Suggested practice questions (the answers are in the back of the textbook):

• §4.1; 1, 3, 15, 29, 33, 47, 55, 63, 75, 77.

1. Calculate:
   \[ \lim_{\theta \to \pi/2} \frac{1 - \sin \theta}{\csc \theta}. \]

2. Prove the following result:

   **Proposition.** For any \( \rho > 0 \),
   \[ \lim_{x \to \infty} \frac{\ln x}{x^\rho} = 0. \]

3. Find the critical numbers of:
   
   (i) \( f(x) = x^3 + x^2 - x, \)
   
   (ii) \( g(\theta) = 4\theta - \tan \theta. \)

4. Find the global maximum and global minimum values of the following functions on the given intervals:
   
   (i) \( f(x) = x^3 - 6x^2 + 9x + 2 \) on the interval \([-1, 4], \)
   
   (ii) \( f(x) = 2x^3 - 3x^2 - 12x + 1 \) on the interval \([-2, 3], \)
   
   (iii) \( f(x) = (x^2 - 1)^3 \) on the interval \([-1, 2], \)
   
   (iv) \( f(x) = xe^{-x} \) on the interval \([0, 2], \)

http://erdos.math.unb.ca/~kasprzyk/
kasprzyk@unb.ca.