

$$\int 2x(x^2+1)^5 dx$$

① Set  $u$  and  $du$

$$u = x^2 + 1 \quad du = 2x dx$$

$$\int 2x(x^2+1)^5 dx$$

$$\int (x^2+1)^5 2x dx$$

$$\int u^5 du$$

② Integrate

$$\int u^5 du \quad \int x^k dx = \frac{x^{k+1}}{k+1} + C$$

$$\frac{u^{5+1}}{5+1} + C, \quad k=5$$

$$\frac{u^6}{6} + C$$

Replace  $u$  with  $x^2+1$

$$\frac{(x^2+1)^6}{6} + C$$

③ Summary

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



Get  $\int \sqrt{2x+1} dx$

$$\sqrt{2x+1} \quad 2x+1 \geq 0$$

$$\frac{-1}{2} \quad \frac{-1}{2}$$

$$\frac{2x}{2} = \frac{-1}{2}$$

$$x = -\frac{1}{4}$$

① Set  $u$  and  $du$

$$u = 2x+1, \quad du = 2dx$$

$$\int \sqrt{u} du$$

② Get Domain

$$\int \frac{1}{2} \cdot \sqrt{u} du$$

Integral is  
opposite sign

③ Pull out constant

$$\frac{1}{2} \int \sqrt{u} du$$

④ Integrate

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

$$\int x^k dx = \frac{x^{k+1}}{k+1} + C$$

$$\frac{1}{2} \int \frac{u^{1/2+1}}{1/2+1} + C, \quad k=1/2$$

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

Apply Constant

$$\frac{u^{3/2}}{2 \cdot \frac{3}{2}} + C$$

$$\frac{u^{3/2}}{3} + C$$

$$\frac{1}{3} u^{3/2} + C$$

Replace  $u$  with  $2x+1$

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

⑤ Summary

$$\int \sqrt{2x+1} dx = \frac{1}{3} (2x+1)^{3/2} + C$$