Problem 1 (25 points)
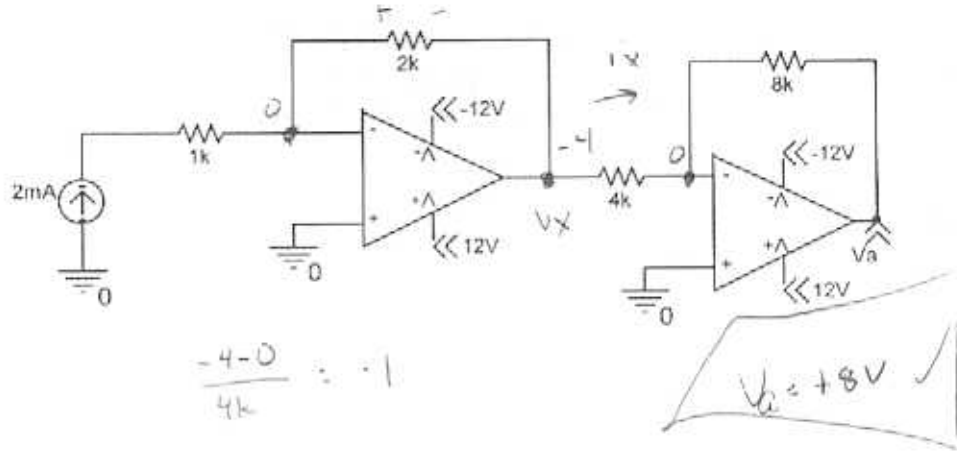
In the circuit below, find Va. **DO NOT IGNORE THE EFFECTS OF THE RAIL VOLTAGES.**

$V_{p1} = V_{n1} = 0$

$\dfrac{-4-0}{4k} = -1$

$V_a = +8V$ ✓

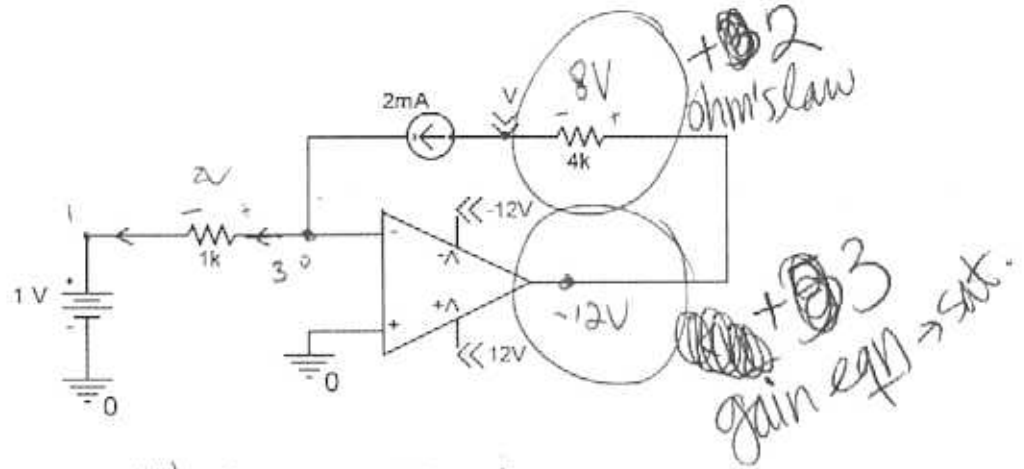$V_x = 0 - (2k)(2mA) = -4V$

$I_x = \dfrac{-4-0}{4k} = -1 mA$

$V_{p2} = V_{n2} = 0$

$V_a = 0 - (8k)(-1mA) = +8V$

Va = _____8V_____

Problem 4 (12 points)

In the circuit below, find V. **DO NOT IGNORE THE EFFECTS OF THE RAIL VOLTAGES!**

2mA

V   -8V

4k

+2 ohm's law

2v

1k   3

-12V

1 V

-12U

+3 gain eqn → sat.

0

Gross $V_n = V_p = 0$ Wrong

$V_n = 3$ KUL +   4

$V_n \neq V_p$

$A(V_p - V_n) = A(0 - 3) \rightarrow -\infty \Rightarrow V_{out} = -12U$

-12

$V + 8U = -12$ +3 KUL

$V = -20$

$V = \underline{\quad -20U \quad}$

8