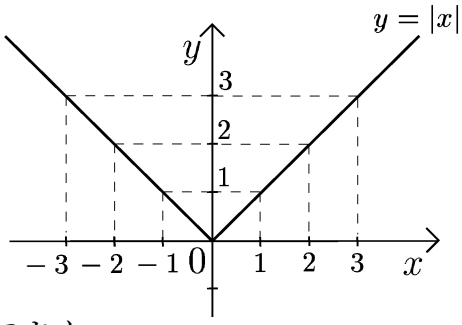
＜ ページ 1. 絶対値 ＞

解答 1

x	-3	-2	-1	0	1	2	3
y	3	2	1	0	1	2	3

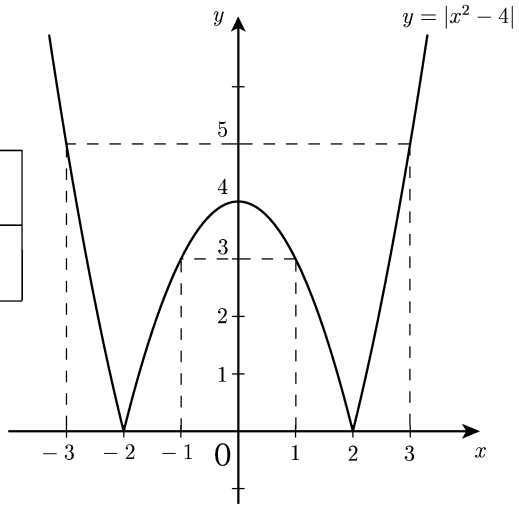


$x \geqq 0$ の範囲では、直線 $y =$ $\boxed{x}$ であり
$x < 0$ の範囲では、直線 $y =$ $\boxed{-x}$ であることから、

$$y = |x| = \begin{cases} \boxed{x} & (x \geqq 0) \\ \boxed{-x} & (x < 0) \end{cases}$$ が分かる。

解答 2

x	-3	-2	-1	0	1	2	3
y	5	0	3	4	3	0	5



$$y = |x^2 - 4| = \begin{cases} \boxed{x^2 - 4} & (\boxed{2} \leqq x) \\ \boxed{-x^2 + 4} & (\boxed{-2} < x < \boxed{2}) \\ \boxed{x^2 - 4} & (x \leqq \boxed{-2}) \end{cases}$$

で、表わされる。グラフをよく見ると、このグラフは 2 次関数

$y =$ $\boxed{x^2 - 4}$

＜ ページ 2. ガウス記号 ＞

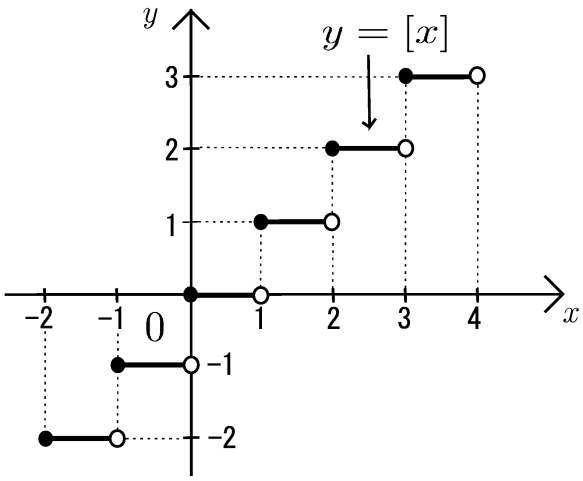
解答 1

(1) $[3.27] = 3$　　(2) $[9.787] = 9$

(3) $[\ 0.9\ ] = 0$　　(4) $[-0.61] = -1$

(5) $[-5.73] = -6$　　(6) $[-1.5\ ] = -2$

解答 2



＜ ページ 3. 左極限・右極限 1 ＞

解答

(1) $\lim_{x \to 3-0} [x] = 2$

(2) $\lim_{x \to 3+0} [x] = 3$

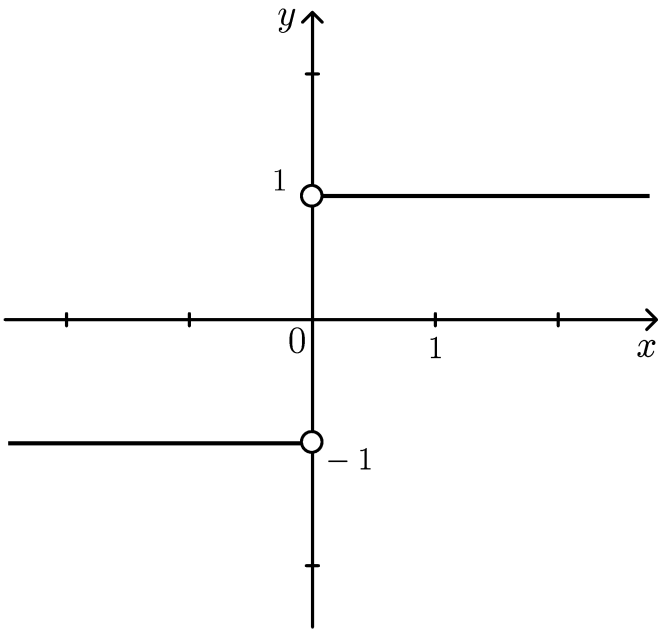
(2) $\lim_{x \to -0} [x] = -1$

(4) $\lim_{x \to +0} [x] = 0$

＜ ページ 4. 左極限・右極限 2 ＞

解答

(1) $\lim_{x \to -0} \dfrac{|x|}{x} = -1$　　(2) $\lim_{x \to +0} \dfrac{|x|}{x} = 1$



＜ ページ 5. 三角関数の極限 1 ＞

解答 1

$$S_1 = \frac{1}{2} \times 1 \times \sin\theta = \frac{\sin\theta}{2}$$

解答 2

$$S_2 = \frac{1}{2} \times 1 \times \tan\theta = \frac{1}{2}\tan\theta$$

解答 3

$$\frac{1}{2}\sin\theta \ < \ \frac{1}{2}\theta \ < \ \frac{1}{2}\tan\theta$$

解答 4

$$\boxed{\sin\theta} \ < \ \theta \ < \ \boxed{\frac{\sin\theta}{\cos\theta}}$$

＜ ページ 6. 三角関数の極限 2 ＞

解答 1

$$(**) \qquad \boxed{1} < \frac{\theta}{\sin\theta} < \boxed{\frac{1}{\cos\theta}}$$

解答 2

$$\lim_{\theta\to+0}\frac{\theta}{\sin\theta} = 1$$

解答 3

$$\lim_{\theta\to+0}\frac{\sin\theta}{\theta} = \lim_{\theta\to+0}\frac{1}{\dfrac{\sin\theta}{\theta}} = \frac{1}{1} = 1$$

解答 4

$$\lim_{x\to0}\frac{\sin x}{x} = 1$$

< ページ 7. 三角関数の極限 3 >

解答

$$\lim_{\theta \to 0} \frac{\cos(x+\theta) - \cos x}{\theta}$$

$$= \lim_{\theta \to 0} \frac{\cos x \cos\theta - \sin x \sin\theta - \cos x}{\theta}$$

$$= \lim_{\theta \to 0} \frac{\cos x(\cos\theta - 1) - \sin x \sin\theta}{\theta}$$

$$= \lim_{\theta \to 0} \left\{ -\left(\frac{1-\cos\theta}{\theta}\right)\cos x - \left(\frac{\sin\theta}{\theta}\right)\sin x \right\}$$

$$= -0 \times \cos x - 1 \times \sin x = -\sin x$$

＜ ページ 8. 三角関数の微分 ＞

解答 1

$$\begin{aligned}(\cos x)' &= \lim_{h\to 0} \frac{\cos(x+h)-\cos x}{h} \\ &= \lim_{\theta\to 0} \frac{\cos(x+\theta)-\cos x}{\theta} \\ &= -\sin x\end{aligned}$$

解答 2

(1) $(5\sin x - 4\cos x)' = 5\times(\sin x)' - 4\times(\cos x)'$

$$= 5\cos x + 4\sin x$$

(2) $(6+3x+x^2-2\sin x+5\cos x)' = 3+2x-2\cos x-5\sin x$

＜ ページ 9．積の微分 1 ＞

解答

$$\Big(f(x) \times g(x)\Big)' = f'(x)g(x) + f(x)g'(x)$$

＜ ページ 10. 積の微分 2 ＞

解答

(1) $(x\sin x)' = (x)' \times \sin x + x \times (\sin x)' = \sin x + x\cos x$

(2) $\left(x^2\cos x\right)' = 2x\cos x - x^2\sin x$

(3) $\left(\sin^2 x\right)' = (\sin x \times \cos x)' = \cos x\sin x + \sin x\cos x$

$= 2\sin x\cos x$

＜ ページ11. 商の微分1 ＞

解答

$$\left(\frac{1}{g(x)}\right)' = -\frac{g'(x)}{\big(g(x)\big)^2}$$

＜ ページ 12. 商の微分 2 ＞

解答

(1) $\left(\dfrac{1}{x}\right)' = -\dfrac{(x)'}{(x)^2} = -\dfrac{1}{x^2}$

(2) $\left(\dfrac{1}{x^2}\right)' = \dfrac{\left(x^2\right)'}{\left(x^2\right)^2} = -\dfrac{2x}{x^4} = -\dfrac{2}{x^3}$

(3) $\left(\dfrac{1}{x^3}\right)' = \dfrac{\left(x^3\right)'}{\left(x^3\right)^2} = -\dfrac{3x^2}{x^6} = -\dfrac{3}{x^4}$

(4) $\left(\dfrac{1}{\cos x}\right)' = -\dfrac{-\sin x}{\cos^2 x} = \dfrac{\sin x}{\cos^2 x}$

＜ ページ 13. 分数関数の微分 ＞

解答

$$(1)\quad \left(\frac{x}{\cos x}\right)' = \left(x \times \frac{1}{\cos x}\right)'$$

$$= 1 \times \frac{1}{\cos x} + x \times \left(-\frac{-\sin x}{\cos^2 x}\right)$$

$$= \frac{\cos x + x \sin x}{\cos^2 x}$$

$$(2)\quad \left(\frac{\cos x}{\sin x}\right)' = \left(\cos x \times \frac{1}{\sin x}\right)'$$

$$= -\sin x \times \frac{1}{\sin x} + \cos x \times \left(-\frac{\cos x}{\sin x}\right)$$

$$= \frac{-\sin^2 x - \cos^2 x}{\sin^2 x}$$

$$= -\frac{1}{\sin^2 x}$$

＜ ページ 14. 速度 ＞

解答 1

$$\frac{f(2)-f(1)}{2-1}=\frac{19.6-4.9}{1}=14.7\ (\mathrm{m/s})$$

解答 2

$$\begin{aligned}f'(2)=\lim_{h\to 0}\frac{f(2+h)-f(2)}{h}&=\lim_{h\to 0}\frac{4.9\times(2+h)^2-4.9\times 2^2}{h}\\&=\lim_{h\to 0}\bigl\{4.9\times(4+h)\bigr\}\\&=19.6\end{aligned}$$

解答 3

$$\begin{aligned}f'(t)=\lim_{h\to 0}\frac{f(t+h)-f(t)}{h}&=\lim_{h\to 0}\frac{4.9\times(t+h)^2-4.9\times t^2}{h}\\&=\lim_{h\to 0}\bigl\{4.9\times(2t+h)\bigr\}\\&=9.8t\end{aligned}$$

＜ ページ 15. 微分記号 ＞

解答

(1) $y = 3x^2 - 4x + 5$ $\qquad \dfrac{dy}{dx} = 6x - 4$

(2) $y = 4 - 9.8t$ $\qquad \dfrac{dy}{dt} = -9.8$

(3) $\ell = 5t^2 - 3t$ $\qquad \dfrac{d\ell}{dt} = 10t - 3$

(4) $S = \pi r^2$ (π は円周率) $\qquad \dfrac{dS}{dr} = 2\pi r$

(5) $V = \dfrac{4}{3}\pi r^3$ $\qquad \dfrac{dV}{dr} = 4\pi r^2$

＜ ページ 16. 増分記号 Δ (デルタ) ＞

解答

(1) $\displaystyle\lim_{\Delta x \to 0} \frac{(x+\Delta x)^5 - x^5}{\Delta x} = \left(x^5\right)' = 5x^4$

(2) $\displaystyle\lim_{\Delta t \to 0} \frac{\sin(t+\Delta t) - \sin(t)}{\Delta t} = (\sin t)' = \cos t$

(3) $\displaystyle\lim_{\Delta u \to 0} \frac{\cos(u+\Delta u) - \cos(u)}{\Delta u} = (\cos u)' = -\sin u$

＜ ページ17. 合成関数 ＞

解答1

(1) $f(x) = x^2 - 3,\ g(x) = 2x$, $g(f(x)) = 2(x^2 - 3)$
, $f(g(x)) = 4x^2 - 3$

(2) $f(x) = \cos x,\ g(x) = 2x + 3$, $g(f(x)) = 2\left(\cos x\right) + 3$
, $f(g(x)) = \cos\left(2x + 3\right)$

(3) $f(x) = \sqrt{x},\ g(x) = x^2 + 1$, $g(f(x)) = x + 1$
, $f(g(x)) = \sqrt{x^2 + 1}$

(4) $f(x) = x^4 + 3,\ g(x) = \log_2 x$, $g(f(x)) = \log_2\left(x^4 + 3\right)$
, $f(g(x)) = \left(\log_2 x\right)^4 + 3$

解答2

(1) $f(x) = \left(x^2 + 2x + 3\right)^5$, $f(x) = x^2 + 2x + 3$
, $g(x) = x^5$

(2) $f(x) = \sin\left(4x + 3\right)$, $f(x) = 4x + 3$
, $g(x) = \sin x$

(3) $f(x) = \sqrt{4 - x^2}$, $f(x) = 4 - x^2$
, $g(x) = \sqrt{x}$

＜ ページ 18. 合成関数の微分 1 ＞

解答

$$(\text{解})\quad \frac{dy}{dx} = \left(\lim_{\Delta u \to 0} \frac{\cos(u+\Delta u) - \cos u}{\Delta u}\right) \times \left(\lim_{\Delta u \to 0} \frac{(x+\Delta x)^4 - x^4}{\Delta x}\right)$$

$$= (\cos u)' \times \left(x^4\right)'$$

$$= -\sin u \times 4x^3$$

$$= -4x^3 \sin\left(x^4\right)$$

＜ ページ 19．合成関数の微分 2 ＞

解答 1

(答) $\boxed{\dfrac{dy}{dx} = \dfrac{dy}{du} \times \dfrac{du}{dx}}$

解答 2

(1) $u = x^2 + 3x - 1$

$$\begin{aligned}\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx} &= \left(u^5\right)' \times (x^2 + 3x - 1)' \\ &= 5u^4 \times (2x + 3) \\ &= 5\left(x^2 + 3 - 1\right)^4 (2x + 3)\end{aligned}$$

(2) $u = 3x + 4$

$$\begin{aligned}\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx} &= (\cos u)' \times (3x + 4)' \\ &= -\sin u \times 3 \\ &= -3\sin(3x + 4)\end{aligned}$$

(3) $u = x^3 + 5x^2$

$$\begin{aligned}\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx} &= (\sin u)' \times (x^3 + 5x^2)' \\ &= \cos u \times (3x^2 + 10x) \\ &= \cos\left(x^3 + 5x^2\right)(3x^2 + 10x)\end{aligned}$$

＜ ページ 20. ネピアの数 1 ＞

解答

$$\lim_{x\to 0}(1+x)^{\frac{1}{x}} = \lim_{n\to\infty}\left(1+\frac{1}{n}\right)^{n} = e$$

＜ ページ 21．ネピアの数 2 ＞

解答

$$(1)\quad \lim_{h\to 0}\frac{e^{3+h}-e^3}{h}=\lim_{h\to 0}\frac{e^3\left(e^h-1\right)}{h}=e^3$$

$$(2)\quad \lim_{h\to 0}\frac{e^{x+h}-e^x}{h}=\lim_{h\to 0}\frac{e^x\left(e^h-1\right)}{h}=e^x$$

＜ ページ 22. 指数関数の微分 ＞

解答 1

(1) $\log e = \log_e e = 1$　　(2) $\log(e^2) = 2$　　(3) $\log 1 = 0$

解答 2

(1) $(3^x)' = 3^x \log 3$　　(2) $(4^x)' = 4^x \log 4$

＜ ページ 23. 逆関数の微分 ＞

解答

(1) $y = \cos^{-1} x \Leftrightarrow x = \cos y$

$$\frac{dy}{dx} = \frac{1}{\dfrac{dx}{dy}} = \frac{1}{(\cos y)'} = \frac{1}{-\sin y} = \frac{1}{-\sqrt{1-\cos^2 y}} = -\frac{1}{\sqrt{1-x^2}}$$

(2) $y = \tan^{-1} x \Leftrightarrow x = \tan y$

$$\frac{dy}{dx} = \frac{1}{\dfrac{dx}{dy}} = \frac{1}{(\tan y)'} = \frac{1}{\dfrac{1}{\cos^2 y}} = \frac{1}{1+\tan^2 y} = \frac{1}{1+x^2}$$

＜ ページ 25. 対数関数の微分 2 ＞

解答 1

(1) $u = x^4 + 3x + 1$

$$\begin{aligned}\frac{dy}{dx} = \frac{dy}{du} \times \frac{du}{dx} &= (\log u)' \times \left(x^4 + 3x + 1\right)' \\ &= \frac{1}{u} \times \left(4x^3 + 3\right) \\ &= \frac{4x^3 + 3}{x^4 + 3x + 1}\end{aligned}$$

(2) $\dfrac{dy}{dx} = \dfrac{\cos x}{2 + \sin x}$

(3) $\dfrac{dy}{dx} = \dfrac{\sin x}{3 - \cos x}$

解答 2

(答) $\boxed{\left(\log\left(f(x)\right)\right)' = \dfrac{f'(x)}{f(x)}}$

＜ ページ 26．対数微分法 ＞

解答 1

(解) $\log y = \log 3^x = x \log 3$

$$\frac{y'}{y} = \log 3 \Rightarrow y' = y \times \log 3 = 3^x \log 3$$

解答 2

(答) $(a^x)' = a^x \log a$

解答 3

(答) $(e^x)' = e^x \log e = e^x$

＜ ページ 27. x^r の微分 ＞

解答

(解) $\log y = r \log x$

$$\frac{y'}{y} = \frac{r}{x} \Rightarrow y' = y \times \frac{r}{x} = x^r \times \frac{r}{x} = rx^{r-1}$$

(答) $(x^r)' = rx^{r-1}$

解答 2

(1) $\left(\sqrt[3]{x^4}\right)' = \left(x^{\frac{4}{3}}\right)' = \frac{4}{3}x^{\frac{1}{3}} = \frac{4}{3}\sqrt[3]{x}$

(2) $(\sqrt{x})' = \left(x^{\frac{1}{2}}\right)' = \frac{1}{2}x^{-\frac{1}{2}} = \frac{1}{2\sqrt{x}}$

(3) $\left(\frac{1}{\sqrt{x}}\right)' = \left(x^{-\frac{1}{2}}\right)' = -\frac{1}{2}x^{-\frac{3}{2}} = -\frac{1}{2x\sqrt{x}}$

(4) $(x\sqrt{x})' = \left(x^{\frac{3}{2}}\right)' = \frac{3}{2}x^{\frac{1}{2}} = \frac{3}{2}\sqrt{x}$

< ページ 28. 微分の練習 >

解答 1

(1) $(k)' = 0$ $(k$ は定数$)$

(2) $(x^r)' = rx^{r-1}$ $(r$ は定数$)$

(3) $(\sin x)' = \cos x$

(4) $(\cos x)' = -\sin x$

(5) $(\tan x)' = \dfrac{1}{\cos^2 x}$

(6) $(\log x)' = \dfrac{1}{x}$

(7) $(a^x)' = a^x \log a$ $(a > 0,\ a \neq 1)$

(8) $(e^x)' = e^x$

(9) $\big(f(x) \times g(x)\big)'$
$= f'(x)g(x) + f(x)g'(x)$ (積の微分)

(10) $\left(\dfrac{1}{g(x)}\right)' = -\dfrac{g'(x)}{(g(x))^2}$
(商の微分)

解答 2

(1) $y = e^{-x^2}$ $\qquad \dfrac{dy}{dx} = -2xe^{-x^2}$

(2) $y = (2 + \sin x)^4$ $\qquad \dfrac{dy}{dx} = 4\cos x(2 + \sin x)^3$

< ページ 29. $\log|x|$ の微分 >

解答

(1) $y = \log|\sin x|$, $\dfrac{dy}{dx} = \dfrac{\cos x}{\sin x}$

(2) $y = \log|x^3 - 3x|$, $\dfrac{dy}{dx} = \dfrac{3x^2 - 3}{x^3 - 3x}$

(3) $y = \log|f(x)|$, $\dfrac{dy}{dx} = \dfrac{f'(x)}{f(x)}$

＜ ページ 30. 原始関数 ＞

解答

(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 $= \dfrac{1}{7}x^7 + C$

＜ ページ 31．不定積分 1 ＞

解答 1

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

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

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

解答 2

$$\int x^n dx = \frac{1}{n+1}x^{n+1} + C$$

解答 3

$$n \neq -1$$

＜ ページ 32. 不定積分 2 ＞

解答 1

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

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

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

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

解答 2

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

＜ ページ 33. 不定積分 3 ＞

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

解答 2

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

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

＜ ページ 34. 不定積分 4 ＞

解答 1

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

(3) $\displaystyle\int \left(6x^2 - 8x + 1\right) dx = 2x^3 - 4x^2 + x + C$

解答 2

$$\int \left(6x^2 - 6x - 3\right) dx + 2\int \left(-3x^2 + 4x - 1\right) dx$$

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

$$= \int (2x - 5)\,dx = x^2 - 5x + C$$

＜ ページ 35．不定積分 5 ＞

解答 1

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

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

解答 2

$$(1)\quad \int (ax+b)^3 dx = \frac{1}{4a}(ax+b)^4 + C$$

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

解答 3

$$(1)\quad \int \sqrt{4x-3}\,dx = \int (4x-3)^{\frac{1}{2}} dx = \frac{1}{4\left(\frac{1}{2}+1\right)}(4x-3)^{\frac{3}{2}} + C$$
$$= \frac{1}{6}(4x-3)\sqrt{4x-3} + C$$

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

＜ ページ 36．不定積分 6 ＞

解答 1

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

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

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

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

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

< ページ 37. 積分記号 >

解答

(1) $\displaystyle\int (10 - 9.8t)dt = 10t - 4.9t^2 + C$

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

＜ ページ38. 置換積分法1 ＞

解答

(1) $u = x^4$

$$\int \cos\left(x^4\right) \times 4x^3 dx = \int \cos(u)\frac{du}{dx}dx = \int \cos u du = \sin u + C$$

$$= \sin\left(x^4\right) + C$$

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

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

＜ ページ 39. 置換積分法 2 ＞

解答 1

(1) $\displaystyle\int \sin\bigl(x^3\bigr) \times 3x^2 dx = -\cos\bigl(x^3\bigr) + C$

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

解答 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) $\displaystyle\int \bigl\{g(x)\bigr\}^n \times g'(x) dx = \frac{1}{n+1}\bigl\{g(x)\bigr\}^{n+1} + C$

解答 3

$u = g(x)$

$$\int f\bigl(g(x)\bigr) \times g'(x) dx = \int f(u)\frac{du}{dx} dx = \int f(u) du$$

＜ ページ 40. 置換積分法 3 ＞

解答

(1) $\displaystyle\int x\left(x^2+1\right)^5 dx = \frac{1}{12}(x^2+1)^6 + C$

(2) $\displaystyle\int x^3 \cos\left(x^4+6\right) dx = \frac{1}{4}\sin\left(x^4+6\right) + C$

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

(4) $\displaystyle\int \tan x dx = \int \frac{\sin x}{\cos x} dx = -\log|\cos x| + C$