

**Name:**

Warm-up #18

Show that the series

$$\sum_{n=1}^{\infty} \frac{\sin(nx)}{n^2}$$

converges for each  $x \in \mathbb{R}$ , and denote the sum by  $f(x)$ . Is  $f$  continuous on  $[0, \pi]$ ? Can you compute  $\int_0^{\pi} f(x) dx$ ?