## MATH 152, Fall 2019

## Worksheet 9

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

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

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

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

3. Find a power series expansion of

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

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

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

5. To six decimal places, find the definite integral

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

