

### 3.3 有理関数の積分

#### 問題A

$$\begin{aligned} \text{II (1)} \int \frac{3}{x^2+x-2} dx &= \int \frac{3}{(x+2)(x-1)} dx = \int \left( \frac{1}{x-1} - \frac{1}{x+2} \right) dx \\ &= \ln|x-1| - \ln|x+2| + C = \ln \frac{x-1}{x+2} + C \end{aligned}$$

$$\begin{aligned} \text{(2)} \int_2^3 \frac{1}{x^2-1} dx &= \int_2^3 \frac{1}{(x+1)(x-1)} dx = \frac{1}{2} \int_2^3 \left( \frac{1}{x-1} - \frac{1}{x+1} \right) dx \\ &= \frac{1}{2} \ln|x-1| - \ln|x+1| \Big|_2^3 \\ &= \frac{1}{2} \ln \frac{x-1}{x+1} \Big|_2^3 \\ &= \frac{1}{2} \ln \frac{2}{4} - \frac{1}{2} \ln \frac{1}{3} \\ &= -\frac{1}{2} \ln 2 + \frac{1}{2} \ln 3 = +\frac{1}{2} \ln \end{aligned}$$