

Name: _____

Math 2924 Section 170

Practice Exam 1

March 3, 2015

Follow the instructions for each question and show enough of your work so that I can follow your thought process. If I can't read your work or answer, you will receive little or no credit!

1. Let $f(x) = 3 + x^2 + \tan\left(\frac{\pi x}{2}\right)$ for $-1 < x < 1$. Compute $(f^{-1})'(3)$.

2. Let $f(x) = \sqrt{x^5 + x^2 + x + 1}$. Compute $(f^{-1})'(2)$.

3. Use logarithmic differentiation to compute y' of the following function:

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

4. Use logarithmic differentiation to compute y' of the following function:

$$y = \sqrt{\frac{\cos x}{x^4 + 1}}$$

5. Compute the following limit if it exists:

$$\lim_{x \rightarrow 0} \frac{e^x - 1 - x}{x^2}$$

6. Compute the following limit if it exists:

$$\lim_{x \rightarrow 0^+} \sin x \ln x$$

For problems 7 - 12, compute the following integrals:

7. $\int e^{\cos x} \sin(2x) dx$

8. $\int x^3 \sin(x^2) dx$

9. $\int \frac{dx}{x^2\sqrt{16-x^2}}$

10. $\int \frac{x^5}{\sqrt{x^2+4}} dx$

11. $\int \frac{4x^2 - 7x - 12}{x^3 - x^2 - 6x} dx$

12. $\int \frac{x^2 + 2x - 1}{x^3 - x} dx$

13. Let f be a continuous function such that $f(0) = 0$, $f(1) = 1$, $f'(x) > 0$ and

$$\int_0^1 f(x) dx = \frac{1}{3}$$

Compute the following integral:

$$\int_0^1 f^{-1}(y) dy$$