

定積分問題集

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		No	グラフ参照
例1	$\int_0^1 x^3 dx$	例2	$\int_0^{\frac{\pi}{2}} \cos^2 x dx$
例3	$\int_0^4 \frac{dx}{x^2 - 4x + 8}$	例4	$\int_{-2}^{-1} \frac{dx}{x}$

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1	$\int_1^e \frac{dx}{x}$	2	$\int_0^1 (x^2 - 2x + 2)(x - 1) dx$
3	$\int_0^a \frac{dx}{a^2 + x^2}$	4	$\int_0^2 \frac{x^3}{x + 1} dx$
5	$\int_2^3 \frac{x}{1 + x^2} dx$	6	$\int_0^{\frac{\pi}{2}} \frac{\cos x}{1 + \sin^2 x} dx$
7 ✖	$\int_0^{\frac{\pi}{4}} \sec^4 x dx$	8	$\int_0^{\frac{\pi}{2}} \frac{dx}{\sin x}$
9	$\int_0^1 \frac{dx}{x^2 - x + 1}$	10	$\int_0^1 \frac{x + 2}{x^2 + x + 1} dx$
11	$\int_0^1 \frac{x}{\sqrt{1 + x^2}} dx$	12	$\int_0^1 \frac{dx}{\sqrt{3 - 2x}}$
13 ✖	次の不等式を証明せよ	$\int_0^{\frac{\pi}{2}} e^{-x} dx < \int_0^{\frac{\pi}{2}} e^{-\sin x} dx$	
14 ✖	$n > 2$ のとき次の不等式を証明せよ	$\frac{1}{2} < \int_0^{\frac{1}{2}} \frac{dx}{\sqrt{1 - x^n}} < \frac{\pi}{6}$	
15 ✖	次の不等式を証明せよ	$\frac{\pi}{6} \leq \int_0^{\frac{\pi}{6}} \frac{dx}{\sqrt{1 - \frac{1}{4} \sin^2 x}} \leq \frac{2}{3\sqrt{15}} \pi$	

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例5	$\int_0^a \sqrt{a^2 - x^2} dx$	$a > 1$	例6	$\int_0^1 x^2 \sqrt{1 - x} dx$
例7 ✖	$\int_0^{\frac{\pi}{2}} \sin^m x dx$	m は整数	例8 ✖	$\int_0^{\frac{\pi}{2}} \sin^m x \cos^n x dx$
例9	$\int_0^{\frac{\pi}{2}} \sin^5 x \cos^4 x dx$	$\int_0^{\frac{\pi}{2}} \sin^4 x \cos^3 x dx$		

1	$\int_0^4 \frac{dx}{1+\sqrt{x}}$	2	$\int_0^4 \frac{x}{\sqrt{2+4x}} dx$
3	$\int_0^1 \frac{x}{(1+2x)^3} dx$	4	$\int_0^{16} \frac{x^{\frac{1}{4}}}{1+x^{\frac{1}{2}}} dx$
5 ✖	$\int_0^a x^2 \sqrt{a^2 - x^2} dx$	6	$\int_1^6 \frac{x}{\sqrt{x+3}} dx$
7	$\int_0^{\frac{\pi}{2}} \frac{dx}{1+\sin x}$	8	$\int_{\frac{\pi}{2}}^{\pi} \frac{dx}{1-\cos x}$
9	$\int_0^1 x \log x dx$	10	$\int_0^1 x^2 \tan^{-1} x dx$
11 ✖	$\int_0^{\frac{\pi}{2}} \sin^6 x \cos^4 x dx$	12 ✖	$\int_0^{\frac{\pi}{2}} \cos^8 x dx$
13 ✖	$\int_0^{\pi} \sin^4 x dx$	14 ✖	$\int_0^{\pi} \sin^6 x dx$
15 ✖	次のを公式を証明せよ	$\int_0^a f(x) dx = \int_0^a f(a-x) dx$	

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例10	$\int_0^{\infty} e^{-x} dx$	例11	$\int_0^{\infty} \sin x dx$
例12	$\int_0^{-\infty} \frac{dx}{1+x^2}$	例13	$\int_{-\infty}^{\infty} \frac{dx}{1+x^2}$
例14 ✖	$\int_0^{\infty} \frac{dx}{(1+x^2)^n}$ ただし $2n \geq 2$ の整数	例15	$\int_0^1 \frac{1}{\sqrt{1-x^2}} dx$
例16	$\int_0^1 \frac{dx}{x^2}$	例17	$\int_0^1 \frac{dx}{1-x^2}$
例18	$\int_{-1}^1 \frac{dx}{x}$	例19 ✖	$\int_0^{3a} \frac{2x}{(x^2-a^2)^{\frac{2}{3}}} dx$

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1	$\int_0^{\infty} \frac{2+x}{1+x^2} dx$	2	$\int_1^{\infty} \frac{dx}{x^4}$
3	$\int_0^{\infty} e^{-ax} dx$	4	$\int_{-\infty}^1 e^x dx$
5	$\int_1^{\infty} \frac{dx}{x\sqrt{x}}$	6	$\int_{-\infty}^{\infty} \frac{dx}{x^2+2x+2}$
7	$\int_a^b \frac{dx}{\sqrt{x^2-a^2}}$	8	$\int_0^a x\sqrt{a^2-x^2} dx$
9	$\int_0^2 \frac{dx}{(1-x)^2}$	10	$\int_0^{2a} \frac{dx}{(x-a)^2}$
11	$\int_{-2}^2 \{x(x-2)(x-1)(x+1)(x+2)+2\} dx$		