Problem 1
Compute the following limits. If they don’t exist, explain why.

1. \[ \lim_{{x \to 1}} \frac{x - 2}{(x - 1)^2} \]
2. \[ \lim_{{x \to 1}} \frac{x - 2}{(x - 1)^3} \]
3. \[ \lim_{{x \to -\infty}} \frac{4x^4 + 2x^2 + 1}{3x^4 + 6} \]
4. \[ \lim_{{x \to \infty}} \frac{e^x + \sin x}{\cos x + \ln x} \]
5. \[ \lim_{{x \to \infty}} (\sqrt{x^2 + ax} - \sqrt{x^2 + bx}) \]
6. \[ \lim_{{x \to -\infty}} (x^4 + x^5) \]
7. \[ \lim_{{x \to 2\pi^{-}}} e^x \csc x \]

Problem 2
Find all vertical and horizontal asymptotes of the following function:

1. \[ f(x) = \frac{2x^2 + x - 1}{x^2 + x - 2} \]
2. \[ g(x) = \frac{e^x \ln |x|}{2e^x - 5} \]

Problem 3
A tank contains 5000 liters of pure water. A solution that contains 30g of salt per liter of water is being pumped inside the tank at a rate of 25L/min. Show that the concentration of salt after \( t \) minutes (in grams per liter) is \( C(t) = \frac{30t}{200t+1} \). What happens to the concentration as \( t \to \infty \)?