

微分積分学 II 自習用問題・解答

3 部分積分

問 3.1.

- (1) $xe^x - e^x$ (2) $x \sin x + \cos x$ (3) $-x \cos x + \sin x$
(4) $x \tan x + \log |\cos x|$ (5) $\frac{1}{2}x \sin 2x + \frac{1}{4} \cos 2x$ (6) $\frac{1}{2}xe^x - \frac{1}{4}e^x$
(7) $-xe^{-x} - e^{-x}$ (8) $\frac{1}{5}x(x-5)^5 - \frac{1}{30}(x-5)^6$
(9) $\frac{1}{10}(x+1)(2x-3)^5 - \frac{1}{120}(2x-3)^6$

問 3.2.

- (1) $\frac{1}{2}x^2 \log x - \frac{1}{4}x^2$ (2) $\frac{1}{3}x^3 \log x - \frac{1}{9}x^3$
(3) $(x^2 + x) \log x - \frac{1}{2}x^2 - x$ (4) $\frac{1}{2}(x+1)^2 \log(x+1) - \frac{1}{4}(x+1)^2$

問 3.3.

- (1) $x^2e^x - 2xe^x + 2e^x$ (2) $x^2 \sin x + 2x \cos x - 2 \sin x$
(3) $-x^2 \cos x + 2x \sin x + 2 \cos x$ (4) $\frac{1}{5}x^5 - \frac{1}{2}x^4 + \frac{1}{3}x^3$

問 3.4.

- (1) $x \log x - x$ (2) $x \arctan x - \frac{1}{2}(x^2 + 1)$
(3) $x \arcsin x + \sqrt{1-x^2}$ (4) $x \arccos x - \sqrt{1-x^2}$
(5) $x(\log x)^2 - 2x \log x + 2x$ (6) $(x+1) \log(x+1) - x$

問 3.5.

- (1) $\frac{1}{2}e^x(\sin x - \cos x)$ (2) $\frac{1}{2}e^x(\sin x + \cos x)$
(3) $\frac{3}{10}e^{3x} \sin x - \frac{1}{10}e^{3x} \cos x$ (4) $\frac{1}{2}e^{-x}(\sin x - \cos x)$