

MathQuest: Series

Power Series

1. Consider the power series $\sum_{n=1}^{\infty} \frac{(x-4)^n}{4^n}$. What values of x will make this series converge?
 - (a) This series converges for all values of x .
 - (b) This series converges for all values of x between 0 and 8.
 - (c) This series converges for all values of x between -4 and 4.
 - (d) This series converges for all values of x between -8 and 0.
 - (e) This series diverges for all values of x .
2. Consider the power series $\sum_{n=1}^{\infty} \frac{(x-4)^n}{4^n}$. Will this series converge if $x = 0$ or if $x = 8$?
 - (a) This series converges for both $x = 0$ and $x = 8$.
 - (b) This series does not converge for either $x = 0$ or $x = 8$.
 - (c) This series converges for $x = 8$ but does not converge for $x = 0$.
 - (d) This series converges for $x = 0$ but does not converge for $x = 8$.
3. Consider the power series $\sum_{n=1}^{\infty} \frac{(3x)^n}{n^8}$. What values of x will make this series converge?
 - (a) This series converges for all values of x .
 - (b) This series converges for all values of x between -3 and 3.
 - (c) This series converges for all values of x between 0 and 3.
 - (d) This series converges for all values of x between -1/3 and 1/3.
 - (e) This series diverges for all values of x .
4. Consider the power series $\sum_{n=1}^{\infty} \frac{(2x)^n}{n^7}$. Will this series converge if $x = -1/2$ or if $x = +1/2$?
 - (a) This series converges for both $x = -1/2$ and $x = +1/2$.
 - (b) This series does not converge for either $x = -1/2$ or $x = +1/2$.
 - (c) This series converges for $x = -1/2$ but does not converge for $x = +1/2$.
 - (d) This series converges for $x = +1/2$ but does not converge for $x = -1/2$.

5. Consider the power series $\sum_{n=1}^{\infty} \frac{(x-8)^n}{n(-6)^n}$. What values of x will make this series converge?
- (a) This series converges for all values of x .
 - (b) This series converges for all values of x between 2 and 14.
 - (c) This series converges for all values of x between -8 and 8.
 - (d) This series converges for all values of x between 0 and 16.
 - (e) This series diverges for all values of x .
6. Consider the power series $\sum_{n=1}^{\infty} \frac{(x-5)^n}{n(-3)^n}$. Will this series converge if $x = 2$ or if $x = 8$?
- (a) This series converges for both $x = 2$ and $x = 8$.
 - (b) This series does not converge for either $x = 2$ or $x = 8$.
 - (c) This series converges for $x = 2$ but does not converge for $x = 8$.
 - (d) This series converges for $x = 8$ but does not converge for $x = 2$.
7. A power series converges when $x = 2.5, 2.7$ and 2.8 , but diverges when $x = 2.1, 2.2$ and 2.9 . Which of the following could be the point where the power series is centered?
- (a) 2.3
 - (b) 2.6
 - (c) 2.7
 - (d) 2.8
 - (e) All of the above are possible.
 - (f) More than one but not all of the above are possible.