Logarithmic Differentiation

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$$ln(f(x)) = (l + \frac{1}{x})^{x}$$

$$ln(f(x)) = x ln(l + \frac{1}{x})^{x}$$

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$$f(x) = \frac{1}{4x}(x ln(l + \frac{1}{x}))$$

$$f(x) = ln(l + \frac{1}{x}) + x \cdot \frac{1}{1 + \frac{1}{x}}(-x^{-2})$$

$$f(x) = ln(l + \frac{1}{x}) - \frac{x}{x^{2} + x}$$

$$f(x) = f(x)(ln(l + \frac{1}{x}) - \frac{1}{x + l})$$

$$f(x) = (l + \frac{1}{x})^{x}(ln(l + \frac{1}{x}) - \frac{1}{x + l})$$

$$g(x) = (ln(x))^{x^{2}}$$

$$ln(g(x)) = x^{2} ln(ln(x)) + x^{2} \frac{1}{ln(x)}$$

$$g(x) = g(x)(2x ln(ln(x)) + \frac{x}{ln(x)})$$

$$g'(x) = (ln(x))^{x^{2}}(2x ln(ln(x)) + \frac{x}{ln(x)})$$

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Ideas Page

$$(3)$$
 $h(x)$

$$h(x) = \frac{\sin^{(0)}(x)}{(5x+3)^6}$$
 could use quotient rule.

$$ln(h(x)) = ln(sin(x)) - ln(5x+3)^{6}$$

$$ln(h(x)) = 10 ln(sin(x)) - 6 ln(5x+3)$$

$$ln(x) = 10 \cdot ln(sin(x)) - 6 \cdot ln(5x+3)$$

$$ln(x) = 10 \cdot ln(x) \cdot ln(x) - 6 \cdot ln(5x+3)$$

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$$ln(x) = ln(sin(x)) - ln(5x+3)^{6}$$

$$ln(x) = ln(x) \cdot ln(x) - ln(x) \cdot ln(x)$$

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