Instructions. Show all work, with clear logical steps. No work or hard-to-follow work will lose points.

Problem 1. (5 points) For the given function and values of z

$$f(x, y) = \ln\left(y - e^{5x}\right), \quad z = 0, \ln 10,$$

(a) What is the domain of this function?

(b) What type of function describes the level curves?

(c) Give a sketch of the level curves.

(d) What functions $y = f(x)$ do you get for these values of z?

Problem 2. (4 points) How much money should you invest today at an annual interest rate of 6.7% compounded continuously so that, starting 2 years from today you can make annual withdrawals of \$2600 in perpetuity?

Problem 3. (1 points) Which lesson numbers will be relevant for our exam over lessons 13 through 19?