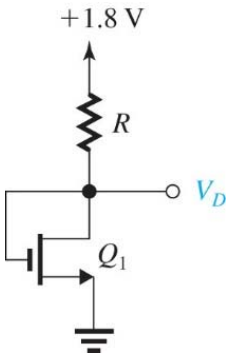
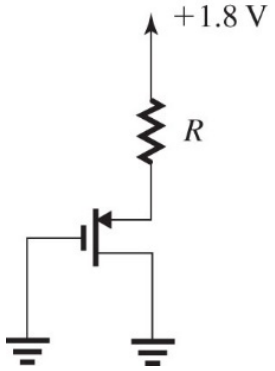
Exercise MOSFET (2)

Problem 1 (*Exercise D5.9 in 7th edition textbook.*)
For the circuit below, find the value of R that results in $V_D = 0.7$ V. The MOSFET has $V_{tn} = 0.5$ V, $\mu_n C_{ox} = 0.4$ mA/V^2, and $W/L = 0.72$ µm / 0.18 µm.



Problem 2 (*Exercise 5.14 in 7th edition textbook.*)

For the circuit below, find he value of R that results in the PMOS transistor operating with an overdrive voltage of $|V_{OV}| = 0.6$ V. The threshold voltage is $V_{tp} = -0.4$ V, $k_p' = 0.1$ mA/V^2, and $W/L = 10\ \mu m / 0.18\ \mu m$.



Problem 3 (*Problem 5.51 in 7th edition textbook.*)
The NMOS transistors in the circuit below have $V_t = 0.5$ V, $\mu_n C_{ox} = 90\ \mu A/V^2$, and $L_1 = L_2 = L_3 = 0.5\ \mu m$. Find the required values of gate width for each of Q_1, Q_2, and Q_3 to obtain the voltage and current values indicated.