1. Differentiate  \( y = \ln(x + \ln(x + \ln(x))) \)

2. Find \( \frac{dy}{dx} \) by implicit differentiation of  \( x^3 + x^2y + xy^2 + y^3 = 1 \)

3. Differentiate  \( y = (\ln x)^{\ln x} \)

4. Sketch the curve  \( y = x^{\frac{5}{3}} - 5x^{\frac{2}{3}} \)

5. Sketch the curve  \( y = \ln(1 + x^2) \)

6. Find  \( \lim_{x \to \infty} \frac{\ln(1+e^x)}{x} \)

7. Find  \( \lim_{x \to \infty} (xe^{\frac{1}{x}} - x) \)

8. Show that the equation  \( x^5 + x + 1 = 0 \) has at least one root.

9. Determine  \( \lim_{n \to \infty} \sum_{i=1}^{n} \frac{\pi}{2n} \sin \frac{i\pi}{2n} \)

   Hint: interpret as Riemann sums and evaluate the definite integral.

10. Evaluate  \( \int_1^2 (1 + \frac{1}{x})^2 dx \)

11. Find  \( \frac{d}{dx} \int_1^{\sqrt{x}} \sqrt{t} dt \)

12. Find all extrema of  \( f(x) = x + \frac{1}{x} \) for  \( \frac{1}{2} \leq x \leq 2 \)

13. #38 p.262.

14. #42 p.338.