

2.71
4

$$\textcircled{6} \int_{-1}^0 \frac{x^3+1}{x+2} dx = \left[\frac{x^2-2x+4}{x^2+2x^2} \right]_{-1}^0 = \int_{-1}^0 \left(x^2-2x+4 - \frac{7}{x+2} \right) dx =$$
$$= \left[\frac{x^3}{3} - x^2 + 4x - 7 \ln|x+2| \right]_{-1}^0 = \frac{4x+1}{4x+8} - 7$$
$$= 7 \ln \left(-\frac{1}{3} - 1 - 4 - 7 \ln 1 \right) = -7 \ln 2 + 5 \frac{1}{3}$$

$$\textcircled{7} \int_{\frac{\pi}{2}}^{\pi} \frac{\sin x}{1-\cos x} dx = \int_{-\cos x=t}^{\sin x dx=dt} \frac{dt}{1+t} = \ln|t+1|$$
$$\ln|1-\cos x| \Big|_{\frac{\pi}{2}}^{\pi} = \ln 2 - \ln 1 = \ln 2$$