MATH 152, Fall 2019

Worksheet 9

1. Find the radius and interval of convergence of the power series

$$\sum_{n=1}^{\infty} \frac{n^{2n}}{(2n)!} (x-1)^n$$

2. Find the radius and interval of convergence of the power series

$$\sum_{n=1}^{\infty} \frac{n^2 x^n}{2 \cdot 4 \cdot 6 \cdot \dots \cdot (2n)}$$

3. Find a power series expansion of

$$h(x) = \int \frac{(1-x)\ln(1-x)}{x} dx$$

4. Use the powers series for $\tan^{-1}(x)$ to show that π can be written as the infinite sum

$$2\sqrt{3}\sum_{n=0}^{\infty}\frac{(-1)^n}{(2n+1)3^n} = \pi$$

5. To six decimal places, find the definite integral

$$\int_{0}^{0.3} \frac{x^2}{1+x^4} dx$$