10350 Quiz 01 Name _____ Section _____

1. The position function $s(t)$ of a particle travelling a straight line is given by $s(t) = \cos^2(t)$. Find the **acceleration** of the particle at any time t.

2. Consider the **piece-wise defined** function $f(x) = \begin{cases} x\cos\left(\dfrac{1}{x}\right) & -\infty < x < 0 \\ 1 & x = 0 \\ \dfrac{\sin(5x)}{6x} & 0 < x < +\infty \end{cases}$

(a) Find the values of the following limits. **Justify your answer.** You are required to use $\lim\limits_{x\to 0} \dfrac{\sin x}{x} = 1$ where applicable and not L'Hopital's Rule.

$\lim\limits_{x\to 0^-} f(x) \stackrel{?}{=}$ _____

$\lim\limits_{x\to 0^+} f(x) \stackrel{?}{=}$ _____.

(b) Which of the choices below **BEST** describes the behavior of $f(x)$ at $x = 0$? Circle one:

Removable Discontinuity Jump Discontinuity

Right Continuous Continuous