Name: Richard

QUIZ 6

MATH 200
September 10, 2024

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

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

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

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Find the derivatives of the given functions.

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

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

2. $y = \frac{1}{3x^3} = \frac{1}{3}x^{-3}$ $\quad \frac{dy}{dx} = \frac{-3}{3}x^{-4} = \boxed{\frac{-1}{x^4}}$

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

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

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

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

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

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