

12.9A

3-10: Find a power series representation for the function and determine the interval of convergence.

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

4. $f(x) = \frac{3}{1-x^4}$

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

6. $f(x) = \frac{1}{1+9x^2}$

7. $f(x) = \frac{1}{x-5}$

8. $f(x) = \frac{x}{4x+1}$

9. $f(x) = \frac{x}{9+x^2}$

10. $f(x) = \frac{x^2}{a^3-x^3}$

12.9B

15-18: Find a power series representation for the function and determine the radius of convergence.

15. $f(x) = \ln(5-x)$

16. $f(x) = \frac{x^2}{(1-2x)^2}$

17. $f(x) = \frac{x^3}{(x-2)^2}$

18. $f(x) = \arctan\left(\frac{x}{3}\right)$

19-22: Find a power series representation for f , and graph f as several partial sums $s_n(x)$ on the same screen. What happens as x increases?

19. $f(x) = \ln(3+x)$

20. $f(x) = \frac{1}{x^2+25}$

21. $f(x) = \ln\left(\frac{1+x}{1-x}\right)$

22. $f(x) = \tan^{-1}(2x)$

23-26: Evaluate the indefinite integral as a power series. What is the radius of convergence?

23. $\int \frac{t}{1-t^8} dt$

24. $\int \frac{\ln(1-t)}{t} dt$

25. $\int \frac{x - \tan^{-1} x}{x^3} dx$

26. $\int \tan^{-1}(x^2) dx$

27-30: Use a power series to approximate the definite integral to six decimal places.

27. $\int_0^{0.2} \frac{1}{1+x^5} dx$

28. $\int_0^{0.4} \ln(1+x^4) dx$

29. $\int_0^{\sqrt[3]{3}} x^2 \tan^{-1}(x^4) dx$

30. $\int_0^{0.5} \frac{dx}{1+x^6}$