1. Newton’s method is used to estimate the \( x \)-coordinate of the point of intersection of the curves \( y = x^2(x + 1) \) and \( y = \frac{1}{x} \) \((x > 0)\). If we start with \( x_0 = 1 \), then find \( x_1 \).

2. Find the dimensions of the rectangle of largest area that can be inscribed in a circle of radius \( r \).
3. Find \( y \) that satisfies: \(\frac{dy}{dx} = \frac{\csc \theta}{\csc \theta - \sin \theta}; \quad y(0) = 1\)

4. Evaluate \( \lim_{x \to \infty} (1+2x)^{(1/2 \ln x)} \)

5. Evaluate \( \lim_{x \to 1^+} \left( \frac{1}{x-1} - \frac{1}{\ln x} \right) \)