2. We have $a(x)=\sum_{n=0}^{\infty}(-1)^n x^{2n} = 1 - x^2 + x^4 - x^6 + x^8 - x^{10} + \ldots = \frac{1}{1+x^2}$ on $-1 < x < 1$.

a. Then $b(x)=\int a(x)dx =$ $\square + \square + \square + \square + \square + \square + \ldots$ $= \int \frac{1}{1+x^2}dx$

b. Integrate the closed form of the representation of the function $\int \frac{1}{1+x^2}dx =$ _____ $+ C$.

c. If $x = 0$ then, from **2b**, we have $b(0) =$ ___ $+ C$. Hint. See the graph below. Thus, equating **2a** and **2b**, we have $C =$ ___.

d. Write the expression for the series $b(x)$ in sigma notation so it is simplified. $b(x)=\sum_{n=0}^{\infty}(-1)^n \cdot \square$
TIP: You can see the pattern in part **2a** or
you can integrate the expression x^{2n} in the sigma notation for $a(x)=\sum(-1)^n \cdot x^{2n}$

e. Report the radius of convergence of $b(x)$. $R =$ _____ (No Ratio Test needed. See the Fun Facts on the previous page.)

Explore the **left** endpoint:

i. Complete: $b(\square) = \square + \square + \square + \square + \square + \ldots = \sum_{n=0}^{\infty}(-1)^n \cdot \square$ will _____.
{converge, diverge}

Your claim is true because of the _____.
{ Give the name of your convergence test}

Therefore, the **left** endpoint of the interval of convergence, $x =$ ____, is _____ in the interval.
{ included, excluded}
So on the graph of $b(x)$ at the left endpoint there is a _____.
{ hole, point on the graph}

ii. Explore the **right** endpoint:

Complete: $b(\square) = \square + \square + \square + \square + \square + \ldots = \sum_{n=0}^{\infty}(-1)^n \cdot \square$ will _____.
{converge, diverge}

Your claim is true because of the _____.
{ Give the name of your convergence test}

Therefore, the **right** endpoint of the interval of convergence, $x =$ ___, is _____ in the interval.
{ included, excluded}
So on the graph of $b(x)$ at the right endpoint there is a _____.
{ hole, point on the graph}

We conclude the series $b(x)$ in part will converge to the function to its closed form representation on the interval below.
Circle one.

A. $\square \le x \le \square$ B. $\square < x \le \square$ C. $\square \le x < \square$ D. $\square < x < \square$

f. If you enter your closed form expression in a grapher using a viewing window where Xmin = −1 and Xmax = 1. you should see the graph below.
The graph has odd symmetry. Why would you expect this to be the case given what you wrote for the expanded form and the sigma notation?

