

Taylor Series Worksheet

Twenty problems on known series, transformations, coefficients, intervals, approximations, and error.

Revision: 2026-07-23 **Canonical page:** <https://bettergrades.net/subjects/math/calculus/worksheets/taylor-series/>

Name: _____ **Date:** _____

1. Find the degree-3 Maclaurin polynomial for e^x .

2. Find the degree-5 Maclaurin polynomial for $\sin x$.

3. Find the degree-4 Maclaurin polynomial for $\cos x$.

4. Write the first four nonzero terms of $\ln(1+x)$.

5. Expand $1/(1-x)$ as a power series.

6. Expand $1/(1+x^2)$ as a power series.

7. Expand $1/(1-3x)$ as a power series.

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8. Find a power series for $1/(1-x)$ to the power 2.
 9. Find a power series for $\arctan x$ by integrating $1/(1+x^2)$, and state its interval of convergence.
 10. Find the degree-2 Taylor polynomial for $\ln x$ centered at 1.
 11. Write the Taylor series for e^x centered at a .
 12. If $f^{(n)}(0) = 2^n$ to the power n , find the Maclaurin series.
 13. Use T_3 for e^x to approximate $e^{0.1}$.
 14. Use $x - x^3/6$ to approximate $\sin(0.2)$.
 15. Find the radius of $\sum_{n=1}^{\infty} nx^n/4^n$.
 16. Find the interval of convergence of $\sum_{n=1}^{\infty} x^n/n$.

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17. Find the interval of convergence of $\sum_{n=1}^{\infty} (x-2)^n / (n3^n)$.
18. Find R for $\sum_{n=0}^{\infty} n!(x+1)^n / (2n)!$.
19. Bound the error of the degree-3 Maclaurin approximation to e to the power (0.2).
20. How many terms of the alternating arctan series ensure error below 0.001 at $x=1/2$?