

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{f(x+\Delta x) - f(x)}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{2(x+\Delta x)^2 - 3(x+\Delta x) - (2x^2 - 3x)}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{2x^2 + 4x\Delta x + 2\Delta x^2 - 3x - 3\Delta x - 2x^2 + 3x}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{\Delta x(4x + 2\Delta x - 3)}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} 4x + 2\Delta x - 3$$

$$f'(x) = 4x - 3$$

$$\textcircled{2} f(x) = x^2 + 5x + 1 \quad f'(x) = \lim_{\Delta x \rightarrow 0} \frac{f(x+\Delta x) - f(x)}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{(x+\Delta x)^2 + 5(x+\Delta x) + 1 - (x^2 + 5x + 1)}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{x^2 + 2x\Delta x + \Delta x^2 + 5x + 5\Delta x + 1 - x^2 - 5x - 1}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{2x\Delta x + \Delta x^2 + 5\Delta x}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{\Delta x(2x + \Delta x + 5)}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} 2x + \Delta x + 5$$

$$f'(x) = 2x + 5$$

$$\textcircled{1} f(x) = \frac{(x+4)^2}{\sqrt{x+3}}$$

قاعدة اولى / 0²

$$f(x) = \frac{(x+4)^2}{x^{1/2} + 3}$$

$$f'(x) = \frac{(x^{1/2} + 3) * 2(x+4) * 1 - (x+4)^2 * \frac{1}{2} x^{-1/2}}{(x^{1/2} + 3)^2}$$

$$\textcircled{2} f(x) = 4x\sqrt{x-1}$$

$$f(x) = \underbrace{4x}_{(1)} \underbrace{(x-1)^{1/2}}_{(2)}$$

$$f'(x) = 4x * \frac{1}{2}(x-1)^{-1/2} * 1 + (x-1)^{1/2} * 4$$

$$\textcircled{1} \int \frac{1}{x^2 - x} dx$$

جواب، 108

$$\int \frac{1}{x^2} dx - \int \frac{1}{x} dx$$

$$\int x^{-2} dx - \int \frac{1}{x} dx$$

$$\frac{x^{-1}}{-1} - \ln(x) + C$$

$$\textcircled{2} \int (5x^4 - 3x^2 + 2x^{-3} + 2) dx$$

$$\int 5x^4 dx - \int 3x^2 dx + \int 2x^{-3} dx + \int 2 dx$$

$$5 \int x^4 dx - 3 \int x^2 dx + 2 \int x^{-3} dx + 2 \int dx$$

$$5 \frac{x^5}{5} - 3 \frac{x^3}{3} + 2 \frac{x^{-2}}{-2} + 2x + C$$

$$x^5 - x^3 - x^{-2} + 2x + C$$

$$\textcircled{1} \int e^{2x+3} dx \quad (2 \text{ سہولتوں سے})$$

$$\frac{2}{2} \int e^{2x+3} dx$$

$$\frac{1}{2} \int 2 e^{2x+3} dx$$

$$\frac{1}{2} e^{2x+3} + C$$

$$\textcircled{2} \int \frac{-x^2+1}{6x-2x^3} dx$$

$$\int \frac{1-x^2}{6x-2x^3} dx$$

(6-6x²) سے تقسیم

$$\frac{6}{6} \int \frac{(1-x^2)}{6x-2x^3} dx$$

$$\frac{1}{6} \int \frac{6(1-x^2)}{6x-2x^3} dx$$

$$\frac{1}{6} \int \frac{6-6x^2}{6x-2x^3} dx$$

$$\frac{1}{6} \ln(6x-2x^3) + C$$

$$\textcircled{1} f(x) = \sqrt[4]{x^2} + 2x$$

$$\frac{2x^2}{1/4}$$

$$f(x) = x^{2/4} + 2x$$

$$f(x) = x^{1/2} + 2x$$

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

$$\textcircled{2} f(x) = (2x^2 + 6x^3 + 5)^4$$

$$f'(x) = 4(2x^2 + 6x^3 + 5)^3 * (4x + 18x^2)$$

$$\textcircled{1} f(x) = 3x^2 - 3$$

سواء بالاشتقاق حسب التعريف

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{f(x + \Delta x) - f(x)}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{3(x + \Delta x)^2 - 3 - (3x^2 - 3)}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{3(x^2 + 2x\Delta x + \Delta x^2) - 3 - 3x^2 + 3}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{3x^2 + 6x\Delta x + 3\Delta x^2 - 3 - 3x^2 + 3}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{6x\Delta x + 3\Delta x^2}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{\Delta x(6x + 3\Delta x)}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} 6x + 3\Delta x$$

$$f'(x) = 6x$$

المشتقة حسب التعريف

$$\textcircled{2} f(x) = 4 + 2x^2$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{(x + \Delta x) - f(x)}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{4 + 2(x + \Delta x)^2 - (4 + 2x^2)}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{4 + 2(x^2 + 2x\Delta x + \Delta x^2) - 4 - 2x^2}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{\cancel{4} + \cancel{2x^2} + 4x\Delta x + 2\Delta x^2 - \cancel{4} - \cancel{2x^2}}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{4x\Delta x + 2\Delta x^2}{\Delta x}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} \frac{\cancel{\Delta x} (4x + 2\Delta x)}{\cancel{\Delta x}}$$

$$f'(x) = \lim_{\Delta x \rightarrow 0} 4x + 2\Delta x$$

$$f'(x) = 4x$$