Homework Set 20

(sect 8.7: Taylor & Binomial Series)

Find the Taylor series representation for each function centered at the given value of a.

1. $f(x) = 2 - 3x + x^2,\ \ a = -1$

2. $f(x) = e^x,\ \ a = 5$

3. $f(x) = \cos x\,,\ \ a = \frac{\pi}{2}$

4. $f(x) = \ln x\,,\ \ a = 2$

Use a known Maclaurin series to evaluate each of the following expressions:

5. Obtain the Maclaurin series for $2x\sin(x^3)$.

6. Evaluate the indefinite integral as an infinite series: $\int \frac{e^x - 1}{x}\,dx$.

7.

a. Expand $f(x) = \frac{x}{(1-x)^2}$ as a power series.

b. Use part (a) to the sum of the series $\sum_{n=1}^{\infty} \frac{n}{2^n}$

8. Find the sum of the series: $\sum_{n=0}^{\infty} \frac{3^n}{5^n n!}$

Use the Binomial series to expand the given function as a power series.

9. $f(x) = \frac{1}{(1+x)^3}$

10. $f(x) = (1-x)^{1/5}$

11. $f(x) = \frac{x^2}{\sqrt{9-x}}$