

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

(a) $f(x) = \sin(x)$

(b) $f(x) = \cos(x)$ Hint: $\frac{d}{dx} \sin(x) = \cos(x)$

2. (a) Find the power series expansion for $\sin(x^2)$

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

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