

MATH 166
SUMMER 2012
QUIZ 1 (REVIEW)

1. (20 pt) Evaluate the following limits (in part c), $0 \leq f(x) \leq |\sin(x)|$ for all x).

a) $\lim_{x \rightarrow 0} \frac{e^{2x^2} - 1 - 2x^2}{x^4}$ b) $\lim_{x \rightarrow 0} \frac{\sin(5 \tan(4x))}{\sin(3x)}$ c) $\lim_{x \rightarrow 1} \ln(x) f\left(\frac{1}{x^4 - 1}\right)$

d) $\lim_{x \rightarrow \infty} (\sqrt{x^2 + 1} - \sqrt{x^2 - x})$

2. (20 pt) Find the derivative of each of the following functions.

a) $f(x) = \sin(e^{x^3}) \tan(xe^{\sin(2x)})$ b) $g(x) = (x \ln(x))^{\sqrt{x^2+1}}$ c) $h(x) = (x + \ln(x)^x)^x$

d) $k(x) = \int_{2x}^{x^2} 2t^3 e^{t^2} dt$

3. (20 pt) Evaluate the following integrals.

a) $\int 3x^2 \sin(x^3 + 1) dx$ b) $\int \frac{1}{x((\ln(x))^2 + 1)} dx$ c) $\int_0^2 x^3 \sqrt[3]{x^2 + 2} dx$

d) $\int_{\ln(3)}^{\ln(8)} \frac{e^x}{\sqrt{e^x + 1}} dx$