

Math 141
Exam #1
Spring 2011

Name:

1. 10 pts. Find the inverse of $f(x) = \sqrt{x+3}$, for $x \geq -3$.

2. 10 pts. Find $(f^{-1})'(3)$ if $f(x) = x^3 + x + 1$.

3. 10 pts. Find

$$\frac{d}{dx}(\ln|x^2 - 1|),$$

and give the intervals on which the result is valid.

4. 10 pts. Find $f'(\pi/4)$ for $f(x) = e^{\sin 2x}$.

5. 10 pts. each Evaluate each integral

(a) $\int \frac{e^{\sqrt{x}}}{\sqrt{x}} dx$

(b) $\int_{-1}^1 10^x dx$

(c) $\int \frac{5}{\sqrt{49 - x^2}} dx$

6. 10 pts. Find the derivative using logarithmic differentiation:

$$f(x) = (\cos x)^{\tan x}$$

7. 10 pts. each Find each derivative.

(a) $y = 4^{-x} \sin x$

(b) $y = \ln(x^3 + 1)^\pi$

(c) $y = 4 \log_3(x^2 - 1)$

(d) $f(z) = \tan^{-1}(2z^2 - 4)$

8. 10 pts. Evaluate using L'Hôpital's Rule:
 $\lim_{x \rightarrow 0^+} x^{20x}$.

9. 10 pts. each Evaluate each integral.

(a) $\int x^2 e^{4x} dx$

(b) $\int_0^{\pi/2} x \cos 2x dx$