Quiz 1 (10 min.)

Student Name: Key

Consider the differential equations $y' + y^2 \sin x = 0$.

a) Check that $y \equiv 0$ is a solution.

$y' = 0 \Rightarrow 0 + 0^2 \cdot \sin x = 0$ ✓

b) Find the general solution for $y \neq 0$ (this depends on an arbitrary constant).

$$\frac{dy}{dx} = -y^2 \sin x \Rightarrow$$

$$-\frac{dy}{y^2} = (\sin x)\, dx \Rightarrow$$

$$y^{-1} = -\cos x + C \Rightarrow$$

$$y = \frac{1}{C - \cos x}$$

c) Find the particular solution which also satisfies $y(\pi/2) = 0$. What is its domain?

$y \equiv 0$, Domain $= \mathbb{R}$

Remark:
Since $y \neq 0$ is an assumption for the solution in part (b), we must use the solution to part (a).