Definite Integrals Ex 20.1 Q65

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} (\tan^2 x + 2\tan x \cot x + \cot^2 x)dx$$

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \left\{\left(\sec^2 x - 1\right) + 2 + \left(\operatorname{cosec}^2 x - 1\right)\right\} dx$$

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \left\{\sec^2 x + \operatorname{cosec}^2 x\right\} dx$$

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \sec^2 x dx + \int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \operatorname{cosec}^2 x dx$$

$$\left\{\tan x\right\}_{\frac{\pi}{6}}^{\frac{\pi}{3}} + \left\{-\cot x\right\}_{\frac{\pi}{6}}^{\frac{\pi}{3}}$$

$$\left\{\sqrt{3} - \frac{1}{\sqrt{3}}\right\} - \left\{\frac{1}{\sqrt{3}} - \sqrt{3}\right\}$$

$$2\left(\sqrt{3} - \frac{1}{\sqrt{3}}\right)$$

$$\frac{4}{\sqrt{3}}$$

Definite Integrals Ex 20.1 Q66

$$I = \int_0^{\pi/4} \left(a^2\cos^2 x + b^2\sin^2 x\right)dx$$

$$I = \int_0^{\pi/4} \left(a^2\left(1-\sin^2 x\right) + b^2\sin^2 x\right)dx$$

$$I = \int_0^{\pi/4} \left(a^2 - a^2\sin^2 x + b^2\sin^2 x\right)dx$$

$$I = \int_0^{\pi/4} a^2 + \left(b^2 - a^2\right)\sin^2 x\, dx$$

$$I = \int_0^{\pi/4} a^2 + \left(b^2 - a^2\right)\frac{\left(1+\cos 2x\right)}{2}dx$$

$$I = \left[a^2 x + \frac{\left(b^2-a^2\right)}{2}\left(x + \frac{\sin 2x}{2}\right)\right]_0^{\pi/4}$$

$$I = \left[\frac{a^2\pi}{4} + \frac{\left(b^2-a^2\right)}{2}\left(\frac{\pi}{4}+\frac{1}{2}\right)\right]$$

$$I = \frac{\left(b^2+a^2\right)\pi}{8} + \frac{\left(b^2-a^2\right)}{4}$$

Definite Integrals Ex 20.1 Q67

$$\int_0^1 \frac{1}{x^4+2x^3+2x^2+2x+1}dx$$

$$\int_0^1 \frac{1}{(x+1)^2(x^2+1)}dx$$

$$\int_0^1 \left\{-\frac{x}{2(x^2+1)} + \frac{1}{2(x+1)} + \frac{1}{2(x+1)^2}\right\}dx$$

$$-\int_0^1 \frac{x}{2(x^2+1)}dx + \int_0^1 \frac{1}{2(x+1)}dx + \int_0^1 \frac{1}{2(x+1)^2}dx$$

$$-\left\{\frac{\log(x^2+1)}{4}\right\}_0^1 + \left\{\frac{\log(x+1)}{2}\right\}_0^1 - \left\{\frac{1}{2(x+1)}\right\}_0^1$$

$$-\frac{\log 2}{4} + \frac{\log 2}{2} - \frac{1}{4} + \frac{1}{2}$$

$$\frac{\log 2}{4} + \frac{1}{4}$$

$=(1/4)\log(2e)$

*********** END **********