

$$\begin{aligned}
 \underline{6} \quad f(x) &= (3x+2)^4 (4x-1)^{-3} \\
 f'(x) &= (3x+2)^4 \frac{d}{dx} (4x-1)^{-3} + (4x-1)^{-3} \frac{d}{dx} (3x+2)^4 \\
 &= (3x+2)^4 (-3) (4x-1)^{-4} \cdot 4 + (4x-1)^{-3} \cdot 4(3x+2)^3 \cdot 3 \\
 &= -12 \frac{(3x+2)^4}{(4x-1)^4} + 12 \frac{(3x+2)^3}{(4x-1)^3} \\
 &= 12 \cdot \frac{(3x+2)^3}{(4x-1)^3} \left[ 1 - \frac{(3x+2)}{(4x-1)} \right] \\
 &= \frac{12(3x+2)^3}{(4x-1)^3} \cdot \frac{x-3}{(4x-1)} = \boxed{\frac{12(3x+2)^3(x-3)}{(4x-1)^4}}
 \end{aligned}$$

$$\begin{aligned}
 \underline{7} \quad f(x) &= (4x^2 - 7x + 8) e^{-3x} \\
 f'(x) &= (4x^2 - 7x + 8) \cdot \frac{d}{dx} e^{-3x} + e^{-3x} \frac{d}{dx} (4x^2 - 7x + 8) \\
 &= \boxed{(4x^2 - 7x + 8) \cdot (-3)e^{-3x} + e^{-3x} (8x - 7)}
 \end{aligned}$$

$$\begin{aligned}
 \underline{8} \quad f(x) &= -4^{10x^2-1} \\
 f'(x) &= -4^{10x^2-1} \cdot \ln 4 \cdot \frac{d}{dx} (10x^2-1) = \boxed{-4^{10x^2-1} \cdot \ln 4 (20x)}
 \end{aligned}$$

$$\begin{aligned}
 \underline{9} \quad f(x) &= 3 \cdot 9^{\sqrt{x-5}} \\
 f'(x) &= 3 \cdot 9^{\sqrt{x-5}} \cdot \ln 9 \cdot \frac{d}{dx} (\sqrt{x-5}) \\
 &= \boxed{3 \cdot 9^{\sqrt{x-5}} \cdot \ln 9 \cdot \left( \frac{1}{2\sqrt{x-5}} \right)}
 \end{aligned}$$

$$\begin{aligned}
 \underline{10} \quad f(x) &= \ln(4x^3+5x)^{9/5} = \frac{9}{5} \ln(4x^3+5x) \\
 f'(x) &= \frac{9}{5} \cdot \frac{1}{4x^3+5x} \cdot \frac{d}{dx} (4x^3+5x) \\
 &= \boxed{\frac{9}{5} \frac{12x^2+5}{4x^3+5x}}
 \end{aligned}$$