
Math 2150 - Homework # 11

Review of Power Series

1. Find a power series expansion for $f(x)$ centered at x_0 .

State the radius of convergence r and the x values where the series converges.

(a) $f(x) = x^3 + x$ centered at $x_0 = 1$

(b) $f(x) = x$ centered at $x_0 = 1$

(c) $f(x) = x^2$ centered at $x_0 = 1$

(d) $f(x) = \frac{-1}{1-x^2}$ centered at $x_0 = 0$

(e) $f(x) = \frac{x}{1-x^2}$ centered at $x_0 = 0$

(f) $f(x) = \frac{1}{x}$ centered at $x_0 = 1$

(g) $f(x) = \frac{1}{x^2}$ centered at $x_0 = 1$

(h) $f(x) = e^{x^2}$ centered at $x_0 = 0$

-
2. (a) Estimate $\sin(0.1)$ using the first five terms of the power series for $\sin(x)$ centered at $x_0 = 0$.

(b) Then use your calculator to compare your estimate to the true value of $\sin(0.1)$. How close were you?

-
3. (a) Estimate $\ln(1.1)$ using the first four terms of the power series for $\ln(x)$ centered at $x_0 = 1$.

(b) Then use your calculator to compare your estimate to the true value of $\ln(1.1)$. How close were you?
