

1. 微分 2 $(f^n)' = n \cdot f' \cdot f^{n-1}$ まで

$(f^2)' = 2f'f$ の確認

$$(1) \quad \{(2x-4)^2\}' = \{(2x-4)(2x-4)\}' \\ = (2x-4)'(2x-4) + (2x-4)(2x-4)' = 2(2x-4)'(2x-4) =$$

$$(2) \quad \{(3x^2-4)^2\}' = (\text{略}) = 2(3x^2-4)'(3x^2-4) =$$

$$(3) \quad \{(2x^2-10x)^2\}' = (\text{略}) = 2(2x^2-10x)'(2x^2-10x) =$$

$$(4) \quad \{(2x-9)^2\}' =$$

$$(5) \quad \{(x^2+10)^2\}' =$$

$$(6) \quad \{(3x^2-8x)^2\}' =$$

$$(7) \quad \{(x^3-6x^2)^2\}' =$$

$(f^2)'$ の結果を用いて、 $(f^3)'$ を求める

$$(8) \quad \{(x+1)^3\}' = \{(x+1)(x+1)^2\}' \\ = (x+1)'(x+1)^2 + (x+1)\{(x+1)^2\}' \\ = (x+1)'(x+1)^2 + (x+1)\{2(x+1)'(x+1)\} \\ = 3(x+1)'(x+1)^2 \\ =$$

同様に繰り返し $(f^4)' = 4f'f^3, (f^5)' = 5f'f^4, \dots, (f^n)' = nf'f^{n-1}$

$$(9) \quad \{(3x-6)^4\}' = 4(3x-6)'(3x-6)^3 \quad (10) \quad \{(4x^3+6)^9\}' = 9(4x^3+6)'(4x^3+6)^8 \\ = \quad =$$

$$(11) \quad \{(x^3-9)^4\}' =$$

$$(12) \quad \{(x^3-9)^3\}' =$$

$$(13) \quad \{(x^3-7x)^4\}' =$$

$$(14) \quad \{(x-4)^3\}' =$$

$$(15) \quad \{(2x^3+398)^2\}' =$$

$$(16) \quad \{(x^2+2)^{20}\}' =$$

$$(17) \quad \{(-2x^4-114)^2\}' =$$

$$(18) \quad \{(-3x^5-333)^4\}' =$$

2. 微分 2 $(f^n)' = n \cdot f' \cdot f^{n-1}$ まで

$(f^2)' = 2f'f$ の確認

$$(1) \quad \{(x+2)^2\}' = \{(x+2)(x+2)\}' \\ = (x+2)'(x+2) + (x+2)(x+2)' = 2(x+2)'(x+2) =$$

$$(2) \quad \{(2x^2+4)^2\}' = (\text{略}) = 2(2x^2+4)'(2x^2+4) =$$

$$(3) \quad \{(2x^2-5x)^2\}' = (\text{略}) = 2(2x^2-5x)'(2x^2-5x) =$$

$$(4) \quad \{(x^2-4)^2\}' =$$

$$(5) \quad \{(x^3-6x^2)^2\}' =$$

$$(6) \quad \{(x^2+8x)^2\}' =$$

$$(7) \quad \{(x^3+5)^2\}' =$$

$(f^2)'$ の結果を用いて、 $(f^3)'$ を求める

$$(8) \quad \{(3x-4)^3\}' = \{(3x-4)(3x-4)^2\}' \\ = (3x-4)'(3x-4)^2 + (3x-4)\{(3x-4)^2\}' \\ = (3x-4)'(3x-4)^2 + (3x-4)\{2(3x-4)'(3x-4)\} \\ = 3(3x-4)'(3x-4)^2 \\ =$$

同様に繰り返し $(f^4)' = 4f'f^3, (f^5)' = 5f'f^4, \dots, (f^n)' = nf'f^{n-1}$

$$(9) \quad \{(x-1)^4\}' = 4(x-1)'(x-1)^3 \quad (10) \quad \{(3x^8-7)^{20}\}' = 20(3x^8-7)'(3x^8-7)^{19} \\ = \quad =$$

$$(11) \quad \{(3x^3-3)^4\}' =$$

$$(12) \quad \{(x^2-3)^4\}' =$$

$$(13) \quad \{(2x^2+10)^3\}' =$$

$$(14) \quad \{(x-8)^4\}' =$$

$$(15) \quad \{(x-7)^{10}\}' =$$

$$(16) \quad \{(2x^4-1)^7\}' =$$

$$(17) \quad \{(-2x+365)^9\}' =$$

$$(18) \quad \{(x+10)^5\}' =$$

3. 微分 2 $(f^n)' = n \cdot f' \cdot f^{n-1}$ まで

$(f^2)' = 2f'f$ の確認

$$(1) \quad \{(3x-6)^2\}' = \{(3x-6)(3x-6)\}' \\ = (3x-6)'(3x-6) + (3x-6)(3x-6)' = 2(3x-6)'(3x-6) =$$

$$(2) \quad \{(x^2-5)^2\}' = (\text{略}) = 2(x^2-5)'(x^2-5) =$$

$$(3) \quad \{(3x^2+4x)^2\}' = (\text{略}) = 2(3x^2+4x)'(3x^2+4x) =$$

$$(4) \quad \{(3x+6)^2\}' =$$

$$(5) \quad \{(2x^3+3)^2\}' =$$

$$(6) \quad \{(3x^2+8)^2\}' =$$

$$(7) \quad \{(2x^3-4x^2)^2\}' =$$

$(f^2)'$ の結果を用いて、 $(f^3)'$ を求める

$$(8) \quad \{(2x-7)^3\}' = \{(2x-7)(2x-7)^2\}' \\ = (2x-7)'(2x-7)^2 + (2x-7)\{(2x-7)^2\}' \\ = (2x-7)'(2x-7)^2 + (2x-7)\{2(2x-7)'(2x-7)\} \\ = 3(2x-7)'(2x-7)^2 \\ =$$

同様に繰り返し $(f^4)' = 4f'f^3, (f^5)' = 5f'f^4, \dots, (f^n)' = nf'f^{n-1}$

$$(9) \quad \{(2x-5)^4\}' = 4(2x-5)'(2x-5)^3 \quad (10) \quad \{(-x-8)^9\}' = 9(-x-8)'(-x-8)^8 \\ = \quad =$$

$$(11) \quad \{(x^3-x)^4\}' =$$

$$(12) \quad \{(2x^3+9)^4\}' =$$

$$(13) \quad \{(3x+4)^3\}' =$$

$$(14) \quad \{(2x^3+7)^3\}' =$$

$$(15) \quad \{(-2x^{100}-6)^4\}' =$$

$$(16) \quad \{(x^3+1)^4\}' =$$

$$(17) \quad \{(x^2+5)^2\}' =$$

$$(18) \quad \{(2x^2+3)^{20}\}' =$$

4. 微分 2 $(f^n)' = n \cdot f' \cdot f^{n-1}$ まで

$(f^2)' = 2f'f$ の確認

$$\begin{aligned} \text{(1)} \quad \{(3x+8)^2\}' &= \{(3x+8)(3x+8)\}' \\ &= (3x+8)'(3x+8) + (3x+8)(3x+8)' = 2(3x+8)'(3x+8) = \end{aligned}$$

$$\text{(2)} \quad \{(x^2+7)^2\}' = (\text{略}) = 2(x^2+7)'(x^2+7) =$$

$$\text{(3)} \quad \{(2x^2+4x)^2\}' = (\text{略}) = 2(2x^2+4x)'(2x^2+4x) =$$

$$\text{(4)} \quad \{(x^2-9x)^2\}' =$$

$$\text{(5)} \quad \{(3x^2+3)^2\}' =$$

$$\text{(6)} \quad \{(x+3)^2\}' =$$

$$\text{(7)} \quad \{(3x^3+7x^2)^2\}' =$$

$(f^2)'$ の結果を用いて、 $(f^3)'$ を求める

$$\begin{aligned} \text{(8)} \quad \{(2x-3)^3\}' &= \{(2x-3)(2x-3)^2\}' \\ &= (2x-3)'(2x-3)^2 + (2x-3)\{(2x-3)^2\}' \\ &= (2x-3)'(2x-3)^2 + (2x-3)\{2(2x-3)'(2x-3)\} \\ &= 3(2x-3)'(2x-3)^2 \\ &= \end{aligned}$$

同様に繰り返し $(f^4)' = 4f'f^3, (f^5)' = 5f'f^4, \dots, (f^n)' = nf'f^{n-1}$

$$\begin{aligned} \text{(9)} \quad \{(2x+10)^4\}' &= 4(2x+10)'(2x+10)^3 & \text{(10)} \quad \{(3x^9+7)^6\}' &= 6(3x^9+7)'(3x^9+7)^5 \\ &= & &= \end{aligned}$$

$$\text{(11)} \quad \{(x^3+1)^4\}' =$$

$$\text{(12)} \quad \{(2x^3-8)^3\}' =$$

$$\text{(13)} \quad \{(x^4-2x^2)^3\}' =$$

$$\text{(14)} \quad \{(x^2-7)^4\}' =$$

$$\text{(15)} \quad \{(x^{10}+4)^{10}\}' =$$

$$\text{(16)} \quad \{(4x^9+412)^5\}' =$$

$$\text{(17)} \quad \{(-3x^4+8)^5\}' =$$

$$\text{(18)} \quad \{(2x^{100}-8)^2\}' =$$

5. 微分 2 $(f^n)' = n \cdot f' \cdot f^{n-1}$ まで

$(f^2)' = 2f'f$ の確認

$$(1) \quad \{(2x+6)^2\}' = \{(2x+6)(2x+6)\}' \\ = (2x+6)'(2x+6) + (2x+6)(2x+6)' = 2(2x+6)'(2x+6) =$$

$$(2) \quad \{(3x^2+7)^2\}' = (\text{略}) = 2(3x^2+7)'(3x^2+7) =$$

$$(3) \quad \{(x^2+8x)^2\}' = (\text{略}) = 2(x^2+8x)'(x^2+8x) =$$

$$(4) \quad \{(2x^2+8)^2\}' =$$

$$(5) \quad \{(2x^3-3)^2\}' =$$

$$(6) \quad \{(3x^3+x^2)^2\}' =$$

$$(7) \quad \{(2x^2+2x)^2\}' =$$

$(f^2)'$ の結果を用いて、 $(f^3)'$ を求める

$$(8) \quad \{(3x-8)^3\}' = \{(3x-8)(3x-8)^2\}' \\ = (3x-8)'(3x-8)^2 + (3x-8)\{(3x-8)^2\}' \\ = (3x-8)'(3x-8)^2 + (3x-8)\{2(3x-8)'(3x-8)\} \\ = 3(3x-8)'(3x-8)^2 \\ =$$

同様に繰り返し $(f^4)' = 4f'f^3, (f^5)' = 5f'f^4, \dots, (f^n)' = nf'f^{n-1}$

$$(9) \quad \{(2x-6)^4\}' = 4(2x-6)'(2x-6)^3 \quad (10) \quad \{(3x-4)^9\}' = 9(3x-4)'(3x-4)^8 \\ = \quad =$$

$$(11) \quad \{(2x^3+2)^4\}' =$$

$$(12) \quad \{(2x+2)^3\}' =$$

$$(13) \quad \{(3x^2-1)^4\}' =$$

$$(14) \quad \{(3x^3-x)^4\}' =$$

$$(15) \quad \{(-2x^2-8)^3\}' =$$

$$(16) \quad \{(3x^3-400)^9\}' =$$

$$(17) \quad \{(3x^5-9)^5\}' =$$

$$(18) \quad \{(x^3+9)^7\}' =$$

6. 微分 2 $(f^n)' = n \cdot f' \cdot f^{n-1}$ まで

$(f^2)' = 2f'f$ の確認

$$\begin{aligned} \text{(1)} \quad \{(3x+9)^2\}' &= \{(3x+9)(3x+9)\}' \\ &= (3x+9)'(3x+9) + (3x+9)(3x+9)' = 2(3x+9)'(3x+9) = \end{aligned}$$

$$\text{(2)} \quad \{(x^2-10)^2\}' = (\text{略}) = 2(x^2-10)'(x^2-10) =$$

$$\text{(3)} \quad \{(x^2+10x)^2\}' = (\text{略}) = 2(x^2+10x)'(x^2+10x) =$$

$$\text{(4)} \quad \{(3x^2-8)^2\}' =$$

$$\text{(5)} \quad \{(3x^2+9x)^2\}' =$$

$$\text{(6)} \quad \{(3x^3+7x^2)^2\}' =$$

$$\text{(7)} \quad \{(3x+5)^2\}' =$$

$(f^2)'$ の結果を用いて、 $(f^3)'$ を求める

$$\begin{aligned} \text{(8)} \quad \{(3x-3)^3\}' &= \{(3x-3)(3x-3)^2\}' \\ &= (3x-3)'(3x-3)^2 + (3x-3)\{(3x-3)^2\}' \\ &= (3x-3)'(3x-3)^2 + (3x-3)\{2(3x-3)'(3x-3)\} \\ &= 3(3x-3)'(3x-3)^2 \\ &= \end{aligned}$$

同様に繰り返し $(f^4)' = 4f'f^3, (f^5)' = 5f'f^4, \dots, (f^n)' = nf'f^{n-1}$

$$\begin{aligned} \text{(9)} \quad \{(x-5)^4\}' &= 4(x-5)'(x-5)^3 & \text{(10)} \quad \{(2x^7+3)^{10}\}' &= 10(2x^7+3)'(2x^7+3)^9 \\ &= & &= \end{aligned}$$

$$\text{(11)} \quad \{(x^3+3)^3\}' =$$

$$\text{(12)} \quad \{(2x^3+2)^4\}' =$$

$$\text{(13)} \quad \{(x^2-3)^3\}' =$$

$$\text{(14)} \quad \{(x^4-8x^2)^3\}' =$$

$$\text{(15)} \quad \{(-x^6+936)^{100}\}' =$$

$$\text{(16)} \quad \{(3x^2-6)^2\}' =$$

$$\text{(17)} \quad \{(-2x^3-8)^2\}' =$$

$$\text{(18)} \quad \{(2x+3)^7\}' =$$