$

(j) $\int \dfrac{1}{1 - x}\,dx$

(k) $\int \dfrac{3x^2 - 2}{(x^3 - 2x + 1)^3}\,dx$

(l) $\int \dfrac{\sin\sqrt{x}}{\sqrt{x}}\,dx$

(m) $\int e^{3-x}\,dx$

(n) $\int e^{\cos x} \sin x\,dx$

(o) $\int \sqrt{1 + \tan x}\sec^2 x\,dx$

(p) $\int x \sin(x^2)\,dx$

(q) $\int \sin x \sin(\cos x)dx$

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

4. Evaluate the following definite integrals.

(a) $\int_0^1 e^{2x+1}\,dx$

(b) $\int_0^2 \dfrac{1}{(1 + 5x)^4}\,dx$

(c) $\int_0^2 x\sqrt{4 - x^2}\,dx$

(d) $\int_0^1 \sin \pi t\,dt$

(d) $u = \sin x$

2. (a) $-\frac{1}{22}(1 - x^2)^{11} + C$ (b) $\frac{1}{5}e^{5x} + C$

(c) $\frac{2}{3}(x - 1)^{\frac{3}{2}} + C$ (d) $\frac{1}{2}\ln|x^2 + 2x - 6| + C$

3. (a) $\frac{1}{18}(x^2 + 4)^9 + C$ (b) $\frac{2}{9}(x^3 + 2)^{\frac{3}{2}} + C$

(c) $\frac{1}{11}(x + 6)^{11} + C$ (d) $-\dfrac{1}{3(3x - 1)} + C$

(e) $\frac{1}{3}\tan 3x + C$ (f) $\frac{1}{16}(1 + 2x^4)^2 + C$

(g) $\frac{1}{3}\sin^3 x + C$ (h) $\frac{2}{3}(\ln x)^{\frac{3}{2}} + C$

(i) $\frac{1}{3}e^{t^3} + C$ (j) $-\ln|1 - x| + C$

(k) $-\dfrac{1}{2(x^3 - 2x + 1)^2} + C$

(l) $-2\cos\sqrt{x} + C$ (m) $-e^{3-x} + C$

(n) $-e^{\cos x} + C$ (o) $\frac{2}{3}(1 + \tan x)^{\frac{3}{2}} + C$

(p) $-\frac{1}{2}\cos(x^2) + C$ (q) $\cos(\cos x) + C$

(r) $\frac{1}{2}(\tan^{-1} x)^2 + C$

4. (a) $\frac{1}{2}(e^3 - e)$ (b) $\frac{266}{3993}$ (c) $\frac{8}{3}$ (d) $\dfrac{2}{\pi}$ (e) $\frac{3}{2}$

(f) 2.1 (g) $\frac{665}{6}$ (h) $\frac{1}{6}(e^{20} - e^5)$

5. (a) $\ln|\sec x| + C$ (b) $\ln|\sin x| + C$