

1) $x^{1/2} \ln x$

$$\int x^{1/2} \ln x$$

$$u = x^{1/2} \quad dv = \ln x$$

$$\frac{du}{dx} = \frac{1}{2} x^{-1/2}$$

$$\int \frac{v du}{dx} + \int \frac{u dv}{dx}$$

$$\ln x \int \frac{x^{1/2}}{dx} + x^{1/2} \int \frac{dx}{x}$$

$$\ln x \left[\frac{x^{3/2}}{3/2} \right] + x^{1/2} \left[\frac{1}{2x} \right] + C$$

$$\frac{2 \ln x \cdot x^{3/2}}{3} + \frac{x^{1/2}}{2x} + C$$

$$\frac{2x^{3/2} \ln x}{3} + \frac{\sqrt{x}}{2x} + C$$

2) $2 \cos 6t \cos t$

$$2 \cos 6t \cos t = 2 \int \cos 6t \cos t$$

$$A = 6t \quad B = t$$

$$\cos A \cos B = \frac{1}{2} [\cos(A+B) + \cos(A-B)]$$

$$= \frac{2}{2} [\cos(6+t) + \cos(6-t)]$$

$$= \frac{2}{2} [\cos 7t + \cos 5t]$$

$$\int 2 \cos 6t \cos t = \frac{2}{2} \int (2 \cos 7t + \cos 5t)$$

$$= \left[\frac{\sin 7t}{7} - \frac{\sin 5t}{5} \right]$$

$$= \frac{\sin 7t}{7} - \frac{\sin 5t}{5} + C$$