

NAME

Math 230, Sec.6, Spring 08, Exam 2

1. Compute the following limits.

(a) (5 points) $\lim_{\theta \rightarrow 0} \frac{3^{\sin(\theta)} - 1}{\theta}$

(b) (5 points) $\lim_{x \rightarrow 1^+} \left(\frac{1}{x-1} - \frac{1}{\ln x} \right)$

(c) (10 points) $\lim_{x \rightarrow \infty} (x^2 + 3)^{1/\ln x}$

2. (10 points) Compute the following antiderivatives.

(a) $\int \sin^3(4x) \cos^8(4x) dx$

(b) $\int (\tan x)^{2/3} \sec^4 x dx$

3. (20 points — 5 points each, NO PARTIAL CREDIT) Find the following antiderivatives. No work need be shown if you have them memorized.

(a) $\int \tan x \, dx$

(b) $\int \sec x \, dx$

(c) $\int \cos^2 x \, dx$

(d) $\int \tan^2 x \, dx$

4. (10 points) Find $\int \ln x \, dx$.

5. (10 points) Compute $\int_1^3 x e^{-5x} dx$

6. (10 points) Find the partial fractions decomposition of the rational function

$$\frac{x^2 + 1}{x^4 + 4x^2}$$

7. (20 points) Compute $\int \frac{\sqrt{u^2 - 16}}{u^3} du$ ($u > 4$)

8. (20 points) Compute $\int_0^{\sqrt{5}} \frac{3x - 4}{(x^2 + 5)^2} dx$