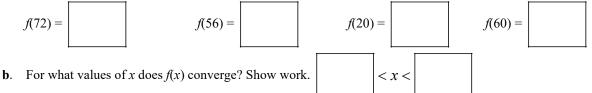
Practice Questions from HW 26

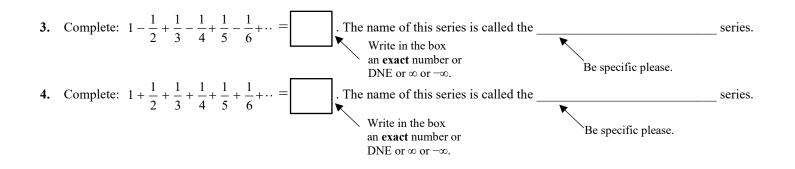
1. Consider the function
$$f(x) = \sum_{n=0}^{\infty} 30 \left(\frac{x-40}{20} \right)^n = 30 + 30 \left(\frac{x-40}{20} \right) + 30 \left(\frac{x-40}{20} \right)^2 + 30 \left(\frac{x-40}{20} \right)^3 + \dots$$

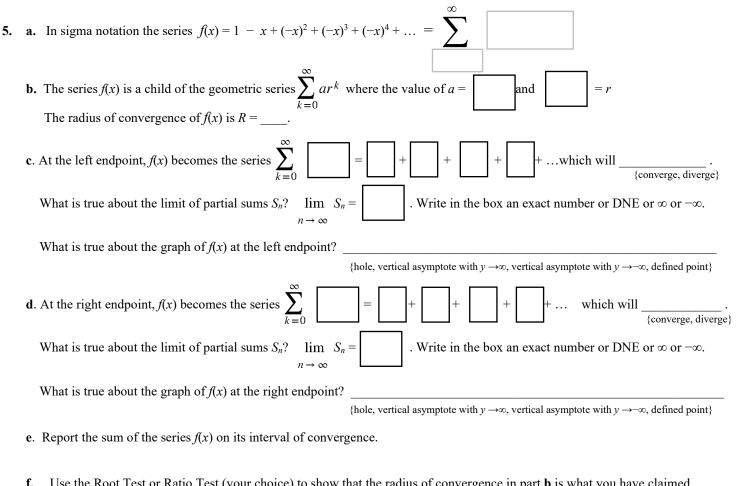
a. Evaluate. No work need be shown. Write in the box an exact number or DNE or ∞ or $-\infty$.



- c. Report the sum of the series on its interval of convergence.
- What is true about the graph of f(x) at the left endpoint? d. {hole, vertical asymptote with $y \rightarrow \infty$, vertical asymptote with $y \rightarrow -\infty$, defined point} What is true about the graph of f(x) at the right endpoint? e. {hole, vertical asymptote with $y \rightarrow \infty$, vertical asymptote with $y \rightarrow -\infty$, defined point} The series $c(x) = \sum_{k=0}^{\infty} \frac{(-1)^{k} \cdot 2x^{5k}}{1024^{k}}$ is a child of the geometric series $\sum_{k=0}^{\infty} ar^{k}$ where the value of $a = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 1 \end{bmatrix}$ 2. and $= \gamma$ $|\langle x \rangle|$ which converges for . You can solve the inequality graphically or with a table. **a**. At the left endpoint, c(x) becomes the series $\sum_{\nu=0}^{\infty}$ + ... which will {converge, diverge} What is true about the limit of partial sums S_n ? lim $S_n =$. Write in the box an exact number or DNE or ∞ or $-\infty$. What is true about the graph of c(x) at the left endpoint? {hole, vertical asymptote with $y \rightarrow \infty$, vertical asymptote with $y \rightarrow -\infty$, defined point} **b**. At the right endpoint, c(x) becomes the series $\sum_{n=1}^{\infty}$ $+ \dots$ which will {converge, diverge} . Write in the box an exact number or DNE or ∞ or $-\infty$. What is true about the limit of partial sums S_n ? lim S_n = What is true about the graph of c(x) at the right endpoint? {hole, vertical asymptote with $y \rightarrow \infty$, vertical asymptote with $y \rightarrow -\infty$, defined point}

c. Report the sum of the series on its interval of convergence.



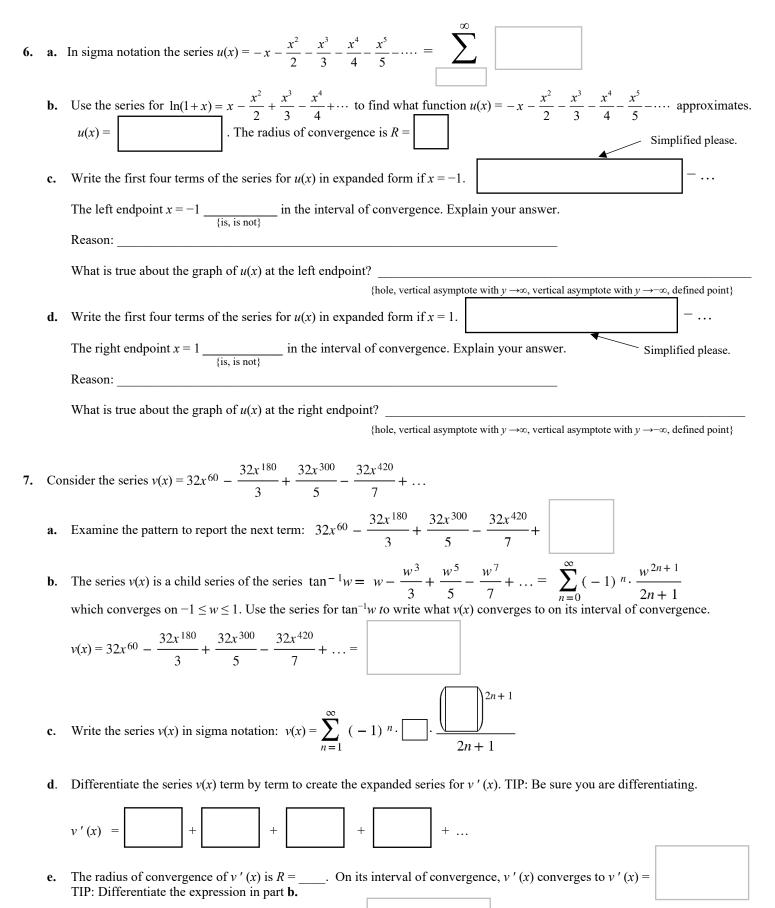


| 1. | (your endled) to sho | w that the radius of converge | ence in part b is what. | you nuve elunneu. |
|----|----------------------|-------------------------------|-------------------------|-------------------|
| | | | | |
| | | | | |

| g. | Integrate the above series term by term to create $g(x) = \int f(x)dx$. TIP: Be sure you are integrating. | | | | |
|------|--|--|--|--|--|
| | g(x) = + + + + + + + + + + + + + + + + + + | | | | |
| h. | The radius of convergence of $g(x)$ is $R = $ | | | | |
| i. 4 | At the left endpoint, $g(x)$ becomes the series $\sum_{k=1}^{\infty} = + + + + + + + + + + + + + + + + + + $ | | | | |
| | What is true about the limit of partial sums S_n ? $\lim_{n \to \infty} S_n = $. Write in the box an exact number or DNE or ∞ or $-\infty$. | | | | |
| | What is true about the graph of $g(x)$ at the left endpoint? {hole, vertical asymptote with $y \to \infty$, vertical asymptote with $y \to -\infty$, defined point} | | | | |
| | (note, vertical asymptote with $y \to \infty$, vertical asymptote with $y \to \infty$, actined point; | | | | |
| j. | At the right endpoint, $g(x)$ becomes the series $\sum_{k=1}^{\infty} = + + + + + + + + + + + + + + + + + + $ | | | | |
| | What is true about the limit of partial sums S_n ? $\lim_{n \to \infty} S_n = $. Write in the box an exact number or DNE or ∞ or $-\infty$. | | | | |
| | What is true about the graph of $g(x)$ at the right endpoint? | | | | |

{hole, vertical asymptote with $y \rightarrow \infty$, vertical asymptote with $y \rightarrow -\infty$, defined point}

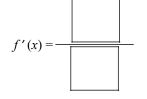
k. Report the sum of the series g(x) on its interval of convergence. TIP: Integrate the expression in 5e.



f. Write the series v'(x) in sigma notation: $v'(x) = \sum_{n=1}^{\infty}$ TIP: Differentiate the expression in part **c.**

| | g. | Write the first four terms of the series $v'(x)$ in expanded form if $x = -1$. | | | |
|----|---|--|--|--|--|
| | | The left endpoint $x = -1$ in the interval of convergence. Explain your answer. Reason: Simplified please. | | | |
| | | What is true about the graph of $v'(x)$ at the left endpoint? | | | |
| | h. | Write the first four terms of the series $v'(x)$ in expanded form if $x = 1$. | | | |
| | | The right endpoint $x = 1$ in the interval of convergence. Explain your answer. Simplified please. Reason: | | | |
| | What is true about the graph of $v'(x)$ at the right endpoint? | | | | |
| | {hole, vertical asymptote with $y \to \infty$, vertical asymptote with $y \to -\infty$, | | | | |
| | d. | Sketch a graph of the series $v'(x)$ on its the interval of convergence. | | | |
| 8. | a. | e term-by-term derivative of $f(x) = \sum_{n=0}^{\infty} 5x^n = 5 + 5x + 5x^2 + 5x^3 + 5x^4 + \cdots$ is the power series below. Write the first four nonzero terms of the series for $f'(x)$. $f'(x) = + \cdots$ | | | |
| | b. | The radius of convergence of $f'(x)$ is $R = $ | | | |
| | c. | If x is equal to the left endpoint of the interval of convergence, the series for $f'(x)$ will | | | |
| | e. | If x is equal to the right endpoint of the interval of convergence, the series for $f'(x)$ will {converge, diverge}. | | | |
| | f. | Write the series for $f'(x)$ in sigma notation. | | | |
| | | $f'(x) = \sum_{n=1}^{\infty} \left(\boxed{} \right)$ | | | |

g. When x is in the interval of convergence, we can write the series for f'(x) as what rational function?



h. Sketch a graph of $\sum_{n=0}^{\infty} 5x^n = 5 + 5x + 5x^2 + 5x^3 + 5x^4 + \cdots$ on its the interval of convergence.