

Homework for section 10.3

1. Find $3 + \frac{27}{3!} + \frac{243}{5!} + \frac{2187}{7!} + \dots$

2. Find $x^2 - \frac{x^4}{3!} + \frac{x^6}{5!} - \frac{x^8}{7!} + \dots$

3. Find $\sum_{k=1}^{\infty} \frac{(-1)^{k+1} x^k}{k}$.

4. Find $f^{(5)}(0)$ and $f^{(6)}(0)$ for $f(x) = \frac{x}{1-x^2}$. Hint: First find the series for $f(x)$.

5. Use the series for $\ln(1-x)$ and differentiation to find a series for $\frac{1}{1-x}$.

6. Find a series for $\int_0^x te^t dt$.

7. In this problem you will evaluate/ approximate $\int_0^1 \sqrt{2-x^2} dx$ in four different ways.

A. Use the first two nonzero terms of an appropriate series to get an approximation.

B. Use Simpson's rule with $n = 20$ to get an approximation.

C. Break up the region into a triangle and a part of a circle, then use geometry to get an exact value.

D. Use the integration tables to get an exact value.