EE 230 — HW 3.4   Name_____

In your first job at Acme Electronics, your new boss wants you to build an amplifier as your initial project. He asks you to design an inverting amp that will take a 10-kHz sine wave with an amplitude of 50 mV and amplify it so that the output has amplitude of 12 V. In addition to the usual resistors, etc. he wants you to use the BS99[1] op amp that he found on Digi-Key for $0.05 per part. The specs for the BS99 are:

- It works only with ±12.5 V power supplies. (It does have rail-to-rail outputs, so the output can go all the to these limits.)

- The gain-bandwidth product of the op amp is 1 MHz.

- The slew rate of the op amp is 0.5 V/μs. (5×10^5 V/s).

- The offset voltage is 5 mV. (The bias currents are zero and so can be ignored.)

Since you successfully completed EE 230 (We are being optimistic here.) and know all about op amps, you realize that you are faced with the prospect of telling the boss why his cheap, crappy op amp will not work. In fact, there are three reasons why it won't work, one relating to gain-bandwidth, one relaxing to slew rate, and one relating to output limits. Explain, using numbers, why this op amp fails in each of these different aspects.

After showing the boss how good you really are, he swallows his pride and asks you to choose an op amp that will do the job. The first step, of course, is to determine the required parameters. Calculate the required minimum (or maximum) limit for each of the key parameters

GBW ≥ _____

Slew rate ≥ _____

V_{OS} ≤ _____

_____

[1] Totally made up.

Write your answers — and whatever work will fit — on this sheet. Staple any sheets with additional work behind.