Name: ______________________________

QUIZ 6

MATH 200

February 8, 2022

Directions: Find the derivatives of the given functions. Perform any "obvious" simplifications.

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

$$f'(x) = 4{\cdot}5x^4 - 3{\cdot}2x^1 + 2 + 0 = \boxed{20x^4 - 6x + 2}$$

2. $g(x) = \dfrac{x^3}{3} + \pi^3 \;=\; \dfrac{1}{3}x^3 + \pi^3$

$$g'(x) = \frac{1}{3}3x^2 + 0 = \boxed{x^2}$$

3. $y = \dfrac{1}{5\sqrt[3]{x}} \;=\; \dfrac{1}{5}\dfrac{1}{x^{1/3}} \;=\; \dfrac{1}{5}x^{-1/3}$

$$y' \;=\; \frac{1}{5}\left(-\frac{1}{3}x^{-1/3-1}\right) \;=\; \frac{-1}{15}x^{-4/3} \;=\; \frac{-1}{15x^{4/3}} \;=\; \boxed{-\frac{1}{15\sqrt[3]{x}^{\,4}}}$$

4. $g(x) = \dfrac{2}{x} \;=\; 2x^{-1}$

$$g'(x) = 2(-x^{-1-1}) \;=\; -2x^{-2} \;=\; \boxed{-\frac{2}{x^2}}$$

5. $h(x) = \dfrac{2+\sqrt{2}}{x} \;=\; (2+\sqrt{2})x^{-1}$

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

Name: ______________________________

Quiz 6

MATH 200
February 8, 2022

Directions: Find the derivatives of the given functions. Perform any "obvious" simplifications.

1. $f(x) = 4x^4 - 2x^3 - x + 1$ $\qquad f'(x) = 4{\cdot}4x^3 - 2{\cdot}3x^2 - 1 + 0 = \boxed{16x^3 - 6x^2 - 1}$

2. $y = \dfrac{3}{x^3} = 3x^{-3}$ $\qquad y' = 3\cdot\left(-3x^{-3-1}\right) = -9x^{-4} = \boxed{-\dfrac{9}{x^4}}$

3. $f(x) = \sqrt[3]{x}^2 + \sqrt[3]{2}^2 = x^{2/3} + \sqrt[3]{2}^2$ $\qquad f'(x) = \dfrac{2}{3}x^{2/3-1} + 0 = \dfrac{2}{3}x^{-1/3} = \dfrac{2}{3x^{1/3}} = \boxed{\dfrac{2}{3\sqrt[3]{x}}}$

4. $g(x) = \dfrac{1}{2x^2} = \dfrac{1}{2}x^{-2}$ $\qquad g'(x) = \dfrac{1}{2}\left(-2x^{-3}\right) = -x^{-3} = \boxed{-\dfrac{1}{x^3}}$

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

$$h'(x) = (2+\pi)(-x^{-1-1}) = -(2+\pi)x^{-2} = \boxed{-\dfrac{2+\pi}{x^2}}$$