

27)  $f(x) = (5x^2 + 2x^3)^3$   
 $g = 5x^2 + 2x^3$

$$\left. \begin{aligned} f(g) &= g^3 \rightarrow f'(g) = 3g^2 \\ g(x) &= 5x^2 + 2x^3 \rightarrow g'(x) = 10x + 6x^2 \end{aligned} \right\} \times h'(x) = 3g^2(10x + 6x^2)$$

$$= 3(5x^2 + 2x^3)^2(10x + 6x^2)$$

$$= \underline{(5x^2 + 2x^3)^2(30x + 18x^2)}_{/4}$$

28)  $h(x) = \sqrt{8x^5 + 9x + 100}$   
 $g = 8x^5 + 9x + 100$

$$\left. \begin{aligned} f(g) &= \sqrt{g} = g^{1/2} \rightarrow f'(g) = \frac{1}{2}g^{-1/2} = \frac{1}{2\sqrt{g}} \\ g(x) &= 8x^5 + 9x + 100 \rightarrow g'(x) = 40x^4 + 9 \end{aligned} \right\} \times h'(x) = \frac{1}{2\sqrt{g}} \cdot (40x^4 + 9)$$

$$= \underline{\frac{40x^4 + 9}{2\sqrt{8x^5 + 9x + 100}}}_{/4}$$

29)  $h(x) = \sqrt[4]{8x-1}$   
 $g = 8x-1$

$$\left. \begin{aligned} f(g) &= \sqrt[4]{g} = g^{1/4} \rightarrow f'(g) = \frac{1}{4}g^{-3/4} = \frac{1}{4\sqrt[4]{g^3}} \\ g(x) &= 8x-1 \rightarrow g'(x) = 8 \end{aligned} \right\} \times h'(x) = \frac{1}{4\sqrt[4]{g^3}} \cdot 8$$

$$= \underline{\frac{8 \cdot 2}{4\sqrt[4]{8x-1}} = \frac{2}{\sqrt[4]{8x-1}}}_{/4}$$

31)  $h(x) = 10^{x^2}$   
 $g = x^2$

$f(x) = a^x \Rightarrow f'(x) = a^x \ln(a)$

$$\left. \begin{aligned} f(g) &= 10^g \rightarrow f'(g) = 10^g \ln(10) \\ g(x) &= x^2 \rightarrow g'(x) = 2x \end{aligned} \right\} \times h'(x) = 10^g \ln(10) \cdot 2x$$

$$= \underline{10^{x^2} \cdot \ln(10) \cdot 2x}_{/4}$$

32)  $h(x) = e^{x^2}$   
 $g = x^2$

$f(x) = e^x \Rightarrow f'(x) = e^x$

$$\left. \begin{aligned} f(g) &= e^g \rightarrow f'(g) = e^g \\ g(x) &= x^2 \rightarrow g'(x) = 2x \end{aligned} \right\} \times h'(x) = e^g \cdot 2x$$

$$= \underline{e^{x^2} \cdot 2x}_{/4}$$

34)  $f(x) = \ln(5x)$   
 $g = 5x$

$$\begin{aligned} f(x) &= \ln(x) \\ \downarrow \\ f'(x) &= \frac{1}{x} \end{aligned}$$

$$\left. \begin{aligned} f(g) &= \ln(g) \rightarrow f'(g) = \frac{1}{g} \\ g(x) &= 5x \rightarrow g'(x) = 5 \end{aligned} \right\} \times h'(x) = \frac{1}{g} \cdot 5 = \frac{\cancel{5}}{5x} = \frac{1}{x}$$

35)  $h(x) = \log_3(5x)$   
 $g = 5x$

$$\begin{aligned} f(x) &= \log_a(x) \\ \downarrow \\ f'(x) &= \frac{1}{x \ln(a)} \end{aligned}$$

$$\left. \begin{aligned} f(g) &= \log_3(g) \rightarrow f'(g) = \frac{1}{g \ln(3)} \\ g(x) &= 5x \rightarrow g'(x) = 5 \end{aligned} \right\} \times h'(x) = \frac{1}{g \ln(3)} \cdot 5 = \frac{\cancel{5}}{5x \cdot \ln(3)} \\ = \frac{1}{x \ln(3)}$$

36)  $h(x) = \log_7(7x)$   
 $g = 7x$

$$\left. \begin{aligned} f(g) &= \log_7(g) \rightarrow f'(g) = \frac{1}{g \ln(7)} \\ g(x) &= 7x \rightarrow g'(x) = 7 \end{aligned} \right\} \times h'(x) = \frac{1}{g \ln(7)} \cdot 7 = \frac{\cancel{7}}{7x \ln(7)} \\ = \frac{1}{x \ln(7)}$$