

Ex. 6

$$\int \frac{2x}{(x+1)^2} dx$$

$$\begin{aligned} u &= x+1 \\ du &= dx \\ &\rightarrow u = x+1 \\ u-1 &= x \end{aligned}$$

$$2 \int \frac{x}{u^2} du$$

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

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

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

$$2 \left( \ln|u| - \frac{u^{-1}}{-1} \right) + C$$

$$2 \left( \ln|x+1| + \frac{1}{x+1} \right) + C$$

Ex. 6

$$\int \frac{2x}{(x+1)^2} dx$$

$$u = (x+1)^2$$

$$du = 2(x+1)'(1) dx$$

$$du = (2x+2) dx$$

$$\int \frac{2x+2-2}{(x+1)^2} dx$$

$$\int \frac{2x+2}{(x+1)^2} dx - \int \frac{2}{(x+1)^2} dx$$

$$\int \frac{1}{u} du - 2 \int \frac{1}{(x+1)^2} dx$$

$$\ln|u|$$

$$\ln|(x+1)|^2$$

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

$$- 2 \int u^{-2} du$$

$$- 2 \frac{u^{-1}}{-1}$$

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

$$u = x+1$$

$$du = dx$$