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MATH F252, Dr. J. Gimbel
Practice Set 2; Not Due: §1.6 #320, 324, 328, 330, 332, 338, 348, 350, 355, 360, 372

320)

$$\int e^{2x}\mathrm{d}x$$
$$\text{let} \quad u = 2x \quad \frac{\mathrm{d}u}{2} = \mathrm{d}x$$
$$\Rightarrow \frac{1}{2}\int e^u \mathrm{d}u = \frac{e^u}{2} + C = \boxed{\frac{e^{2x}}{2} + C}$$

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324)

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

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328)

$$\int \frac{\ln(x)}{x}\mathrm{d}x$$
$$\text{let} \quad u = \ln(x) \quad \mathrm{d}u = \frac{1}{x}\mathrm{d}x$$
$$\Rightarrow \int u\mathrm{d}u = \frac{u^2}{2} + C = \boxed{\frac{\ln^2(x)}{2} + C}$$

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330)

$$\int \frac{\mathrm{d}x}{x\ln(x)}$$
$$\text{let} \quad u = \ln(x) \quad \mathrm{d}u = \frac{1}{x}\mathrm{d}x$$
$$\Rightarrow \int \frac{1}{u}\mathrm{d}u = \ln|u| + C = \boxed{\ln|\ln(x)| + C}$$

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332)

$$\int \tan\theta \mathrm{d}\theta = \int \frac{\sin\theta}{\cos\theta}\mathrm{d}\theta$$
$$\text{let} \quad u = \cos\theta \quad -\mathrm{d}u = \sin\theta$$
$$\Rightarrow -\int \frac{1}{u}\mathrm{d}u = -\ln|u| + C = \boxed{-\ln|\cos\theta| + C}$$

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338)

$$\int e^{\sin x}\cos x \mathrm{d}x$$
$$\text{let} \quad u = \sin x \quad \mathrm{d}u = \cos x \mathrm{d}x$$
$$\Rightarrow \int e^u \mathrm{d}u = e^u + C = \boxed{e^{\sin x} + C}$$

348)

$$\int \tan(2x)\mathrm{d}x = \int \frac{\sin(2x)}{\cos(2x)}\mathrm{d}x$$
$$\text{let} \quad u = \cos(2x) \quad -\frac{1}{2}\mathrm{d}u = \sin(2x)\mathrm{d}x$$
$$\Rightarrow -\frac{1}{2}\int \frac{1}{u}\mathrm{d}u = -\frac{\ln|u|}{2} + C = \boxed{-\frac{\ln|\cos(2x)|}{2} + C}$$

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350)

$$\int \frac{x\sin(x^2)}{\cos(x^2)}\mathrm{d}x$$
$$\text{let} \quad u = \cos(x^2) \quad -\frac{1}{2x}\mathrm{d}u = \sin(x^2)\mathrm{d}x$$
$$\Rightarrow -\frac{1}{2}\int \frac{1}{u}\mathrm{d}u = -\frac{\ln|u|}{2} + C = \boxed{-\frac{\ln|\cos(x^2)|}{2} + C}$$

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355)

$$\int_1^2 \frac{1+2x+x^2}{3x+3x^2+x^3}\mathrm{d}x = \int_1^2 \frac{(x+1)^2}{x(3+3x+x^2)}\mathrm{d}x$$
