

## 数学演習 (1) 第 8 回 テイラーの定理 解答

- I. (1)  $e^{ax+b} = e^b + ae^bx + \frac{a^2}{2}e^bx^2 + \frac{a^3}{6}e^bx^3 + \frac{a^4}{24}e^bx^4 + R_5(x)$
- (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)  $\log(1+x) = x - \frac{1}{2}x^2 + \frac{1}{3}x^3 + R_4(x)$