4.5 u-Substitution

1) $\int (x+2)^5 \, dx$ $\quad u = x+2$, $du = dx$

$$\int u^5 \, du = \frac{1}{6}u^6 + C = \frac{(x+2)^6}{6} + C$$

2) $\int \sqrt{1+x^2} \cdot 2x \, dx$ $\quad u = 1+x^2$, $du = 2x\,dx$

$$\int u^{1/2} \, du = \frac{2}{3}u^{3/2} + C = \frac{2}{3}(1+x^2)^{3/2} + C$$

3) $\int \sqrt{4x-1} \, dx$ $\quad u = 4x-1$, $du = 4\,dx$, $\frac{1}{4}\,du = dx$

$$\int u^{1/2} \cdot \frac{1}{4} \, du$$

$$\frac{1}{4} \cdot \frac{2}{3}u^{3/2} + C = \frac{1}{6}u^{3/2} + C =$$

$$\frac{1}{6}(4x-1)^{3/2} + C$$