

Derivatives-Power Rule Only

Friday, September 21, 2012

Instructions: Show work or provide an explanation for each problem. No work receives no credit. Good luck and have fun-ctions!

For all problems, find the derivative using any valid method of your choice. Simplify appropriately.

<p>(4 points) 1. $f(x) = \sqrt[4]{\sqrt{x}}$ $(x^{1/2})^{1/4} = x^{1/8}$</p> $f'(x) = \frac{1}{8} x^{-7/8}$ $f'(x) = \frac{1}{8\sqrt[8]{x^7}}$	<p>(4 points) 2. $f(x) = (\sqrt{x} + 3)^2$</p> $f(x) = x + 6x^{1/2} + 9$ $f'(x) = 1 + 3x^{-1/2}$ $f'(x) = 1 + \frac{3}{\sqrt{x}}$
<p>(4 points) 3. $h(x) = x^4 + 2x^3 - 5x + e^7$</p> $h'(x) = 4x^3 + 6x^2 - 5$	<p>(4 points) 4. $f(x) = \frac{x^3 - 27}{x - 3}$</p> $f(x) = x^2 + 3x + 9$ $f'(x) = 2x + 3$
<p>(4 points) 5. $f(x) = \frac{x^3 - 3x^2 + 4}{x} = x^2 - 3x + 4x^{-1}$</p> $f'(x) = 2x - 3 - 4x^{-2}$ $f'(x) = 2x - 3 - \frac{4}{x^2}$	<p>(2 points) 6. $y = \sqrt{x}$</p> $y' = \frac{1}{2} x^{-1/2}$ $y' = \frac{1}{2\sqrt{x}}$
<p>(1 point) 7. $y = \frac{e^{\pi\pi e}}{\sqrt{7}}$</p> $y' = 0$	<p>(5 points) 8. $f(x) = \frac{(x^2 + x - 2)^2}{x}$ $(x^2 + x - 2)(x^2 + x - 2)$</p> $f(x) = \frac{x^4 + x^3 - 2x^2}{x} + \frac{x^3 + x^2 - 2x}{x}$ $f'(x) = 3x^2 + 4x - 3 - \frac{4}{x^2} - 2x^2 - 2x + 4$ $(x^4 + 2x^3 - 3x^2 - 4x + 4) \div x$

3 (points) 9. $y = \frac{6}{(3x)^3} \cdot \frac{6}{27x^3}$

$$y' = \frac{2}{9} x^{-3}$$

$$y' = \frac{2}{9} \cdot -3 x^{-4}$$

$$y' = -\frac{6}{9} x^{-4}$$

$$y' = \frac{-2}{3x^4}$$

3 (point) 10. $f(x) = \sqrt[3]{x} + \sqrt[5]{x}$

$$f(x) = x^{1/3} + x^{1/5}$$

$$f'(x) = \frac{1}{3} x^{-2/3} + \frac{1}{5} x^{-4/5}$$

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

$$y = \sqrt{3} x + \frac{x}{\pi+1}$$

$$y' = \sqrt{3} + \frac{1}{\pi+1}$$