

# 問題

問題 1. 次の和を求めよ。

$$(1) \sum_{k=1}^{10} (3k - 5) \quad (2) \sum_{k=1}^8 (k^2 + k) \quad (3) \sum_{k=1}^6 (k^3 + 2k) \quad (4) \sum_{k=1}^4 3 \cdot 2^{k-1}$$

問題 2. 次の和を求めよ。

$$(1) \sum_{k=1}^n (3k - 5) \quad (2) \sum_{k=1}^n (2k + 3) \quad (3) \sum_{k=1}^n (k^2 + k)$$
$$(4) \sum_{k=1}^n (k^2 + 3k + 2) \quad (5) \sum_{k=1}^n (k + 1)(k - 2) \quad (6) \sum_{k=1}^n k(k + 3)$$
$$(7) \sum_{k=1}^n (k^3 - 2k + 1) \quad (8) \sum_{k=1}^n (k^3 + 2k) \quad (9) \sum_{k=1}^n k^2(k + 1)$$
$$(10) \sum_{k=1}^n k(k + 1)(k + 2) \quad (11) \sum_{k=1}^n 3 \cdot 2^{k-1} \quad (12) \sum_{k=1}^n 5 \cdot 3^{k-1}$$
$$(13) \sum_{k=1}^n 2^k \quad (14) \sum_{k=1}^n 5^{k+1}$$

問題 3. 次の和を求めよ。

$$(1) \sum_{k=1}^{n-1} (4k + 1) \quad (2) \sum_{k=1}^{n-1} (5k - 2) \quad (3) \sum_{k=1}^{n-1} (k^2 + 2)$$
$$(4) \sum_{k=1}^{n-1} (6k^2 - k + 1) \quad (5) \sum_{k=1}^{n-1} (k + 1)(k + 2) \quad (6) \sum_{k=1}^{n-1} k(k - 2)$$
$$(7) \sum_{k=1}^{n-1} (k^3 + 2k^2 - k) \quad (8) \sum_{k=1}^{n-1} (4k^3 + k^2) \quad (9) \sum_{k=1}^{n-1} 2k(2k^2 + 3k + 1)$$
$$(10) \sum_{k=1}^{n-1} k(k + 2)(k + 4) \quad (11) \sum_{k=1}^{n-1} 2 \cdot 3^{k-1} \quad (12) \sum_{k=1}^{n-1} 6 \cdot 5^{k-1}$$
$$(13) \sum_{k=1}^{n-1} 3^k \quad (14) \sum_{k=1}^{n-1} 2^{k+2}$$

# 練習

練習 1. 次の和を求めよ。

$$(1) \sum_{k=1}^{10} (4k+1) \quad (2) \sum_{k=1}^8 (k^2+2) \quad (3) \sum_{k=1}^6 (4k^3+k^2) \quad (4) \sum_{k=1}^4 2 \cdot 3^{k-1}$$

練習 2. 次の和を求めよ。

$$(1) \sum_{k=1}^n (4k+1) \quad (2) \sum_{k=1}^n (5k-2) \quad (3) \sum_{k=1}^n (k^2+2)$$
$$(4) \sum_{k=1}^n (6k^2-k+1) \quad (5) \sum_{k=1}^n (k+1)(k+2) \quad (6) \sum_{k=1}^n k(k-2)$$
$$(7) \sum_{k=1}^n (k^3+2k^2-k) \quad (8) \sum_{k=1}^n (4k^3+k^2) \quad (9) \sum_{k=1}^n 2k(2k^2+3k+1)$$
$$(10) \sum_{k=1}^n k(k+2)(k+4) \quad (11) \sum_{k=1}^n 2 \cdot 3^{k-1} \quad (12) \sum_{k=1}^n 6 \cdot 5^{k-1}$$
$$(13) \sum_{k=1}^n 3^k \quad (14) \sum_{k=1}^n 2^{k+2}$$

練習 3. 次の和を求めよ。

$$(1) \sum_{k=1}^{n-1} (3k-5) \quad (2) \sum_{k=1}^{n-1} (2k+3) \quad (3) \sum_{k=1}^{n-1} (k^2+k)$$
$$(4) \sum_{k=1}^{n-1} (k^2+3k+2) \quad (5) \sum_{k=1}^{n-1} (k+1)(k-2) \quad (6) \sum_{k=1}^{n-1} k(k+3)$$
$$(7) \sum_{k=1}^{n-1} (k^3-2k+1) \quad (8) \sum_{k=1}^{n-1} (k^3+2k) \quad (9) \sum_{k=1}^{n-1} k^2(k+1)$$
$$(10) \sum_{k=1}^{n-1} k(k+1)(k+2) \quad (11) \sum_{k=1}^{n-1} 3 \cdot 2^{k-1} \quad (12) \sum_{k=1}^{n-1} 5 \cdot 3^{k-1}$$
$$(13) \sum_{k=1}^{n-1} 2^k \quad (14) \sum_{k=1}^{n-1} 5^{k+1}$$

# 解答

問題 1.

- (1) 115    (2) 240    (3) 483    (4) 45

問題 2.

- (1)  $\frac{1}{2}n(3n-7)$     (2)  $n(n+4)$     (3)  $\frac{1}{3}n(n+1)(n+2)$     (4)  $\frac{1}{3}n(n^2+6n+11)$   
(5)  $\frac{1}{3}n(n^2-7)$     (6)  $\frac{1}{3}n(n+1)(n+5)$     (7)  $\frac{1}{4}n^2(n+3)(n-1)$     (8)  $\frac{1}{4}n(n+1)(n^2+n+4)$   
(9)  $\frac{1}{12}n(n+1)(n+2)(3n+1)$     (10)  $\frac{1}{4}n(n+1)(n+2)(n+3)$     (11)  $3(2^n-1)$   
(12)  $\frac{5}{2}(3^n-1)$     (13)  $2(2^n-1)$     (14)  $\frac{25}{4}(5^n-1)$

問題 3.

- (1)  $(n-1)(2n+1)$     (2)  $\frac{1}{2}(n-1)(5n-4)$     (3)  $\frac{1}{6}(n-1)(2n^2-n+12)$   
(4)  $\frac{1}{2}(n-1)(4n^2-3n+2)$     (5)  $\frac{1}{3}(n-1)(n^2+4n+6)$     (6)  $\frac{1}{6}(n-1)n(2n-7)$   
(7)  $\frac{1}{12}(n-1)n(3n^2+5n-10)$     (8)  $\frac{1}{6}(n-1)n(6n^2-4n-1)$     (9)  $(n-1)n^2(n+1)$   
(10)  $\frac{1}{4}(n-1)n(n+3)(n+4)$     (11)  $3^{n-1}-1$     (12)  $\frac{3}{2}(5^{n-1}-1)$     (13)  $\frac{3}{2}(3^{n-1}-1)$   
(14)  $8(2^{n-1}-1)$

練習 1.

- (1) 230    (2) 220    (3) 1855    (4) 80

練習 2.

- (1)  $n(2n+3)$     (2)  $\frac{1}{2}n(5n+1)$     (3)  $\frac{1}{6}n(2n^2+3n+13)$     (4)  $\frac{1}{2}n(4n^2+5n+3)$   
(5)  $\frac{1}{3}n(n^2+6n+11)$     (6)  $\frac{1}{6}n(n+1)(2n-5)$     (7)  $\frac{1}{12}n(n+1)(3n^2+11n-2)$   
(8)  $\frac{1}{6}n(n+1)(6n^2+8n+1)$     (9)  $n(n+1)^2(n+2)$     (10)  $\frac{1}{4}n(n+1)(n+4)(n+5)$   
(11)  $3^n-1$     (12)  $\frac{3}{2}(5^n-1)$     (13)  $\frac{3}{2}(3^n-1)$     (14)  $8(2^n-1)$

練習 3.

- (1)  $\frac{1}{2}(n-1)(3n-10)$     (2)  $(n-1)(n+3)$     (3)  $\frac{1}{3}(n-1)n(n+1)$   
(4)  $\frac{1}{3}(n-1)(n^2+4n+6)$     (5)  $\frac{1}{3}(n-1)(n^2-2n-6)$     (6)  $\frac{1}{3}(n-1)n(n+4)$   
(7)  $\frac{1}{4}(n-1)^2(n+2)(n-2)$     (8)  $\frac{1}{4}(n-1)n(n^2-n+4)$     (9)  $\frac{1}{12}(n-1)n(n+1)(3n-2)$   
(10)  $\frac{1}{4}(n-1)n(n+1)(n+2)$     (11)  $3(2^{n-1}-1)$     (12)  $\frac{5}{2}(3^{n-1}-1)$     (13)  $2(2^{n-1}-1)$   
(14)  $\frac{25}{4}(5^{n-1}-1)$