3. [19 points] Consider the function $B(x)$ described on its domain by its Taylor series around $x = 0$,

$$B(x) = \sum_{n=0}^{\infty} \frac{(-1)^n}{(n+1)!(2n)!} x^{2n}.$$

a. [5 points] Find the first four non-zero terms of the Taylor series for $B(x)$ about $x = 0$. You do not need to evaluate any factorials in your answer.

b. [6 points] Find the radius of convergence of the Taylor series. Show all of your work and use proper notation.

c. [3 points] Is $B(x)$ an odd function, an even function, or neither? Explain your reasoning.

d. [5 points] Find the value of $B^{(2020)}(0)$. You do not need to evaluate any factorials in your answer.