

1. Evaluate the following limit of sequence

$$\lim \frac{\sqrt{n} + n^{\frac{1}{3}}}{n^{\frac{1}{2}} - 1}.$$

2. Compute f' and f'' for

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

3. Find all local extremes of a function

$$f(x) = e^{x-x^2}$$

4. Compute

$$\int \frac{2^{x+1} - 5^{x-1}}{10^x} dx.$$

5. Find a solution to

$$y' = y(10 - y)$$

satisfying $y(0) = 5$.

6. Find all solutions to

$$y'' + 8y' + 20y = 0.$$