

Find the derivatives of the given functions.

1. $f(x) = 3x^5 - 7x^2 + 4x + 1$

$$f'(x) = 15x^4 - 14x + 4$$

2. $g(x) = \frac{2}{x^3} + x = 2x^{-3} + x$

$$g'(x) = -6x^{-4} + 1 = \frac{-6}{x^4} + 1$$

3. $y = \frac{1}{5x} = \frac{1}{5}x^{-1}$

$$\frac{dy}{dx} = -\frac{1}{5}x^{-2} = \frac{-1}{5x^2}$$

4. $g(x) = \sqrt{x} + \sqrt{2} = x^{\frac{1}{2}} + \sqrt{2}$

$$g'(x) = \frac{1}{2}x^{-\frac{1}{2}} + 0 = \frac{1}{2\sqrt{x}}$$

5. $h(x) = \frac{x}{2+\pi} = \frac{1}{2+\pi}x$

$$h'(x) = \frac{1}{2+\pi}$$

Find the derivatives of the given functions.

1. $f(x) = 4x^4 - 2x^3 - x + 1$

$$f'(x) = 16x^3 - 6x^2 - 1$$

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

$$\frac{dy}{dx} = -\frac{3}{3}x^{-4} =$$

$$\frac{-1}{x^4}$$

3. $f(x) = 10\sqrt{x} + 5x = 10x^{\frac{1}{2}} + 5x$

$$f'(x) = 10 \cdot \frac{1}{2}x^{-\frac{1}{2}} + 5 = \frac{5}{\sqrt{x}} + 5$$

4. $g(x) = \frac{1}{\sqrt[3]{x^2}} = \frac{1}{x^{\frac{2}{3}}} = x^{-\frac{2}{3}}$

$$g'(x) = -\frac{2}{3}x^{-\frac{2}{3}-1} = -\frac{2}{3}x^{-\frac{5}{3}} = \frac{-2}{3x^{\frac{5}{3}}} = \frac{-2}{3\sqrt[3]{x^5}}$$

5. $h(x) = \frac{x + \pi^2}{2} = \frac{x}{2} + \frac{\pi^2}{2} = \frac{1}{2}x + \frac{\pi^2}{2}$

$$h'(x) = \frac{1}{2} + 0 = \frac{1}{2}$$