Warm Up

Differentiate each of the following:

1. $y = 3x^3 + \frac{5}{x^2} + \sqrt{x} - 3x^{\frac{3}{5}} + \pi^4$

2. $f(x) = \left(8\sqrt{x} - x^5 + 2\right)\left(7 - x^{-5}\right)$

3. $h(t) = \dfrac{7t^6 - 3t^4 + \sqrt[3]{t^7}}{8t - 5}$

4. $g(x) = \left[x^5 - (2x+8)^7\right]^{25}$

1. $y = 3x^3 - \frac{5}{x^2} + \sqrt{x} - 3x^{\frac{3}{5}} + \pi^4$

$y = 3x^3 - 5x^{-2} + x^{1/2} - 3x^{3/5} + \pi^4$

$y' = 9x^2 + 10x^{-3} + \frac{1}{2}x^{-1/2} - \frac{9}{5}x^{-2/5}$

2. $f(x) = \left(8\sqrt{x} - x^5 + 2\right)\left(7 - x^{-5}\right)$

$f'(x) = \left(4x^{-1/2} - 5x^4\right)\left(7 - x^{-5}\right) + \left(8\sqrt{x} - x^5 + 2\right)\left(5x^{-6}\right)$

3. $h(t)=\dfrac{7t^6-3t^4+\sqrt[3]{t^7}}{8t-5}$ $t^{7/3}$

$h'(t)=\dfrac{\left(42t^5-12t^3+\frac{7}{3}x^{4/3}\right)(8t-5)-\left(7t^6-3t^4+\sqrt[3]{t^7}\right)(8)}{(8t-5)^2}$

4. $g(x)=\left[x^5-(2x+8)^7\right]^{25}$

$g'(x)=25\left[x^5-(2x+8)^7\right]^{24}\left[5x^4-7(2x+8)^6(2)\right]$

Warm Up

Differentiate:

$$f(x)=\sqrt[4]{\frac{\left(x^5-1\right)^{-2}+3x^7}{x\sqrt{3x-5}}}$$

$$f(x)=\left[\frac{(x^5-1)^{-2}+3x^7}{x(3x-5)^{1/2}}\right]^{1/4} \quad \text{or} \quad f(x)=\frac{\left[(x^5-1)^{-2}+3x^7\right]^{1/4}}{\left[x(3x-5)^{1/2}\right]^{1/4}}$$

$$\text{OR} \quad f(x)=\left[(x^5-1)^{-2}+3x^7\right]^{1/4}\left[x(3x-5)^{1/2}\right]^{-1/4}$$

$$\text{OR} \quad f(x)=\frac{\left[(x^5-1)^{-2}+3x^7\right]^{\frac{1}{4}}}{x^{1/4}(3x-5)^{1/8}}$$

$$f'(x)=\frac{1}{4}\left[\frac{(x^5-1)^{-2}+3x^7}{x\sqrt{3x-5}}\right]^{-3/4}\left[\frac{\left[-2(x^5-1)^{-3}(5x^4)+21x^6\right]\left[x\sqrt{3x-5}\right]-\left[(x^5-1)^{-2}+3x^7\right]\left[(1)\sqrt{3x-5}+x\left[\frac{1}{2}(3x-5)^{-1/2}(3)\right]\right]}{\left(x\sqrt{3x-5}\right)^2}\right]$$

Complete practice sheet using derivative Rules.