Quick Review

(1) $\int x^3 (x^2+8)^5 \, dx$.

Soln: Let $u = x^2 + 8$. $\frac{du}{dx} = 2x \Rightarrow \frac{du}{2x} = dx$.

$$\int x^3 (x^2+8)^5 \, dx = \int x^3 \, u^5 \, \frac{du}{2x}$$

$$= \frac{1}{2} \int x^2 u^5 \, du$$

$$= \frac{1}{2} \int (u-8) u^5 \, du$$

$$= \frac{1}{2} \left[\int u^6 \, du - 8 \int u^5 \, du \right]$$

$$= \frac{1}{2} \left[\frac{u^7}{7} - 8 \frac{u^6}{6} \right] + C$$

$$= \frac{1}{2} \left[\frac{(x^2+8)^7}{7} - \frac{8}{6} (x^2+8)^6 \right] + C.$$

Ans