Math 31B: Week 10 Section

TA: Ben Szczesny   Last updated: 2018/03/13

Discussion Questions

Question 1. Find the interval of convergence for the following

(a) $\displaystyle\sum_{n=2}^{\infty} \frac{x^n}{\ln(n)}$

(b) $\displaystyle\sum_{n=1}^{\infty} n(x-3)^n$

Question 2. We have that

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n \text{ for } |x| < 1.$$

Use this and the equality $\dfrac{1}{1-x} = \dfrac{-1}{1+(x-2)}$ to show that

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} (-1)^{n+1}(x-2)^n \text{ for } |x-2| < 1.$$

Question 3. Find The following Maclaurin series and the interval the expansion is valid by using previously known series.

(a) $f(x) = \dfrac{1 - \cos(x)}{x}$

(b) $f(x) = (x^2 + 1)\sin(x)$

Question 4. Show that

$$\pi - \frac{\pi^3}{3!} + \frac{\pi^5}{5!} - \frac{\pi^7}{7!} + \cdots$$

converges to zero. How many terms must be computed to get within 0.01 of zero?