I. Find the power series expansion for f(x) at $x_0 = 0$.

- $1. \ f(x) = \sin(x)$
- 2. $f(x) = \cos(x)$ Hint: $\frac{d}{dx}\sin(x) = \cos(x)$

II. 1. Find the power series expansion for $\cos(x^2)$

- 2. Find $\int \cos(x^2) dx$
- 3. Approximate $\int_0^1 \cos(x^2) dx$ accurate within 10^{-5}

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