

2. For each of the two circuits in figure 2, perform the calculations for (a) and (b) by hand. Assume $V_{T0}=0.5V$, $k'W/L = 8mA/V^2$, $\lambda=0.1V^{-1}$, $\gamma=0.2V^{1/2}$, $R_1=10k\Omega$, $R_2=2k\Omega$, $R_3=10k\Omega$, $R_4=10k\Omega$, $V_{DD}=3V$.

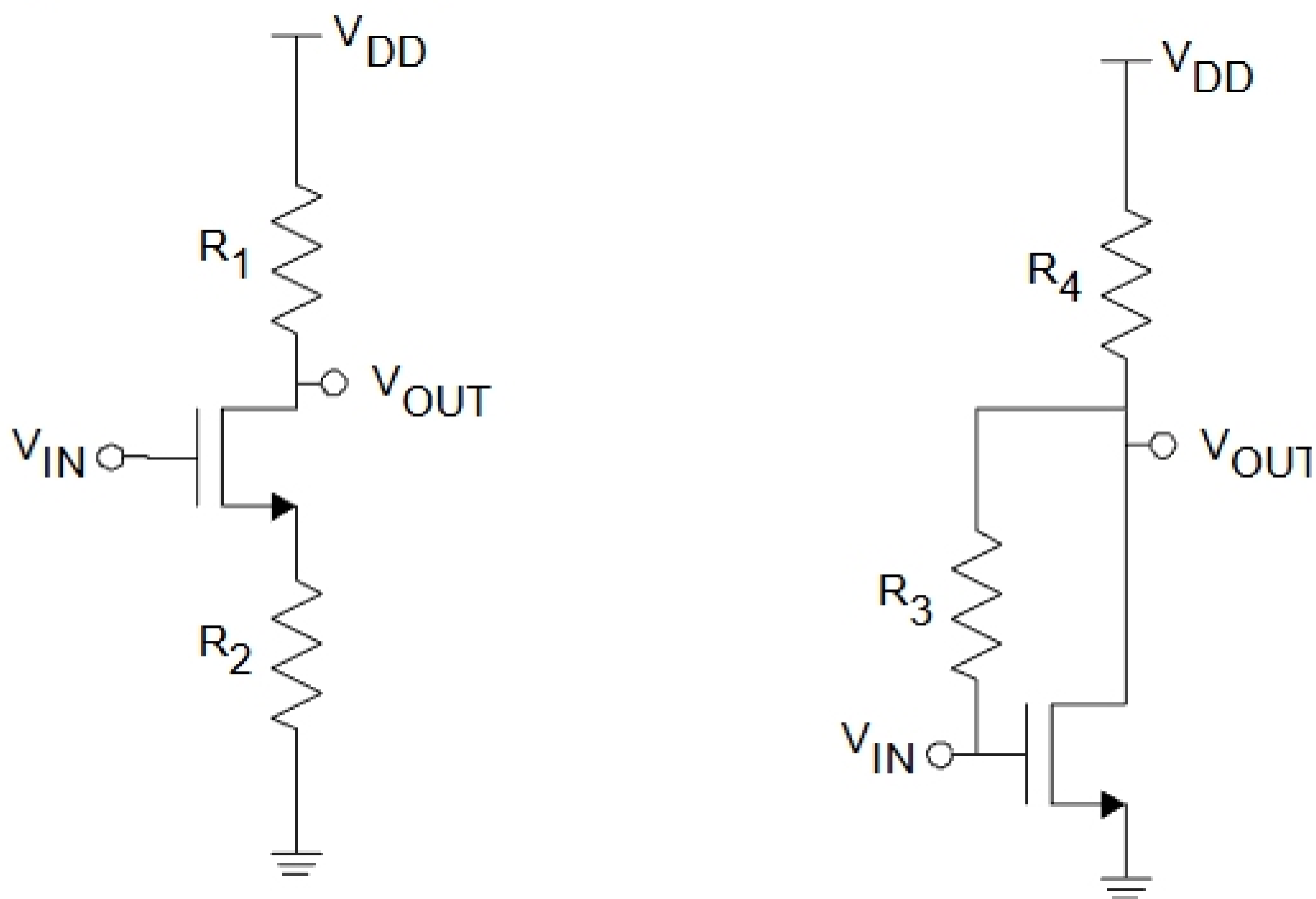


Figure 2

- a) Determine the dc voltage V_{IN} so that V_{OUT} is at 1.5V. Assume that V_{IN} is between 0 and V_{DD} .
 - b) Calculate the operating point parameters I_{DS} , V_T and V_{DSAT} , and the small signal-parameters g_m , g_{mbs} , and r_o .
3. Razavi, problem 2.5, parts a-d. Some notes on the problems are below
- a. Table 2-1 w/ the required device parameters is on p. 37
 - b. Be sure to numerically label the voltages breakpoints at which the transistor changes modes (i.e. from linear to saturation and so forth).
 - c. Remember that the notation for a drain vs. source node is only notation! For an NMOS device, the drain is determined by which of these two nodes has a higher voltage. Therefore, as voltages are swept, the drain and source nodes can become interchanged!