

This print-out should have 5 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering.

001 10.0 points

Find a power series representation for the function

$$f(z) = \frac{1}{z-4}.$$

1. $f(z) = -\sum_{n=0}^{\infty} 4^n z^n$
2. $f(z) = \sum_{n=0}^{\infty} (-1)^{n-1} 4^{n+1} z^n$
3. $f(z) = \sum_{n=0}^{\infty} \frac{1}{4^{n+1}} z^n$
4. $f(z) = -\sum_{n=0}^{\infty} \frac{1}{4^{n+1}} z^n$
5. $f(z) = \sum_{n=0}^{\infty} (-1)^n 4^n z^n$

002 10.0 points

Find a power series representation for the function

$$f(x) = \frac{1}{6+x}.$$

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

003 10.0 points

Find a power series representation for the function

$$f(x) = \frac{1}{6-x^3}.$$

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

004 10.0 points

Find a power series representation for

$$\frac{4+3x}{1+x}.$$

Hint: separate then use the series for $\frac{1}{1+x}$.

1. $\frac{4+3x}{1+x} = 4 + \sum_{k=0}^{\infty} (-1)^k x^k$
2. $\frac{4+3x}{1+x} = \sum_{k=1}^{\infty} (-1)^k x^k$
3. $\frac{4+3x}{1+x} = 7 \sum_{k=1}^{\infty} x^k$
4. $\frac{4+3x}{1+x} = 4 + 7 \sum_{k=1}^{\infty} x^k$
5. $\frac{4+3x}{1+x} = 4 + 7 \sum_{k=0}^{\infty} x^k$

$$6. \frac{4 + 3x}{1 + x} = 4 + \sum_{k=1}^{\infty} (-1)^k x^k$$

005 10.0 points

Evaluate the integral

$$f(t) = \int_0^t \frac{s}{1 - s^4} ds.$$

as a power series.

$$1. f(t) = \sum_{n=0}^{\infty} \frac{(-1)^n t^{4n+2}}{4n+2}$$

$$2. f(t) = \sum_{n=0}^{\infty} \frac{t^{4n+2}}{4n+2}$$

$$3. f(t) = \sum_{n=0}^{\infty} \frac{(-1)^n t^{4n}}{4n}$$

$$4. f(t) = \sum_{n=0}^{\infty} \frac{t^{4n}}{4n}$$

$$5. f(t) = \sum_{n=4}^{\infty} \frac{t^{4n}}{4n+2}$$