

Practice test

July 6, 2015

1. Find the following limits.

(1) $\lim_{x \rightarrow 2} \ln(\cos(\pi x))e^{x^2+2}$

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

(3) $\lim_{w \rightarrow \infty} (w - \sqrt{w^2 + 9})$

2. Suppose $f(x) = \sqrt{|\cos x| - \cos x}$.

(1) Find the domain and range of $f(x)$.

(2) Show that $f(x) = x^3 - 1$ has at least one solution in $[0, 2]$.

3. Suppose $g(x) = x^\alpha \sin(\frac{1}{x})$, $x > 0$ and α is a constant. Give the range of α such that $g(x)$ has a horizontal asymptote.

