

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 $\sin(x^2)$

2. Use this to find $\int \sin(x^2) dx$

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