

問題1

$$(1) \overrightarrow{OH} = \frac{13}{10}\vec{a} - \frac{3}{10}\vec{b}$$

$$(2) \overrightarrow{ON} = \frac{13}{7}\vec{a} - \frac{3}{7}\vec{b}$$

問題2

$$(1) m=2 \text{ のとき} : \frac{1}{3}, \quad m=3 \text{ のとき} : 0, \quad m=4 \text{ のとき} : \frac{4}{35}$$

$$(2) m=3 \text{ のとき} : \frac{11}{60}, \quad m=4 \text{ のとき} : \frac{1}{56}$$

問題3 (A)

$$(1) a_7 = 6, \quad a_8 = 9$$

$$(2) a_{2m-1} = (m-1)(m-2), \quad a_{2m} = (m-1)^2$$

$$(3) \sum_{k=1}^{2n} a_k = \frac{1}{6}n(n-1)(4n-5)$$

問題3 (B)

$$(1) a_n = \left(\frac{1}{\sqrt{2}}\right)^{n-4} \alpha, \quad S = 4(\sqrt{2}+1)\alpha$$

$$(2) n \text{ が奇数のとき} : a_n = 2\sqrt{\alpha^2 + \beta^2} \left(\frac{1}{2}\right)^{\frac{n-1}{2}}, \quad n \text{ が偶数のとき} : a_n = (\alpha + \beta) \left(\frac{1}{2}\right)^{\frac{n}{2}-1},$$

$$S = 4\sqrt{\alpha^2 + \beta^2} + 2(\alpha + \beta)$$

問題 4 (C)

$$(1) b = \frac{3a+3}{3-a}$$

$$(2) (a,b) = (1,3), (2,9)$$

問題 4 (D)

$$(1) d_1 = \frac{4t^3}{\sqrt{36t^4 - 12t^2 + 5}}, \quad d_2 = \frac{t(12t^4 - 8t^2 + 5)}{2\sqrt{36t^4 - 12t^2 + 5}}$$

$$(2) t = \frac{\sqrt{2}}{2}, \quad t = \frac{\sqrt{30}}{6}$$

$$(3) t = \frac{\sqrt{2}}{2} \text{ のとき : } S = \frac{5}{16}, \quad t = \frac{\sqrt{30}}{6} \text{ のとき : } S = \frac{25}{48}$$