WORKSHEET # X

1. Evaluate following integrals.

(a) $\int \cos(\ln x)\, dx$

(b) $\int x^{-1} \ln x\, dx$

(c) $\int \ln \sqrt{1+x}\, dx$

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

(e) $\int \dfrac{2y^4}{y^3 - y^2 + y - 1}\, dy$

(f) $\int \dfrac{\sqrt[3]{x+1}}{x}\, dx$

(g) $\int \dfrac{\sin 6x}{1 - \cos^4 3x}\, dx$

(h) $\int \cosh x \sin x\, dx$

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

(j) $\int \dfrac{e^x\, dx}{(e^x - 1)\,(e^{3x} - 1)}$

(k) $\int \sqrt{12 + 4x - x^2}\, dx$

(l) $\int \dfrac{dx}{(x^2+1)(x^2+x+1)}$

(m) $\int \sqrt{4 - 6x - x^2}\, dx$

(n) $\int \sqrt{\dfrac{1+x}{1-x}}\, dx$

(o) $\int_{\pi/2}^{3\pi/4} \sqrt{1 - \sin(2x)}\, dx$

(p) $\int \dfrac{1}{\cos^3 x}\, dx$

2. Use the trigonometric substitution $z = \tan(\dfrac{x}{2})$ to evaluate the following integral

$$\int \frac{\sin x}{1 - \cos x \sin x}\, dx.$$

3. Evaluate following integrals.

(a) $\int_3^2 \dfrac{1}{(x^2-1)^2}\, dx$

(b) $\int_0^1 \dfrac{1}{(x^2+3x+1)}\, dx$

(c) $\int_e^1 \dfrac{dx}{x\sqrt{1 + (\ln x)^2}}$

(d) $\int_{\pi/2}^{\pi/3} \dfrac{dx}{\sin x - \cos x}$

(e) $\int 6 \sinh(\dfrac{x}{2} - \ln 3) dx$

(f) $\int \cosh^2(5 - x) dx$

(g) $\int_1^e \dfrac{dx}{x\sqrt{1 + (\ln x)^2}}$

(h) $\int (\sin 3x \cos 2x - \cos 3x \sin 2x) dx$

(i) $\int_0^{\pi/4} \dfrac{1 + \sin x}{\cos^2 x} dx$

(j) $\int_0^{2\pi} \sqrt{\dfrac{1 - \cos x}{2}} dx$

(k) $\int \dfrac{7dx}{(x-1)\sqrt{x^2 - 2x - 48}}.$

(l) $\int_{-1}^1 \dfrac{dx}{\sqrt[3]{\tan^{-1} x}\,(1 + x^2)}$

(m) $\int_{-1}^1 \dfrac{dx}{(1 + \cos^{-1} x)\,\sqrt{1 - x^2}}$

(n) $\int_0^1 \dfrac{1 + \sinh\sqrt{x}}{\sqrt{x}}\, dx$