MA1013B-**Real Analysis** -16S1-MidRedo-20170426	Group:
Name:	Index Number:

You can use any result that we discussed in class without proof. $\epsilon - \delta$ proofs are not expected.
Do not use Taylor Series. We have 4 questions for part B-Real Analysis. Write the answers here.

Let $f(x) = \sin^2\left(x \sin\frac{1}{x}\right)$

B1. Find the domain and the range of f.

B2. Find $f(0)$ so that f is right continuous at 0.

B3. Is f right differentiable at 0 with $f(0)$ defined as in question B2? If so what is the right derivative of f at 0?

B4. Show that for all $x \in (0,\infty)$ there exists $y \in (0,x)$ such that $\sin^2\left(x\sin\frac{1}{x}\right) \leq \frac{x}{y}\left|y\sin\frac{1}{y} - \cos\frac{1}{y}\right|$