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MAC 2312.5885
Cyr

Quiz 3

You must show all work to receive full credit!!

Problem 1. (2.5 pts) Evaluate $\lim_{x\to 0} x^2 \sin(1/x)$.

$$-1 \le \sin\left(\tfrac{1}{x}\right) \le 1 \Rightarrow$$

$$-x^2 \le x^2 \sin\left(\tfrac{1}{x}\right) \le x^2$$

Since $\lim_{x\to 0} -x^2 = \lim_{x\to 0} x^2 = 0$, by the squeeze theorem

$$\lim_{x\to 0} x^2 \sin\left(\tfrac{1}{x}\right) = \boxed{0}.$$

Problem 2. (2.5 pts) Evaluate $\int \dfrac{12dx}{\sqrt{x}+x\sqrt{x}}$.

Let $u=\sqrt{x} \Rightarrow u^2=x$, $2udu=dx$.

Then $\int \dfrac{12dx}{\sqrt{x}+x\sqrt{x}} = 12\int \dfrac{2udu}{u+u^3} = 24\int \dfrac{u\,du}{u(1+u^2)}$

$$= 24\int \frac{du}{1+u^2} = 24\arctan u = \boxed{24\arctan(\sqrt{x})+C}$$