Clicker Questions

Clicker Question 1

Power series representation

Find a power series that represents $\dfrac{x^5}{x^2+3}$ on the interval $(-\sqrt{3}, \sqrt{3})$.

A. $\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^{2n+5}}{3^{2n+6}} x^n$

B. $\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n}{(\sqrt{3})^{n+1}} x^{5n}$

C. $\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n}{(\sqrt{3})^{n+1}} x^n$

D. $\displaystyle\sum_{n=0}^{\infty} \frac{(-1)^n}{3^{n+1}} x^{2n+5}$

E. none of the above

Using the previous example

$$\frac{1}{x+3} = \sum_{n=0}^{\infty} \frac{(-1)^n}{3^{n+1}} x^n \quad (|x| < 3)$$

$$\frac{1}{x^2+3} = \sum_{n=0}^{\infty} \frac{(-1)^n}{3^{n+1}} (x^2)^n \quad (|x^2| < 3)$$

$$\frac{x^5}{x^2+3} = \sum_{n=0}^{\infty} \frac{(-1)^n}{3^{n+1}} (x^2)^n x^5 \quad (|x| < \sqrt{3})$$