

Group Work 08

AUTHOR 1	_____	DAY 1	<input type="checkbox"/>	<input type="checkbox"/>
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1. Let $f(x) = x^3e^x - 7 + \sqrt{x}$

(a) Find $f'(x)$.

(b) Find $f''(x)$.

2. Suppose that $h(x)$ is function for which $h'(x) = x^2h(x)$ and $h(2) = 10$.

(a) Find $h'(2)$.

(b) Find $h''(2)$.

3. Follow the steps below to prove the quotient rule: $\left(\frac{f(x)}{g(x)}\right)' = \frac{g(x)f'(x) - f(x)g'(x)}{(g(x))^2}$.

We will let $h(x) = \frac{f(x)}{g(x)}$. This means that we are looking for a formula for $h'(x)$.

- (a) Solving for $f(x)$, we have $f(x) = h(x)g(x)$. Now use the product rule to write an expression for $f'(x)$

$$f'(x) =$$

- (b) Take your expression for $f'(x)$, and solve for $h'(x)$ (in terms of $f'(x)$, $g(x)$, $g'(x)$, and $h(x)$).

$$h'(x) =$$

- (c) Take your expression for $h'(x)$, and substitute in $\frac{f(x)}{g(x)}$ for $h(x)$. Simplify, until you get the quotient rule.

$$h'(x) =$$

4. Find the derivative of $f(x) = \frac{\sqrt{x} + xe^x}{e^x - x}$

5. Let $f(x) = \frac{x^2}{h(x)}$ where the graph of $y = h(x)$ is below. Find $f'(1)$.

