Worksheet #21 (Chapter 11 Review)

Math 231 AD1

1. For each of the following series, determine whether it is Absolutely Convergent, Conditionally Convergent, or Divergent.
   (a) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{n\sqrt{n}}$
   (b) $\displaystyle\sum_{n=1}^{\infty} (-1)^n \frac{\ln(n)}{\sqrt{n}}$
   (c) $\displaystyle\sum_{n=1}^{\infty} (\sqrt[n]{2} - 1)^n$
   (d) $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n + n\cos^2(n)}$
2. Complete the list below by writing down the Maclaurin series and the corresponding intervals of convergence.
   (a) $\dfrac{1}{1-\bigstar} = 1 + \bigstar + \bigstar^2 + \bigstar^3 + \ldots$ for $-1 < \bigstar < 1$
   (b) $\ln(1+\bigstar) =$
   (c) $\sin(\bigstar) =$
   (d) $\cos(\bigstar) =$
   (e) $\arctan(\bigstar) =$
   (f) $e^{\bigstar} =$
3. Find the exact value of $\dfrac{1}{2} - \dfrac{1}{2\cdot 4} + \dfrac{1}{3\cdot 8} - \dfrac{1}{4\cdot 16} + \ldots.$
4. Find the exact value of $1 - \ln(2) + \dfrac{(\ln 2)^2}{2!} + \dfrac{(\ln 2)^3}{3!} + \dfrac{(\ln 2)^4}{4!} + \ldots.$
5. Use series to evaluate $\displaystyle\lim_{x\to 0} \frac{1-\cos(x)}{1+x-e^x}$.
6. Determine the interval of convergence for the series $\displaystyle\sum_{n=1}^{\infty} n^{-2}(x+6)^n$.
7. Determine the Taylor series with center $a = -1$ for $f(x) = x^3 + x$.
8. Give the first three terms of the Maclaurin series for $\dfrac{1}{\sqrt[3]{1+\frac{x}{2}}}$.