

**Problem 1.** Let  $J = \int_0^1 \sin(x^2) dx$ . Express  $J$  as an infinite series.

*Hint:* Remember that

$$\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \cdots,$$

a series which converges for all  $x$ .