

Quiz #4

$$I = \int \underbrace{e^{2\theta}}_u \underbrace{\sin 3\theta \, d\theta}_{dv}$$

$$I = uv - \int v \, du$$

$$u = e^{2\theta}$$

$$du = 2e^{2\theta} \, d\theta$$

$$dv = \sin 3\theta \, d\theta$$

$$v = -\frac{1}{3} \cos 3\theta$$

$$I = -\frac{1}{3} e^{2\theta} \cos 3\theta + \frac{2}{3} \int \underbrace{e^{2\theta}}_u \underbrace{\cos 3\theta \, d\theta}_{dv}$$

$$u = e^{2\theta} \rightarrow du = 2e^{2\theta} \, d\theta$$

$$dv = \cos 3\theta \, d\theta$$

$$v = \frac{1}{3} \sin 3\theta$$

$$I = -\frac{1}{3} e^{2\theta} \cos 3\theta + \frac{2}{3} \left[\frac{1}{3} e^{2\theta} \sin 3\theta - \frac{2}{3} \int e^{2\theta} \sin 3\theta \, d\theta \right]$$

$$I = -\frac{1}{3} e^{2\theta} \cos 3\theta + \frac{2}{9} e^{2\theta} \sin 3\theta - \frac{4}{9} \int e^{2\theta} \sin 3\theta \, d\theta$$

$\frac{4}{9} I$

$$I + \frac{4}{9} I = -\frac{1}{3} e^{2\theta} \cos 3\theta + \frac{2}{9} e^{2\theta} \sin 3\theta$$

$$\frac{13}{9} I = -\frac{1}{3} e^{2\theta} \cos 3\theta + \frac{2}{9} e^{2\theta} \sin 3\theta$$

$$I = -\frac{3}{13} e^{2\theta} \cos 3\theta + \frac{2}{13} e^{2\theta} \sin 3\theta + C$$