p.338 #19

$\int \sec 2x \tan 2x \, dx$

$u = 2x$

$du = 2dx$

$\frac{du}{2} = dx = \frac{1}{2} du$

Substitute

$\int \sec u \tan u \cdot \frac{1}{2} du$

$\frac{1}{2} \int \sec u \tan u \, du$

$= \frac{1}{2} \sec 2x + C$

Rule: $\int \sec u \tan u \, du = \sec u + C$

#29

$\int \tan(4x+2) \, dx$

$\int \frac{\sin(4x+2)}{\cos(4x+2)} \, dx$

$u = \cos(4x+2)$

$du = -4\sin(4x+2) \, dx$

$-\frac{1}{4} du = \sin(4x+2) \, dx$

$\int \frac{1}{u} \cdot -\frac{1}{4} du$

$-\frac{1}{4} \ln|\cos(4x+2)| + C$

Rule: $\int \frac{1}{u} du = \ln|u| + C$

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$$\int \frac{x}{x^2-4}\,dx$$

Rule: $\int \frac{1}{u}\,du = \ln|u| + C$

$u = x^2 - 4$

$du = 2x\,dx$

$\frac{1}{2}du = x\,dx$

$$\frac{1}{2}\int \frac{1}{u}\cdot du$$

$$\frac{1}{2}\ln|x^2-4| + C$$

#56 $$\int_{-1}^{1} \frac{5r}{(4+r^2)^2}\,dr$$

Rule: $\int u^n\,du = \frac{u^{n+1}}{n+1} + C$

$$\int_{-1}^{1} (4+r^2)^{-2}\cdot 5r\cdot dr$$

$u = 4 + r^2$

$du = 2r\,dr$

$\frac{5}{2}du = 5r\,dr$

$u(1) = 4 + (1)^2 = 5$

$u(-1) = 5$

$$\frac{5}{2}\int_{5}^{5} u^{-2}\,du = 0$$