

Calculus I
Final Exam
Mammenga
Spring 2008

There are a total of 65 points on this exam. Read each question/problem carefully. Write complete answers in your blue book and make sure your writing is legible. Don't forget to check your work. Good luck!

1. (18 points) Compute the following limits.

(a) $\lim_{x \rightarrow 9} \frac{9 - x}{(3 - \sqrt{x})^2}$

(b) $\lim_{x \rightarrow 0} \frac{1 - \cos(x)}{\sin^2(x)}$

(c) $\lim_{x \rightarrow 0} \frac{\sqrt{36 + 5x^3 - 11x^4}}{x^2 - 3x + 1}$

2. (20 points) Use differentiation to find the following.

(a) Find $f'(x)$ if $f(x) = \ln(x^2 e^x)$.

(b) Find $g'(t)$ if $g(t) = \frac{t}{\sqrt{1 - t^3}}$.

(c) Find $h''(1)$ if $h(u) = 2u^3 + 5u^2 - 11u - 87$.

3. (27 points) Compute the following integrals.

(a) $\int \sqrt[3]{1 - x} \, dx$

(b) $\int_1^2 x \ln(3x^2 + 4) \, dx$

(c) $\int (e^{2-3x} + \sin(4x)) \, dx$