

解答

1. (1)  $y' = 4x$  (2)  $y' = 9x^2 - 4x$   
 (3)  $y' = 4x + 1$  (4)  $4x - 5$   
 (5)  $y' = \frac{5}{(x+1)^2}$  (6)  $y' = -\frac{1}{(x-4)^2}$
2. (1)  $-\frac{4}{x^5}$  (2)  $\frac{3}{2}\sqrt{x}$   
 (3)  $\frac{1}{3\sqrt[3]{x^2}}$  (4)  $8(2x+1)^3$   
 (5)  $\frac{25}{2}(5x-1)^{\frac{3}{2}}$  (6)  $-\frac{12}{(4x-3)^4}$

解説

1. (1)  $y' = 2(x^2)' = 2 \cdot 2x = 4x$   
 (2)  $y' = 3(x^3)' - 2(x^2)' + (5)' = 9x^2 - 4x$   
 (3)  $y' = (x-2)'(2x+5) + (x-2)(2x+5)'$   
 $= 1 \cdot (2x+5) + (x-2) \cdot 2 = 4x + 1$   
 (4)  $y' = (2x+1)'(x-3) + (2x+1)(x-3)'$   
 $= 2 \cdot (x-3) + (2x+1) \cdot 1 = 4x - 5$   
 (5)  $y' = \frac{(2x-3)'(x+1) - (2x-3)(x+1)'}{(x+1)^2}$   
 $= \frac{2 \cdot (x+1) - (2x-3) \cdot 1}{(x+1)^2} = \frac{5}{(x+1)^2}$   
 (6)  $y' = \frac{(1)'(x-4) - 1 \cdot (x-4)'}{(x-4)^2}$   
 $= \frac{0 \cdot (x-4) - 1 \cdot 1}{(x-4)^2} = -\frac{1}{(x-4)^2}$   
 または  $y' = -\frac{(x-4)'}{(x-4)^2} = -\frac{1}{(x-4)^2}$
2. (1) 教科書 p.18 例7のように  
 $y' = (x^{-4})' = -4x^{-5} = -\frac{4}{x^5}$   
 (2) 教科書 p.19 式(9)のように有理数  $r$  について  
 $(x^r)' = rx^{r-1}$  が成り立つことを用いて  
 $y' = \frac{3}{2}x^{\frac{3}{2}-1} = \frac{3}{2}x^{\frac{1}{2}} = \frac{3}{2}\sqrt{x}$   
 (3) 教科書 p.19 例8のように  
 $y' = (x^{\frac{1}{3}})' = \frac{1}{3}x^{\frac{1}{3}-1} = \frac{1}{3}x^{-\frac{2}{3}} = \frac{1}{3\sqrt[3]{x^2}}$   
 (4) 教科書 p.20 例9のように  $(x^4)' = 4x^3$  より  
 $y' = \{(2x+1)^4\}' = 2 \cdot 4(2x+1)^3 = 8(2x+1)^3$   
 (5)  $(x^{\frac{5}{2}})' = \frac{5}{2}x^{\frac{3}{2}}$  より  
 $y' = \{(5x-1)^{\frac{5}{2}}\}' = 5 \cdot \frac{5}{2}(5x-1)^{\frac{3}{2}}$   
 $= \frac{25}{2}(5x-1)^{\frac{3}{2}} \left( = \frac{25}{2}\sqrt{(5x-1)^3} \right)$   
 (6)  $(\frac{1}{x^3})' = -\frac{3}{x^4}$  より  
 $y' = \left\{ \frac{1}{(4x-3)^3} \right\}'$   
 $= 4 \cdot \left\{ -\frac{3}{(4x-3)^4} \right\} = -\frac{12}{(4x-3)^4}$