

2013年薬学部第5問

5  $x$  の整式  $f(x)$  と  $g(x)$  が

$$f(x) = x \int_0^1 g(t) dt + \int_{-1}^1 g(t) dt + 1, \quad g(x) = \int_0^x f(t) dt$$

を満たすとき,

$$f(x) = \frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}}x + \frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}}, \quad g(x) = \frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}}x^2 + \frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}}x$$

である. さらに, 方程式  $f(x) - g(x) = 0$  の2つの解を  $\alpha, \beta$  ( $\alpha < \beta$ ) とすると,

$$\int_{\alpha}^{\beta} \{f(x) - g(x)\} dx = \frac{\boxed{\phantom{00}}\boxed{\phantom{00}}\sqrt{\boxed{\phantom{00}}\boxed{\phantom{00}}}}{\boxed{\phantom{00}}\boxed{\phantom{00}}},$$

$$\int_{\alpha}^{\beta} \{f(x) + g(x)\} dx = \frac{\boxed{\phantom{00}}\boxed{\phantom{00}}\sqrt{\boxed{\phantom{00}}\boxed{\phantom{00}}}}{\boxed{\phantom{00}}\boxed{\phantom{00}}}$$

である.