Daily Quiz

- Go to Socrative.com and complete the quiz.
- Room Name: HONG5824
- Use your full name.

Express $\dfrac{1}{(1+2x)^2}$ as a power series by differentiation.

(a) Evaluate $\int \frac{1}{1+x^7} dx$ as a power series.

(b) Use part (a) to approximate $\int_0^{0.5} \frac{1}{1+x^7} dx$ correct to within 10^{-7}.

8.7 Taylor Series Centered at 0 (Maclaurin Series)

The Taylor series of $f(x)$ centered at 0 is sometimes called the **Maclaurin Series.**

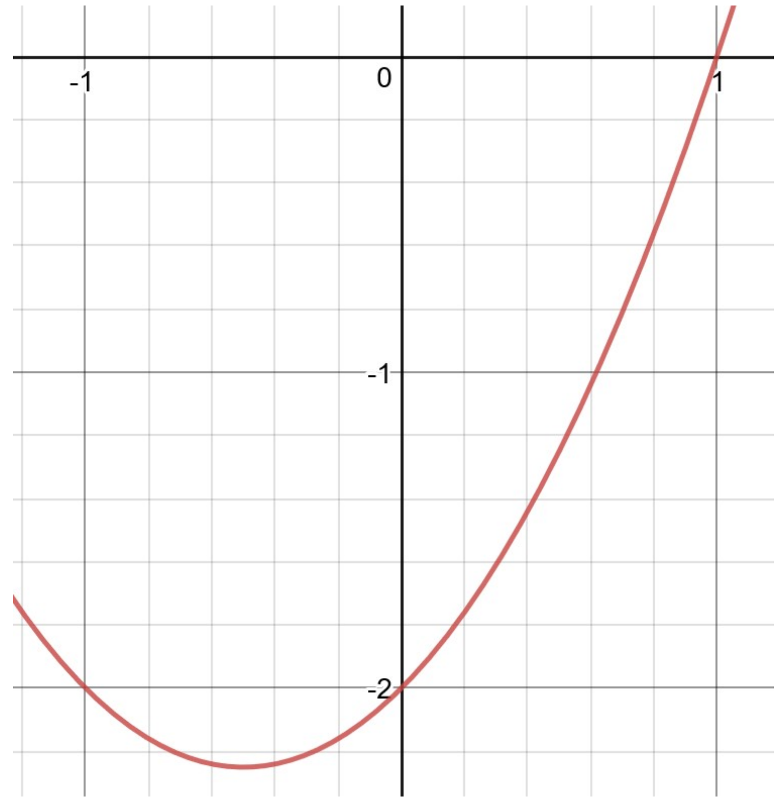
$$T(x) = \sum_{n=0}^{\infty} \frac{f^{(n)}(0)}{n!} x^n = f(0) + \frac{f'(0)}{1!} x + \frac{f''(0)}{2!} x^2 + \cdots$$

8.7 Maclaurin Series

Find the Maclaurin series of $f(x) = e^x$ and its interval of convergence.

1. Find the 4th degree Taylor polynomial for e^x centered at 0.
2. Use $T_4(x)$ to estimate e^2.

Suppose a function f has the following graph. If the 2nd degree Taylor polynomial centered at 0 for f is $T_2(x) = ax^2 + bx + c$, determine the signs of a, b, and c.



8.7 Taylor Series

Find the Taylor series for $f(x) = \cos x$ centered at 0.

8.7 Taylor Series

Find the Taylor series for $f(x) = \sin x$ centered at 0.

List of power series (centered at 0) that you must memorize. "I" means Interval of Convergence.

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n = 1 + x + x^2 + x^3 + \cdots \qquad \text{I: } (-1, 1)$$

$$e^x = \sum_{n=0}^{\infty} \frac{x^n}{n!} = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \cdots \qquad \text{I: } (-\infty, \infty)$$

$$\sin x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!} = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \cdots \qquad \text{I: } (-\infty, \infty)$$

$$\cos x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{(2n)!} = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \frac{x^6}{6!} + \cdots \qquad \text{I: } (-\infty, \infty)$$

$$\arctan x = \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{2n+1} = x - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7} + \cdots \qquad \text{I: } [-1, 1]$$

$$\ln(1+x) = \sum_{n=1}^{\infty} (-1)^{n-1} \frac{x^n}{n} = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \cdots \qquad \text{I: } (-1, 1]$$