1. (10 pts) Solve the initial value problem.

(a) $\dfrac{dy}{dx} = xy^2, \ y(0) = -2$

(b) $\dfrac{dy}{dx} = e^y, \ y(0) = 0$

2. (10 pts) Find the limit of the *sequence* if it converges. Otherwise explain why it diverges.

(a) $a_n = \dfrac{n^2 + n + 2}{n^2 + n}$

(b) $a_n = \dfrac{n^2}{e^n}$

(c) $a_n = \cos\left(\dfrac{1}{2^n}\right)$

(d) $a_n = \dfrac{\sin(n^2)}{n}$