＜１ページ，原始関数＞

解答　問 (1)　x^4　の原始関数の一般形 $= \dfrac{1}{5}x^5 + C$

(2)　x^5　の原始関数の一般形 $= \dfrac{1}{6}x^6 + C$

(3)　x^6　の原始関数の一般形 $= \dfrac{1}{7}x^7 + C$

＜2ページ，不定積分1＞

解答 **問**1 (1) $\displaystyle\int x^4 dx = \frac{1}{5}x^5 + C$

(2) $\displaystyle\int x^5 dx = \frac{1}{6}x^6 + C$

(3) $\displaystyle\int x^6 dx = \frac{1}{7}x^7 + C$

問2 $\displaystyle\int x^n dx = \frac{1}{n+1}x^{n+1} + C$ (n は定数)

問3 $n \neq -1$

解答 **問1** (1) $\displaystyle\int x dx = \frac{1}{2}x^2 + C$

(2) $\displaystyle\int 1 dx = x + C$

(3) $\displaystyle\int \sqrt{x} dx = \frac{2}{3}x\sqrt{x} + C$

(4) $\displaystyle\int \frac{1}{x^3} dx = -\frac{1}{2x^2} + C$

(5) $\displaystyle\int \frac{1}{\sqrt{x}} dx = 2\sqrt{x} + C$

問2 $\displaystyle\int x^{-1} dx = \int \frac{1}{x} dx = \log|x| + C$

解答 **問**1 (1) $\displaystyle\int (-\sin x)\,dx = \cos x + C$

(2) $\displaystyle\int \frac{1}{\cos^2 x} dx = \tan x + C$

(3) $\displaystyle\int e^x dx = e^x + C$

(4) $\displaystyle\int a^x \log a dx = a^x + C$

(5) $\displaystyle\int \frac{1}{\sqrt{1-x^2}} dx = \sin^{-1} x + C$

問2 (1) $\displaystyle\int x^4 dx = \frac{1}{5}x^5 + C$

(2) $\displaystyle\int \sin x dx = -\cos x + C$

(3) $\displaystyle\int a^x dx = \frac{1}{\log a}a^x + C$

解答 **問1** (1) $\displaystyle\int 5x^3 dx = \frac{5}{4}x^4 + C$

(2) $\displaystyle\int (4-7x)\,dx = 4x - \frac{7}{2}x^2 + C$

(3) $\displaystyle\int \left(8x^3 - 6x + 3\right) dx = 2x^4 - 3x^2 + 3x + C$

問2 $\displaystyle\int \left(8x^2 - 7x + 2\right) dx + 2\int \left(-4x^2 + 3x - 1\right) dx$

$= \displaystyle\int \left\{8x^2 - 7x + 2 + (-8x^2 + 6x - 2)\right\} dx = \int (-x) dx = -\frac{1}{2}x^2 + C$

解答 **問1** (1) $\displaystyle\int (3x+2)^5 dx = \frac{1}{18}(3x+2)^6 + C$

(2) $\displaystyle\int (4x-3)^7 dx = \frac{1}{32}(4x+3)^8 + C$

問2 (1) $\displaystyle\int (ax+b)^4 dx = \frac{1}{5a}(ax+b)^5 + C$

(2) $\displaystyle\int (ax+b)^n dx = \frac{1}{(n+1)a}(ax+b)^{n+1} + C$

問3 (1) $\displaystyle\int \sqrt{4x+5}dx = \int (4x+5)^{\frac{1}{2}} dx = \frac{1}{\left(\frac{1}{2}+1\right)\times 4}(4x+5)^{\frac{3}{2}} + C$

$$= \frac{1}{6}(4x+5)\sqrt{4x+5} + C$$

(2) $\displaystyle\int \frac{1}{(5x-1)^3}dx = \int (5x-1)^{-3} dx = \frac{1}{-2\times 5}(5x-1)^{-2} + C$

$$= -\frac{1}{10(5x-1)^2} + C$$

解答 **問1** (1) $\displaystyle\int \cos(3x+4)dx = \frac{1}{3}\sin(3x+4)+C$

(2) $\displaystyle\int \sin(4x-5)dx = -\frac{1}{4}\cos(4x-5)+C$

(3) $\displaystyle\int \frac{1}{3x+2}dx = \frac{1}{3}\log|3x+2|+C$

(4) $\displaystyle\int e^{4x+5}dx = \frac{1}{4}e^{4x+5}+C$

問2 (1) $\displaystyle\int \cos(ax+b)dx = \frac{1}{a}\sin(ax+b)+C$

(2) $\displaystyle\int \sin(ax+b)dx = -\frac{1}{a}\cos(ax+b)+C$

(3) $\displaystyle\int \frac{1}{ax+b}dx = \frac{1}{a}\log|ax+b|+C$

(4) $\displaystyle\int e^{ax+b}dx = \frac{1}{a}e^{ax+b}+C$

< 8ページ，積分記号 >

解答　問 (1) $\displaystyle\int (5-9.8t)dt = 5t - 4.9t^2 + C$

(2) $\displaystyle\int 4\pi r^2 dr = \frac{4}{3}\pi r^3 + C$

(3) $\displaystyle\int e^u du = e^u + C$

(4) $\displaystyle\int \frac{1}{y} dy = \log|y| + C$

(5) $\displaystyle\int \sin u du = -\cos u + C$

＜ 9ページ，置換積分法１ ＞

解答　問 (1) $\displaystyle\int \cos\left(x^4\right) \times 4x^3 dx = \sin\left(x^4\right) + C$

(2) $\displaystyle\int \cos\left(x^5\right) \times 5x^4 dx = \sin\left(x^5\right) + C$

(3) $\displaystyle\int \cos\Big(g(x)\Big) \times g'(x) dx = \sin\Big(g(x)\Big) + C$

＜ 10 ページ，置換積分法 2 ＞

解答 **問** 1 (1) $\displaystyle\int \sin\left(x^3\right) \times 3x^2 dx = -\cos\left(x^3\right) + C$

(2) $\displaystyle\int \sin\Big(g(x)\Big) \times g'(x) dx = -\cos\Big(g(x)\Big) + C$

問 2 (1) $\displaystyle\int e^{g(x)} \times g'(x) dx = e^{g(x)} + C$

(2) $\displaystyle\int \frac{1}{g(x)} \times g'(x) dx = \log|g(x)| + C$

(3) $\displaystyle\int \Big\{g(x)\Big\}^n \times g'(x) dx = \frac{1}{n+1}\left\{g(x)\right\}^{n+1} + C$

問 3 $\displaystyle\int f\Big(g(x)\Big) \times g'(x) dx = \int f(u)\frac{du}{dx} dx = \int f(u) du$

＜ 11 ページ，置換積分法 3 ＞

解答 **問** (1) $\displaystyle\int \cos(5x-4)\,dx = \frac{1}{5}\sin(5x-4)+C$

(2) $\displaystyle\int \sin(4x+3)\,dx = -\frac{1}{4}\cos(4x+3)+C$

＜ 12ページ，置換積分法4 ＞

解答 **問** (1) $\displaystyle\int x\big(x^2+3\big)^5dx=\frac{1}{2}\int 2x(x^2+3)^5dx=\frac{1}{2}\int u^5du=\frac{1}{12}u^6+C$

$$=\frac{1}{12}(x^2+3)^6+C$$

(2) $\displaystyle\int x^3\cos\big(x^4+5\big)dx=\frac{1}{4}\sin(x^4+5)+C$

＜ 13ページ，置換積分法5 ＞

解答 **問** (1) $\displaystyle\int \frac{x^3}{x^4+1}dx = \frac{1}{4}\log\left|x^4+1\right| + C$

(2) $\displaystyle\int \tan x dx = -\log|\cos x| + C$

(3) $\displaystyle\int \frac{f'(x)}{f(x)}dx = \log|f(x)| + C$

＜14ページ，部分積分法1＞

解答 **問** $\int f(x) \times g'(x)dx = f(x) \times g(x) - \int f'(x) \times g(x)\ dx$

＜ 15 ページ，部分積分法 2 ＞

解答 **問** (1) $\displaystyle\int (4x+5)\sin x dx = (4x+5)(-\cos x) - \int 4 \times (-\cos x) du$

$$= -(4x+5)\cos x + 4\sin x + C$$

(2) $\displaystyle\int (3x-4)\cos x dx = (3x-4)\sin x - \int 3 \times (\sin x) du$

$$= (3x-4)\sin x + 3\cos x + C$$

＜16ページ，部分積分法3＞

解答 **問** $\displaystyle\int (\log x) \times x^2 dx = (\log x) \times \left(\frac{1}{3}x^3\right) - \int \left(\frac{1}{x} \times \frac{1}{3}x^3\right) dx$

$$= \frac{1}{3}x^3 \log x - \frac{1}{9}x^3 + C$$

< 17ページ，不定積分の検証 >

解答　問 (1) $\displaystyle\int \tan x dx = \log|\cos x| + C$

$$\Big(\log|\cos x|\Big)' = \frac{-\sin}{\cos} = -\tan x$$

より正しくない

(2) $\displaystyle\int x\log x dx = \frac{x^2}{2}\log x - \frac{1}{4}x^2 + C$

$$\Big(\frac{x^2}{2}\log x - \frac{1}{4}x^2\Big)' = x\log x + \frac{x^2}{2}\times\frac{1}{x} - \frac{1}{2}x = x\log x$$

より正しい

＜18ページ，不定積分の練習1＞

解答 **問1** (1) $\int dx = x + C$ (2) $\int x^n dx = \frac{1}{n+1}x^{n+1} + C$

(3) $\int \frac{dx}{x} = \log|x| + C$ (4) $\int e^x dx = e^x + C$

(5) $\int a^x dx = \frac{1}{\log a}a^x + C$ (6) $\int \cos x dx = \sin x + C$

(7) $\int \sin x dx = -\cos x + C$ (8) $\int \frac{1}{\cos^2 x}dx = \tan x + C$

(9) $\int \frac{1}{\sqrt{1-x^2}}dx = \sin^{-1} x + C$ (10) $\int \frac{1}{1+x^2}dx = \tan^{-1} x + C$

(11) $\int \tan x dx = -\log|\cos x| + C$ (12) $\int \log x dx = x\log|x| - x + C$

問2 (1) $\int \frac{1}{x^4}dx = -\frac{1}{3x^3} + C$ (2) $\int \sqrt[3]{x}dx = \frac{3}{4}x\sqrt[3]{x} + C$

(3) $\int \frac{x^2-2x+1}{x^2}dx = \int (1 - \frac{2}{x} + \frac{1}{x^2})dx$

$= x - 2\log|x| - \frac{1}{x} + C$

問3 (1) $\int (6x-1)^4 dx = \frac{1}{30}(6x-1)^5 + C$ (2) $\int \frac{1}{(2x+3)^4}dx = -\frac{1}{6(2x+3)^3} + C$

(3) $\int \frac{dx}{\sqrt{2x+1}} = \sqrt{2x+1} + C$ (4) $\int \frac{dx}{5x+7} = \frac{1}{5}\log|5x+7| + C$

(5) $\int \cos(3x-2)dx = \frac{1}{3}\sin(3x-2) + C$ (6) $\int \sin(4x-3)dx = -\frac{1}{4}\cos(4x-3) + C$

(7) $\int e^{-2x+3}dx = -\frac{1}{2}e^{-2x+3} + C$ (8) $\int \frac{dx}{\cos^2(4x+1)} = \frac{1}{4}\tan(4x+1) + C$

< 19ページ，不定積分の練習2 >

解答 **問** (1) $\displaystyle\int \frac{1}{x^2-x}dx = \int \left(\frac{1}{x-1} - \frac{1}{x}\right) dx = \log|x-1| - \log|x| + C$

$$= \log\left|\frac{x-1}{x}\right| + C$$

(2) $\displaystyle\int \frac{1}{x^2-x-2}dx = \int \frac{1}{3}\left(\frac{1}{x-2} - \frac{1}{x+1}\right) dx$

$$= \frac{1}{3}\log|x-2| - \frac{1}{3}\log|x+1| + C$$

$$= \frac{1}{3}\log\left|\frac{x-2}{x+1}\right| + C$$

＜ 20 ページ，不定積分の練習 3 ＞

解答 **問** (1) $\displaystyle\int \sin^2 x dx = \int \frac{1}{2}\{1-\cos(2x)\}dx$

$$= \frac{1}{2}x - \frac{1}{4}\sin(2x) + C$$

(2) $\displaystyle\int \cos(3x)\cos x dx = \int \frac{1}{2}\{\cos(4x)+\cos(2x)\}dx$

$$= \frac{1}{8}\sin(4x) + \frac{1}{4}\sin(2x) + C$$

(3) $\displaystyle\int \sin(4x)\sin x dx = \int \frac{1}{2}\{\cos(3x)-\cos(5x)\}dx$

$$= \frac{1}{6}\sin(3x) - \frac{1}{10}\sin(5x) + C$$

＜21ページ，数列の和1＞

解答 **問**1　$a_4 = 5$　，　$a_5 = 6$

問2　$a_n = n+1$

問3　$b_n = \dfrac{n(2n+1)}{6} a_n = \dfrac{n(2n+1)}{6}(n+1)$

問4　$b_5 = \dfrac{5 \times 11 \times 6}{6} = 55$

問5　$1^2 + 2^2 + 3^2 + 4^2 + 5^2 = 1 + 4 + 9 + 16 + 25 = 55$

＜ 22ページ，数列の和2 ＞

解答 **問**1　$a_4 = 6 + 4 = 10$　　，　$b_4 = 36 + 4^3 = 36 + 64 = 100$

$a_5 = 10 + 5 = 15$　　，　$b_5 = 100 + 5^3 = 100 + 125 = 225$

問2　$b_n = (a_n)^2$

問3　$a_n = \dfrac{n(n+1)}{2}$

問4　$b_n = \left\{\dfrac{n(n+1)}{2}\right\}^2$

問5　$b_5 = \left(\dfrac{5 \times 6}{2}\right)^2 = (15)^2 = 225$

＜23ページ，和の記号$\sum$（シグマ）1＞

解答　問　(1) $\displaystyle\sum_{k=1}^{7}(2k-1) = 1+3+5+7+9+11+13 \ \Big(=49\Big)$

(2) $\displaystyle\sum_{k=1}^{5}(k^2-1) = (1^2-1)+(2^2-1)+(3^2-1)+(4^2-1)+(5^2-1)$

$= 0+3+8+15+24 \ \Big(=50\Big)$

(3) $\displaystyle\sum_{k=1}^{n}3\times 4^k = 3\times 4+3\times 4^2+\ \cdots\ +3\times 4^n$

＜24ページ，和の記号$\sum$（シグマ）2＞

解答　**問1**　(1)　$1+2+3+4+\cdots+n=\displaystyle\sum_{k=1}^{n}k$

(2)　$1\times3+3\times5+5\times7+\cdots+(2n-1)(2n+1)=\displaystyle\sum_{k=1}^{n}(2k-1)(2k+1)$

(3)　$1+3+5+\cdots+39=\displaystyle\sum_{k=1}^{20}(2k-1)$

(4)　$3+6+9+12+\cdots+600=\displaystyle\sum_{k=1}^{200}3k$

問2　(1)　$\displaystyle\sum_{k=3}^{7}(k^2+1)=(3^2+1)+(4^2+1)+(5^2+1)+(6^2+1)+(7^2+1)$

$=\ 10\ +\ 17\ +\ 26\ +\ 37\ +\ 50\ \Big(=140\Big)$

(2)　$\displaystyle\sum_{k=2}^{5}(3k-1)^2=(3\times2-1)^2+(3\times3-1)^2+(3\times4-1)^2+(3\times5-1)^2$

$=\ 5^2\ +\ 8^2\ +\ 11^2\ +\ 14^2$

$=\ 25\ +\ 64\ +\ 121\ +\ 196\ \Big(=406\Big)$

< 25ページ，和の記号$\sum$（シグマ）3 >

解答 **問** (1) $\displaystyle\sum_{k=1}^{n}(2k+3) = 2\sum_{k=1}^{n}k + 3\sum_{k=1}^{n}1 = 2\times\frac{n(n+1)}{2} + 3n$

$$= n^2 + n + 3n$$

$$= n^2 + 4n$$

(2) $\displaystyle\sum_{k=1}^{n}(6k-4) = 6\sum_{k=1}^{n}k - 4\sum_{k=1}^{n}1 = 6\frac{n(n+1)}{2} - 4n$

$$= 3n^2 + 3n - 4n$$

$$= 3n^2 - n$$

解答 **問** (1) $1,\ 3,\ 5,\ 7,\cdots,\ 2n-1,\cdots$

$$\begin{aligned}\sum_{k=1}^{n}(2k-1) &= 2\sum_{k=1}^{n}k-\sum_{k=1}^{n}1\\ &= 2\times\frac{n(n+1)}{2}-n\\ &= n^2\end{aligned}$$

(2) $2,\ 5,\ 8,\ 11,\cdots,\ 3n-1,\cdots$

$$\begin{aligned}\sum_{k=1}^{n}(3k-1) &= 3\sum_{k=1}^{n}k-\sum_{k=1}^{n}1\\ &= 3\times\frac{n(n+1)}{2}-n\\ &= \frac{3}{2}n^2+\frac{3}{2}n-n\\ &= \frac{3}{2}n^2+\frac{1}{2}n\end{aligned}$$

(3) $2,\ 7,\ 12,\ 17,\cdots,\ 5n-3,\cdots$

$$\begin{aligned}\sum_{k=1}^{n}(5k-3) &= 5\sum_{k=1}^{n}k-3\sum_{k=1}^{n}1\\ &= 5\times\frac{n(n+1)}{2}-3n\\ &= \frac{5}{2}n^2+\frac{5}{2}n-3n\\ &= \frac{5}{2}n^2-\frac{1}{2}n\end{aligned}$$

< 27ページ，和の記号$\sum$（シグマ）5 >

解答 **問**1 $\displaystyle\sum_{k=1}^{n} k^2 = \frac{n(n+1)(2n+1)}{6}$

問2 (1) $1^2+2^2+3^2+\cdots+7^2 = \displaystyle\sum_{k=1}^{7} k^2 = \frac{7\times 8\times 15}{6} = 7\times 20 = 140$

(2) $1^2+2^2+3^2+\cdots+n^2+(n+1)^2 = \displaystyle\sum_{k=1}^{n+1} k^2 = \frac{(n+1)(n+2)(2n+3)}{6}$

< 28ページ，和の記号$\sum$（シグマ）6 >

解答 **問**1 $\displaystyle\sum_{k=1}^{n} k^3 = \left\{ \frac{n(n+1)}{2} \right\}^2$

問2 (1) $1^3 + 2^3 + 3^3 + \cdots + 7^3 = \displaystyle\sum_{k=1}^{7} k^3 = \left\{ \frac{7 \times 8}{2} \right\}^2 = (28)^2 = 784$

(2) $1^3 + 2^3 + 3^3 + \cdots + (n-1)^3 = \displaystyle\sum_{k=1}^{n-1} k^3 = \left\{ \frac{(n-1)n}{2} \right\}^2$

解答 **問1** (1) $\displaystyle\sum_{i=2}^{5} x_i = x_2 + x_3 + x_4 + x_5$ ， (2) $\displaystyle\sum_{j=3}^{6} y_j = y_3 + y_4 + y_5 + y_6$

(3) $\displaystyle\sum_{i=3}^{n} i^2 = 3^2 + 4^2 + \cdots + n^2$ ， (4) $\displaystyle\sum_{j=2}^{n+1} j^3 = 2^3 + 3^3 + \cdots + (n+1)^3$

問2

$$\sum_{i=2}^{4}\left\{\sum_{j=3}^{5}(x_i - y_j)\right\} = \begin{aligned}&(x_2 - y_3) + (x_2 - y_4) + (x_2 - y_5)\\ &+(x_3 - y_3) + (x_3 - y_4) + (x_3 - y_5)\\ &+(x_4 - y_3) + (x_4 - y_4) + (x_4 - y_5)\end{aligned}$$

＜30ページ，区分求積法1＞

解答 **問** $S=\lim_{n\to\infty}S_n=\lim_{n\to\infty}\frac{1}{6}\left(1-\frac{1}{n}\right)\left(2-\frac{1}{n}\right)=\frac{1}{6}\times1\times2=\frac{1}{3}$

＜31ページ，区分求積法2＞

解答 **問** $S_n^* = \sum_{k=1}^{n} (x_k)^2 h = \sum_{k=1}^{n} (kh)^2 h = h^3 \sum_{k=1}^{n} k^2$

$$= h^3 \times \frac{n(n+1)(2n+1)}{6}$$

$$= \frac{n(n+1)(2n+1)}{6n^3}$$

$$= \frac{1}{6}\left(1+\frac{1}{n}\right)\left(2+\frac{1}{n}\right)$$

$$\lim_{n\to\infty} S_n^* = \lim_{n\to\infty} \frac{1}{6}\left(1+\frac{1}{n}\right)\left(2+\frac{1}{n}\right)$$

$$= \frac{1}{6} \times 1 \times 2 = \frac{1}{3}$$

＜ 32 ページ，区分求積法 3 ＞

解答 **問**

$$S_n^* = \sum_{k=1}^{n} (x_k)^3 \, h = h^4 \sum_{k=1}^{n} k^3$$

$$= \left(\frac{1}{n}\right)^4 \times \left\{\frac{n(n+1)}{2}\right\}^2$$

$$= \frac{1}{4}\left(1+\frac{1}{n}\right)^2$$

$$\lim_{n\to\infty} S_n^* = \lim_{n\to\infty} \frac{1}{4}\left(1+\frac{1}{n}\right)^2$$

$$= \frac{1}{4}$$

< 33ページ，面積関数$S(x)$ $1 >$

解答 **問** $S_n^*(x) = \sum_{k=1}^{n} (x_k)^2 \, h = h^3 \sum_{k=1}^{n} k^2$

$$= \left(\frac{x}{n}\right)^3 \times \frac{n(n+1)(2n+1)}{6}$$

$$= \frac{x^3}{6}\left(1+\frac{1}{n}\right)\left(2+\frac{1}{n}\right)$$

$$\lim_{n\to\infty} S_n^*(x) = \lim_{n\to\infty} \frac{x^3}{6}\left(1+\frac{1}{n}\right)\left(2+\frac{1}{n}\right)$$

$$= \frac{x^3}{6} \times 1 \times 2$$

$$= \frac{x^3}{3}$$

< 34ページ，面積関数$S(x)$ $2 >$

解答　問
$$S_n^*(x) = \sum_{k=1}^{n} (x_k)^3 \, h = h^4 \sum_{k=1}^{n} k^3$$
$$= \left(\frac{x}{n}\right)^4 \times \left\{\frac{n(n+1)}{2}\right\}^2$$
$$= \frac{x^4}{4}\left(1+\frac{1}{n}\right)^2$$

$$\lim_{n\to\infty} S_n^*(x) = \lim_{n\to\infty} \frac{x^4}{4}\left(1+\frac{1}{n}\right)^2$$
$$= \frac{x^4}{4}$$

$<$ 35 ページ，面積関数 $S(x)$ 3 $>$

解答 **問**1 (1) $f(x) = 1$ のとき $S(x) = x$ (2) $f(x) = x$ のとき $S(x) = \dfrac{1}{2}x^2$

(3) $f(x) = x^2$ のとき $S(x) = \dfrac{1}{3}x^3$ (4) $f(x) = x$ のとき $S(x) = \dfrac{1}{4}x^4$

問2 $S(x) = \dfrac{1}{5}x^5$

問3 $S(x) = \dfrac{1}{n+1}x^{n+1}$

問4 $\big(S(x)\big)' = f(x)$

$\left(\text{または } \displaystyle\int f(x)dx = S(x) + C\right)$

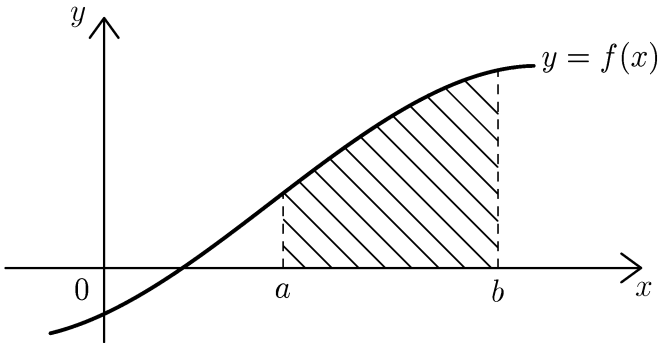
$<$ 36 ページ，面積関数 $S(x)$ 4 $>$

解答 **問** $S(x) = \int f(x)dx = \frac{1}{4}x^4 - x^3 + 4x$

$$
\begin{aligned}
S &= S(3) - S(2) \\
&= \left(\frac{81}{4} - 27 + 12\right) - \left(\frac{16}{4} - 8 + 8\right) \\
&= \frac{65}{4} - 15 = \frac{65 - 60}{4} \\
&= \frac{5}{4}
\end{aligned}
$$

< 37ページ，定積分の定義 >

解答 **問** 斜線部分の面積



< 39ページ，定積分1 >

解答 **問** (1) $\displaystyle\int_4^7 dx = \left[\ x\ \right]_4^7 = 7-4 = 3$

(2) $\displaystyle\int_1^7 x dx = \left[\ \frac{1}{2}x^2\ \right]_1^7 = \frac{49}{2} - \frac{1}{2} = \frac{48}{2} = 24$

(3) $\displaystyle\int_{-1}^5 x^2 dx = \left[\ \frac{x^3}{3}\ \right]_{-1}^5 = \frac{125}{3} - \frac{-1}{3} = \frac{126}{3} = 42$

(4) $\displaystyle\int_{-2}^4 x^3 dx = \left[\ \frac{x^4}{4}\ \right]_{-2}^4 = \frac{4^4}{4} - \frac{(-2)^4}{4} = 64 - 4 = 60$

< 40ページ，定積分2 >

解答 **問** (1) $\displaystyle\int_2^2 (x^6 - 7x^5)dx = 0$

(2) $\displaystyle\int_4^4 \frac{1}{\sqrt{x}}dx = 0$

(3) $\displaystyle\int_\pi^\pi \sin(2x)dx = 0$

(4) $\displaystyle\int_4^1 x^3 dx = \left[\ \frac{x^4}{4}\ \right]_4^1 = \frac{1}{4} - \frac{4^4}{4} = -\frac{255}{4}$

(5) $\displaystyle\int_3^0 x^5 dx = \left[\ \frac{x^6}{6}\ \right]_3^0 = -\frac{3^6}{6} = -\frac{3^5}{2} = -\frac{243}{2}$

(6) $\displaystyle\int_1^{-1} (x^2+3)dx = \left[\ \frac{x^3}{3} + 3x\ \right]_1^{-1} = -\frac{1}{3} - 3 - \left(\frac{1}{3} + 3\right) = -\frac{2}{3} - 6$

$$= -\frac{20}{3}$$

(7) $\displaystyle\int_4^0 (x^4 + 6x^2)dx = \left[\frac{x^5}{5} + 2x^3\right]_4^0 = 0 - \frac{4^5}{5} - 2\times 4^3 = -\frac{1024}{5} - 128$

$$= -\frac{1664}{5}$$

(8) $\displaystyle\int_2^{-2} (x^5 - x^3)dx = \left[\frac{x^6}{6} - \frac{x^4}{4}\right]_2^{-2} = \left(\frac{(-2)^6}{6} - \frac{(-2)^4}{4}\right) - \left(\frac{2^6}{6} - \frac{2^4}{4}\right)$

$$= 0$$