

$$\textcircled{2} f(x) = \frac{1}{2}x^6 + 3x^2$$

$$f'(x) = \frac{1}{2} \cdot 6x^5 + 3 \cdot 2x^1$$

$$\boxed{f'(x) = 3x^5 + 6x}$$

$$\textcircled{4} f(x) = \frac{1}{x} + x = x^{-1} + x$$

$$f'(x) = -1 \cdot x^{-2} + 1$$

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

$$\textcircled{8} f(x) = \sqrt{x} + x^7 = x^{\frac{1}{2}} + x^7$$

$$f'(x) = \frac{1}{2}x^{\frac{1}{2}-1} + 7x^6 = \frac{1}{2}x^{-\frac{1}{2}} + 7x^6 = \frac{1}{2x^{\frac{1}{2}}} + 7x^6$$

$$\boxed{f'(x) = \frac{1}{2\sqrt{x}} + 7x^6}$$

$$\textcircled{12} f(x) = \sqrt{\frac{5}{2x}} = \frac{\sqrt{5}}{\sqrt{2}\sqrt{x}} = \frac{\sqrt{5}}{\sqrt{2}}x^{-\frac{1}{2}}$$

$$f'(x) = \frac{\sqrt{5}}{\sqrt{2}} \left( -\frac{1}{2}x^{-\frac{1}{2}-1} \right) = \frac{\sqrt{5}}{\sqrt{2}} \left( -\frac{1}{2}x^{-\frac{3}{2}} \right)$$

$$= -\frac{\sqrt{5}}{2\sqrt{2}}x^{-\frac{3}{2}} = -\frac{\sqrt{5}}{2\sqrt{2}x^{\frac{3}{2}}}$$

$$\boxed{f'(x) = -\frac{\sqrt{5}}{2\sqrt{2}\sqrt{x^3}}}$$