



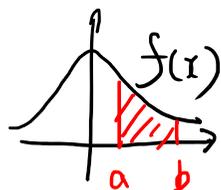
工学系  
公務員試験  
専門試験問題  
演習講座

H.23国家I種理工I  
(現国家総合職工学) No.9

数学

確率密度関数  $f(x)$

$$\textcircled{1} \quad P(a \leq x \leq b) = \int_a^b f(x) dx$$



$$\textcircled{2} \quad \int_{\text{全範囲}} f(x) dx = 1$$

$$\textcircled{3} \quad \mu(\text{期待値}) = \int_{\text{全範囲}} x f(x) dx$$

①

$$P(1 \leq x \leq 2) = \int_1^2 e^{-x} dx = [-e^{-x}]_1^2 = e^{-1} - e^{-2}$$

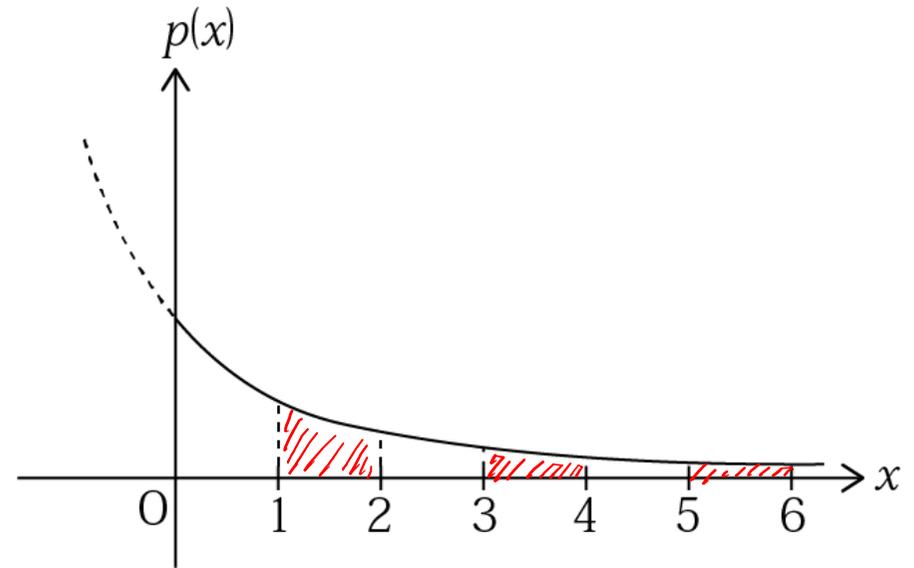
$$P(3 \leq x \leq 4) = \int_3^4 e^{-x} dx = e^{-3} - e^{-4} = e^{-2}(e^{-1} - e^{-2})$$

$$P(5 \leq x \leq 6) = \int_5^6 e^{-x} dx = e^{-5} - e^{-6} = e^{-4}(e^{-1} - e^{-2})$$

$\therefore$  公比  $e^{-2}$ , 初項  $e^{-1} - e^{-2}$  の等比数列

$$a + ar + ar^2 + \dots = a(1 + r + r^2 + \dots) = \frac{a}{1-r} \quad |r| < 1$$

$$\Rightarrow \frac{e^{-1} - e^{-2}}{1 - e^{-2}} = \frac{e-1}{e^2-1} = \frac{1}{e+1}$$



$$\textcircled{\text{H}} : \textcircled{\text{H}} = 1 : \frac{1}{e} = e : 1$$

$$\textcircled{\text{H}} = \frac{1}{e+1} \equiv$$

