2.3.8

e) $f(x) = \dfrac{x^2+2x-2}{x-1}$

$= x+3+\dfrac{1}{x-1}$

$x^2+2x-2 \;\big|\; x-1$

$\vdots \qquad\quad x+3$

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

$$\int_2^6 \frac{8x^3+19x^2+15x+4}{x^2+2x+1}\,dx$$

$8x^3+19x^2+15x+4 \;\big|\; x^2+2x+1$

$\vdots \qquad\quad 8x+3$

$x+1$

$$= \int_2^6 \left(8x+3+\frac{x+1}{x^2+2x+1}\right) dx$$

$$= 4x^2+3x\Big|_2^6 + \frac{1}{2}\int_2^6 \frac{2(x+1)}{x^2+2x+1}\,dx$$

$$= 4x^2+3x+\frac{1}{2}\ln|x^2+2x+1|\Big|_2^6$$

$$= 162+\underbrace{\frac{1}{2}\ln(49)}_{\ln(7)} - 22 - \underbrace{\frac{1}{2}\ln(9)}_{\ln(3)}$$

$$= 140+\ln\left(\frac{7}{3}\right)$$