320)

$$\int e^{2x} dx$$

$$\det u = 2x \quad \frac{du}{2} = dx$$

$$\Rightarrow \frac{1}{2} \int e^{u} du = \frac{e^{u}}{2} + C = \boxed{\frac{e^{2x}}{2} + C}$$

324)

$$\int \frac{1}{2x} dx = \frac{1}{2} \int \frac{1}{x} dx$$
$$\Rightarrow \frac{1}{2} \int \frac{1}{x} dx = \boxed{\frac{\ln|x|}{2} + C}$$

328)

$$\int \frac{\ln(x)}{x} dx$$

$$\det u = \ln(x) \quad du = \frac{1}{x} dx$$

$$\Rightarrow \int u du = \frac{u^2}{2} + C = \boxed{\frac{\ln^2(x)}{2} + C}$$

330)

$$\int \frac{\mathrm{d}x}{x \ln(x)}$$

$$\det u = \ln(x) \quad du = \frac{1}{x} dx$$

$$\Rightarrow \int \frac{1}{u} du = \ln|u| + C = \boxed{\ln|\ln(x)| + C}$$

332)

$$\int \tan \theta d\theta = \int \frac{\sin \theta}{\cos \theta} d\theta$$

$$\det u = \cos \theta - du = \sin \theta$$

$$\Rightarrow -\int \frac{1}{u} du = -\ln|u| + C = \boxed{-\ln|\cos \theta| + C}$$

338)

$$\int e^{\sin x} \cos x dx$$
let  $u = \sin x$   $du = \cos x dx$ 

$$\Rightarrow \int e^{u} du = e^{u} + C = \boxed{e^{\sin x} + C}$$

348)

$$\int \tan(2x) dx = \int \frac{\sin(2x)}{\cos(2x)} dx$$

$$let \quad u = \cos(2x) \quad -\frac{1}{2} du = \sin(2x) dx$$

$$\Rightarrow -\frac{1}{2} \int \frac{1}{u} du = -\frac{\ln|u|}{2} + C = \boxed{-\frac{\ln|\cos(2x)|}{2} + C}$$

350)

$$\int \frac{x \sin(x^2)}{\cos(x^2)} dx$$

$$\det u = \cos(x^2) - \frac{1}{2x} du = \sin(x^2) dx$$

$$\Rightarrow -\frac{1}{2} \int \frac{1}{u} du = -\frac{\ln|u|}{2} + C = \boxed{-\frac{\ln|\cos(x^2)|}{2} + C}$$

355)

$$\int_{1}^{2} \frac{1+2x+x^{2}}{3x+3x^{2}+x^{3}} dx = \int_{1}^{2} \frac{(x+1)^{2}}{x(3+3x+x^{2})} dx$$