

$$\textcircled{1} f(x) = x^2(2x+5)$$

$$\begin{aligned} f'(x) &= 2 \cdot x^2 + 2x(2x+5) \\ &= 2x^2 + 4x^2 + 10x \\ &= \boxed{6x^2 + 10x} \end{aligned}$$

$$\textcircled{2} f(x) = (2x-3)^3$$

$$\begin{aligned} f'(x) &= 3(2x-3)^2 \cdot 2 \\ &= \boxed{6(2x-3)^2} \end{aligned}$$

$$\textcircled{3} y = \frac{2x-1}{x^2+1}$$

$$\begin{aligned} y' &= \frac{2(x^2+1) - 2x(2x-1)}{(x^2+1)^2} \\ &= \frac{2x^2 + 2 - 4x^2 + 2x}{(x^2+1)^2} \end{aligned}$$

$$= \boxed{\frac{-2x^2 + 2x + 2}{(x^2+1)^2}}$$

$$\textcircled{4} y = (3x^2 - 2x + 1)(2x - 1)$$

$$\begin{aligned} y' &= 2(3x^2 - 2x + 1) + (6x - 2)(2x - 1) \\ &= 6x^2 - 4x + 2 + 12x^2 - 10x + 2 \\ &= \boxed{18x^2 - 14x + 4} \end{aligned}$$

$$\textcircled{5} f(x) = (3-4x)^4$$

$$\begin{aligned} f'(x) &= 4(3-4x)^3 \cdot -4 \\ &= \boxed{-16(3-4x)^3} \end{aligned}$$

$$\textcircled{6} g(x) = (2x^2 + 3x - 2)^2$$

$$g'(x) = \boxed{2(2x^2 + 3x - 2)(4x + 3)}$$

$$\textcircled{7} y = \frac{x^2}{x-1}$$

$$\begin{aligned} y' &= \frac{2x(x-1) - x^2}{(x-1)^2} \\ &= \frac{2x^2 - 2x - x^2}{(x-1)^2} \\ &= \boxed{\frac{x^2 - 2x}{(x-1)^2}} \end{aligned}$$

$$\textcircled{8} y = (1+x^2)^{\frac{1}{2}}$$

$$y' = \frac{1}{2}(1+x^2)^{-\frac{1}{2}} \cdot 2x = \boxed{\frac{x}{\sqrt{1+x^2}}}$$

$$\textcircled{9} y = \sqrt{2x-1}$$

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

$$y' = \frac{1}{2}(2x-1)^{-\frac{1}{2}} \cdot 2 = \boxed{\frac{1}{\sqrt{2x-1}}}$$

$$\textcircled{10} y = (x-1)^3(x^2+1)$$

$$\begin{aligned} y' &= (x-1)^3 \cdot 2x + 3(x-1)^2(x^2+1) \\ &= (x-1)^2 [2x(x-1) + 3(x^2+1)] \\ &= (x-1)^2 (2x^2 - 2x + 3x^2 + 3) \\ &= \boxed{(x-1)^2 (5x^2 - 2x + 3)} \end{aligned}$$