

2.3.8

$$e) f(x) = \frac{x^2 + 2x - 2}{x-1} \quad \left\{ \begin{array}{l} x^2 + 2x - 2 \\ \vdots \\ 1 \end{array} \right| \begin{array}{l} x-1 \\ x+3 \end{array}$$
$$= x+3 + \frac{1}{x-1}$$

$$\int f(x) dx = \int \left( x+3 + \frac{1}{x-1} \right) dx = \frac{1}{2}x^2 + 3x + \ln|x-1| + C$$

2.3.9

$$\int_2^6 \frac{8x^3 + 19x^2 + 15x + 4}{x^2 + 2x + 1} dx$$
$$= \int_2^6 \left( 8x + 3 + \frac{x+1}{x^2 + 2x + 1} \right) dx$$
$$= 4x^2 + 3x \Big|_2^6 + \frac{1}{2} \int_2^6 \frac{2(x+1)}{x^2 + 2x + 1} dx$$
$$= 4x^2 + 3x + \frac{1}{2} \ln|x^2 + 2x + 1| \Big|_2^6$$
$$= 162 + \underbrace{\frac{1}{2} \ln(49)}_{\ln(7)} - 22 - \underbrace{\frac{1}{2} \ln(9)}_{\ln(3)}$$
$$= 140 + \ln\left(\frac{7}{3}\right)$$
$$8x^3 + 19x^2 + 15x + 4 \quad \left| \begin{array}{l} x^2 + 2x + 1 \\ 8x + 3 \end{array} \right.$$
$$\vdots$$
$$x+1$$