

数学演習 (1) 第 8 回 テイラーの定理 解答

- I. (1) $e^{ax+b} = e^b + ae^b x + \frac{a^2}{2}e^b x^2 + \frac{a^3}{6}e^b x^3 + \frac{a^4}{24}e^b x^4 + R_5(x)$
- (2) $a^x = 1 + (\log a)x + \frac{(\log a)^2}{2}x^2 + \frac{(\log a)^3}{6}x^3 + \frac{(\log a)^4}{24}x^4 + R_5(x)$
- (3) $\sin x = x - \frac{1}{6}x^3 + R_5(x)$
- (4) $\cos x = 1 - \frac{1}{2}x^2 + \frac{1}{24}x^4 + R_5(x)$
- (5) $\sinh x = x + \frac{1}{6}x^3 + R_5(x)$
- (6) $\cosh x = 1 + \frac{1}{2}x^2 + \frac{1}{24}x^4 + R_5(x)$
- (7) $\sin^2 x = x^2 - \frac{1}{3}x^4 + R_5(x)$
- (8) $\cos^2 x = 1 - x^2 + \frac{1}{3}x^4 + R_5(x)$

- II. (1) $\frac{1}{1-x} = 1 + x + x^2 + x^3 + R_4(x)$
- (2) $\sqrt{1+x} = 1 + \frac{1}{2}x - \frac{1}{8}x^2 + \frac{1}{16}x^3 + R_4(x)$
- (3) $\frac{1}{\sqrt{1+x}} = 1 - \frac{1}{2}x + \frac{3}{8}x^2 - \frac{5}{16}x^3 + R_4(x)$
- (4) $\sqrt[3]{1+x} = 1 + \frac{1}{3}x - \frac{1}{9}x^2 + \frac{5}{81}x^3 + R_4(x)$
- (5) $\log(1+x) = x - \frac{1}{2}x^2 + \frac{1}{3}x^3 + R_4(x)$