高 1D 冬期第 1 週 宿題解答

(104)

(1)

$$I_1 = \int_1^2 (x^3 + x^2)dx = \left[\frac{1}{4}x^4 + \frac{1}{3}x^3\right]_1^2 = \left(4 + \frac{8}{3}\right) - \left(\frac{1}{4} + \frac{1}{3}\right) = \boxed{\frac{73}{12}}$$

(2)

$$\begin{aligned} I_2 &= \int_0^1 (2x+1)^2 dx = \int_0^1 (4x^2 + 4x + 1)dx \\ &= \left[\frac{4}{3}x^3 + 2x^2 + x\right]_0^1 = \frac{4}{3} + 2 + 1 = \boxed{\frac{13}{3}} \end{aligned}$$

(3)

$$I_3 = \int_0^1 (x^3 - x^2)dx = \left[\frac{1}{4}x^4 - \frac{1}{3}x^3\right]_0^1 = \frac{1}{4} - \frac{1}{3} = \boxed{-\frac{1}{12}}$$

(105)

$\dfrac{x^3}{2} + 1$ が $1 \leq x \leq 2$ で正であることに注意して立式すると

$$\int_1^2 \left(\frac{x^3}{2} + 1\right) dx = \left[\frac{x^4}{8} + x\right]_1^2 = (2+2) - \left(\frac{1}{8} + 1\right) = \boxed{\frac{23}{8}}$$