

Math 263A**Guide for Test 4**

Here are some sample questions from sections 3.3–3.5 and 3.7. Some topics that we covered are not represented by these questions, but are still fair game.

1. Prove that $\cosh(x + y) = \cosh(x) \cosh(y) + \sinh(x) \sinh(y)$.

2. Compute the following derivatives:

(a) $f(x) = \sinh(\cosh(x)) \Rightarrow f'(x) =$

(b) $f(x) = \arctan(x) \Rightarrow f'(x) =$

(c) $f(x) = \ln(x) \Rightarrow f'(x) =$

(d) $f(x) = \log_3(x) \Rightarrow f'(x) =$

(e) $f(x) = \frac{\arctan(\log_3(7x))}{x^4 + 2x} \Rightarrow f'(x) =$

(f) $f(x) = e^x \Rightarrow f'(x) =$

(g) $f(x) = 3^x \Rightarrow f'(x) =$

(h) $f(x) = x^3 \Rightarrow f'(x) =$

3. Find the derivative of $y = \frac{x^x \sin(2x)(x^5 - 7x)^6}{(\sqrt{x^9 + 1})3^x}$

4. Compute the following limits:

(a) $\lim_{x \rightarrow \infty} \operatorname{sech}(x) =$

(b) $\lim_{x \rightarrow \infty} \frac{e^{3x}}{x^3} =$

(c) $\lim_{x \rightarrow -\infty} \frac{3e^{3x} - 4}{2e^{3x} - 2} =$

(d) $\lim_{x \rightarrow 1} \frac{\ln(x)}{\sin(\pi x)} =$

(e) $\lim_{x \rightarrow \infty} x \tan(1/x) =$