6.2

$\int \tan x \, dx$ $\qquad u = \cos x$

$du = -\sin x \, dx$

$-\int \frac{\sin x}{\cos x} dx [-]$ du

$-\int \frac{1}{u} du$

$-\ln|u| + C$

$\boxed{-\ln|\cos x| + C}$

$\ln|(\cos x)^{-1}| + C$

$\boxed{\ln|\sec x| + C}$

(47) $\int \sin^3 2x \, dx$ $\qquad \sin^2 2x = 1 - \cos^2 2x$

$\int \sin^2 2x \sin 2x \, dx$

$\int (1-\cos^2 2x) \sin 2x \, dx$ $\qquad u = 1 - \cancel{\cos^2 2x}$

$[-2] du = \cancel{2\cos 2x} \sin 2x \, dx$

$[2], -\frac{1}{2}$

$\frac{1}{2}\int \sin 2x \, dx - \int \cos^2 2x \sin 2x \, dx$

$u = 2x$ $\qquad u = \cos 2x$

$du = 2dx$ $\qquad du = -\sin 2x [2] dx$

$\frac{1}{2}\int \sin u \, du + \frac{1}{2}\int u^2 du$

$-\frac{1}{2}\cos u + \frac{1}{2}\cdot\frac{1}{3}u^3 + C$

$\boxed{-\frac{1}{2}\cos 2x + \frac{1}{6}\cos^3 2x + C}$

6.2

(43) $\int \frac{dx}{\cot 3x}$

$\frac{1}{3}\int \tan 3x \, dx \; [3]$

$u = 3x$

$du = 3\,dx$

$\frac{1}{3}\int \tan u \, du$

$\frac{1}{3} \ln |\sec u| + C$

$\frac{1}{3} \ln |\sec 3x| + C$

(21) $\int \frac{dx}{x^2+9}$ $\quad u = \frac{x}{3}$

$\int \frac{\cancel{dx}}{(3u)^2+9}$ $\quad 3u = x$, $\quad 3du = dx$

$\int \frac{3\,du}{9u^2+9}$

$\frac{3}{9} \int \frac{1}{u^2+1}\, du$

$\frac{1}{3} \arctan u + c$

$\frac{1}{3} \arctan\left(\frac{x}{3}\right) + c$

$\int \frac{dx}{x^2+9}$ $\quad a^2 = 9 \quad u^2 = x^2$

$a = 3 \quad u = x$

$\frac{1}{3} \arctan \frac{x}{3} + C$

6.2

(31) $\frac{1}{3}\int \cos(3z+4)\overset{du}{dz\,[3]}$

$u = 3z+4$

$du = \underline{3\,dz}$

$\frac{1}{3}\int \cos u \, du$

$\frac{1}{3}\sin u + C$

$\boxed{\frac{1}{3}\sin(3z+4) + C}$

6.2

$\int \tan x \, dx$

$-\int \frac{-\sin x}{\cos x} dx$ du

$u = \cos x$

$du = -\sin x \, dx$

$-\int \frac{1}{u} du \qquad -\int \frac{du}{u}$

$-\ln|u| + c$

$\boxed{-\ln|\cos x| + c}$

$\ln|\cos^{-1} x| + c$

$\ln\left|\frac{1}{\cos x}\right| + c$

$\boxed{\ln|\sec x| + c}$

(29) $\frac{1}{4}\int \tan(4x+2)(dx\ 4)$ du

$u = 4x+2$

$du = 4dx$

$\frac{1}{4}\int \tan u \, du$

$\frac{1}{4}\int \frac{\sin u}{\cos u} du$

$v = \cos u$

6.2

35 $\frac{3}{4}\int s^{1/3}\cos(s^{4/3}-8)\,ds \quad [\tfrac{4}{3}]$ du

$u = s^{4/3} - 8$

$du = \frac{4}{3}s^{1/3}\,ds$

$\frac{3}{4}\int \cos u \, du$

$\frac{3}{4}\sin u + C$

$\boxed{\frac{3}{4}\sin(s^{4/3}-8)+C}$

58 $\frac{1}{3}\int_{-\pi}^{\pi}\frac{\cos x}{\sqrt{4+3\sin x}}\,dx \quad [3]$ du

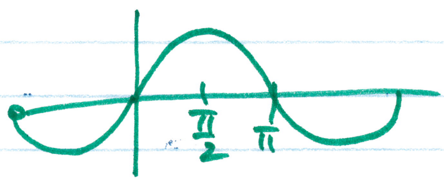
$u = 4 + 3\sin x$

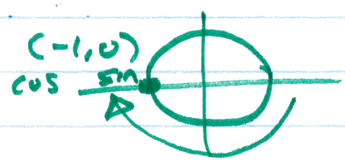
$du = 3\cos x \, dx$

$\frac{1}{3}\int u^{-1/2}\,du$

$\frac{1}{3}\Big|\, 2u^{1/2}$

$\frac{1}{3}\Big|_{-\pi}^{\pi} 2\sqrt{4+3\sin x}$





$\frac{2}{3}\left[\sqrt{4+3\sin\pi} - \sqrt{4+3\sin(-\pi)}\right]$

$\frac{2}{3}\left[\sqrt{4} - \sqrt{4}\right] = \boxed{0}$

6.2

45 $\int \sec x \, dx \left(\frac{\sec x + \tan x}{\sec x + \tan x}\right)$

$\int \left(\left(\frac{\sec^2 x + \sec x \tan x}{\sec x + \tan x}\right) dx\right) du$

$u = \sec x + \tan x$

$du = (\sec x \tan x + \sec^2 x) \, dx$

$\int \frac{1}{u} \, du$

$\ln |u| + C$

$\boxed{\ln |\sec x + \tan x| + C}$