Quiz 11

Name: SOLUTIONS

1. Use L'Hôpital's rule to evaluate the following limits:

(a) $\lim_{x\to 0} \dfrac{\cos(x^2)-1}{x^2}$ form: $\frac{0}{0}$

$\overset{L'H}{=} \lim_{x\to 0}\left(\dfrac{-2x\sin(x^2)}{2x}\right) = \lim_{x\to 0}\left(-\sin(x^2)\right) = 0$

(b) $\lim_{x\to \pi} \dfrac{\sin(x-\pi)}{\ln x - \ln \pi}$ form: $\frac{0}{0}$

$\overset{L'H}{=} \lim_{x\to \pi}\left(\dfrac{\cos(x-\pi)}{\frac{1}{x}}\right) = \dfrac{1}{\frac{1}{\pi}} = \pi$

(c) $\lim_{x\to\infty} x^2 e^{-x}$ form: $\infty \cdot 0$

$= \lim_{x\to\infty}\left(\dfrac{x^2}{e^x}\right)$ form: $\frac{\infty}{\infty}$

$\overset{L'H}{=} \lim_{x\to\infty}\left(\dfrac{2x}{e^x}\right)$ form: $\frac{\infty}{\infty}$

$\overset{L'H}{=} \lim_{x\to\infty}\left(\dfrac{2}{e^x}\right)$

$= 0$