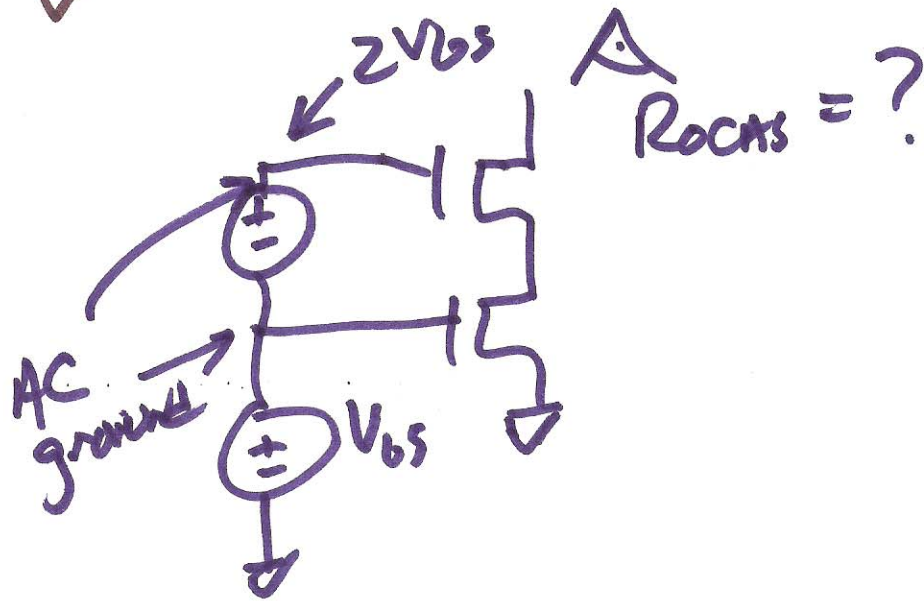
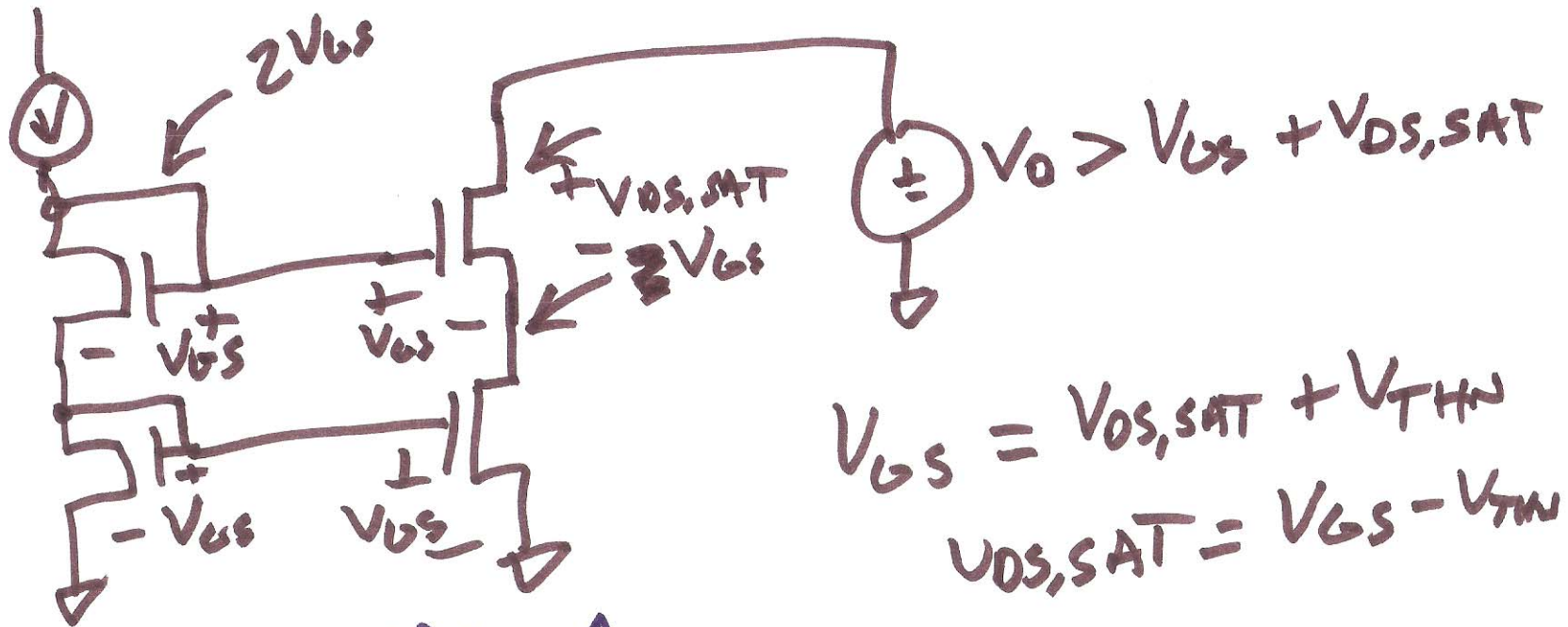
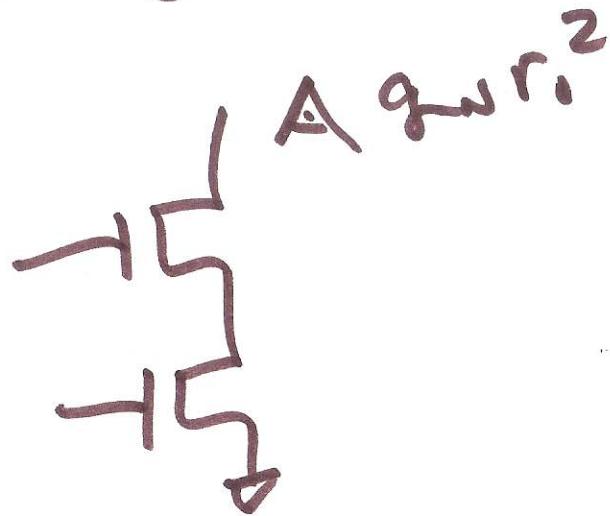
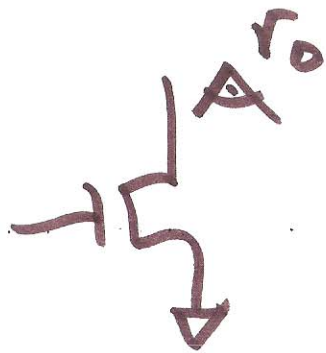


CASCODE CURRENT MIRRORS

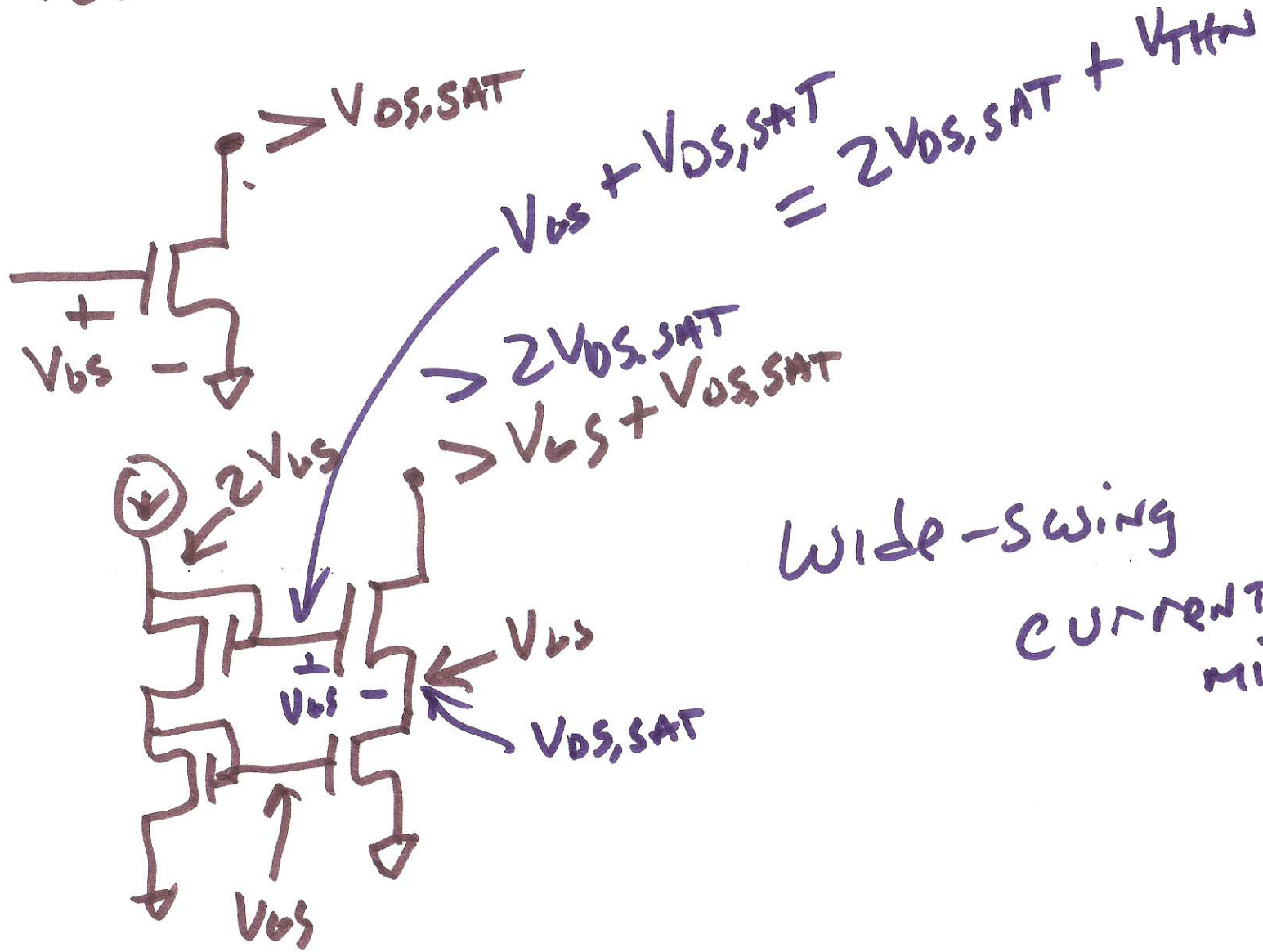


$$i_T(2 + g_{m1}r_o) = \frac{v_T}{r_o}$$

$$R_{out} = \frac{v_T}{i_T} = r_o(2 + g_{m1} \cdot r_o)$$
$$\approx g_{m1} \cdot r_o^2$$

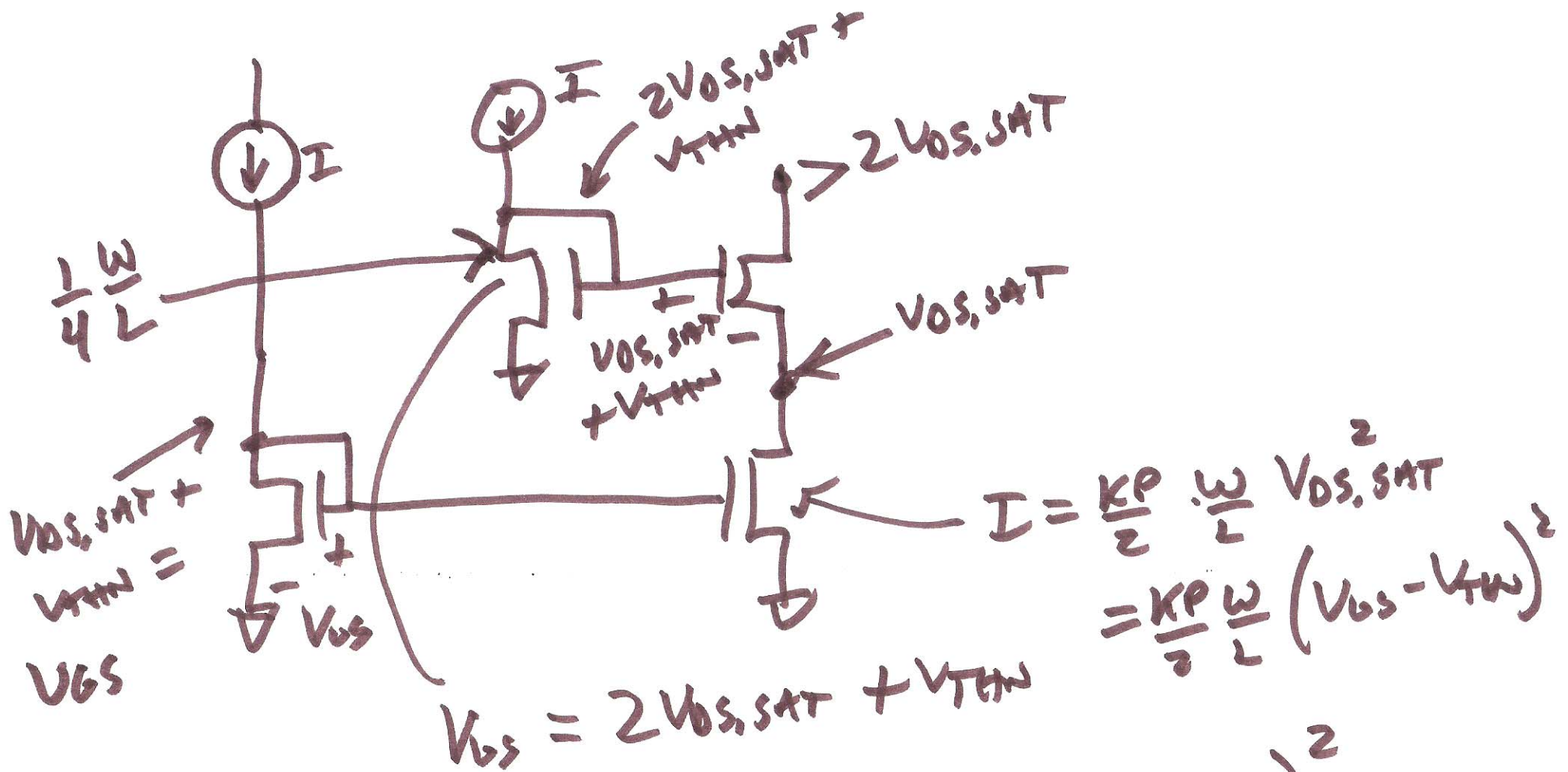


$$V_{GS} = V_{DS,SAT} + V_{THN}$$

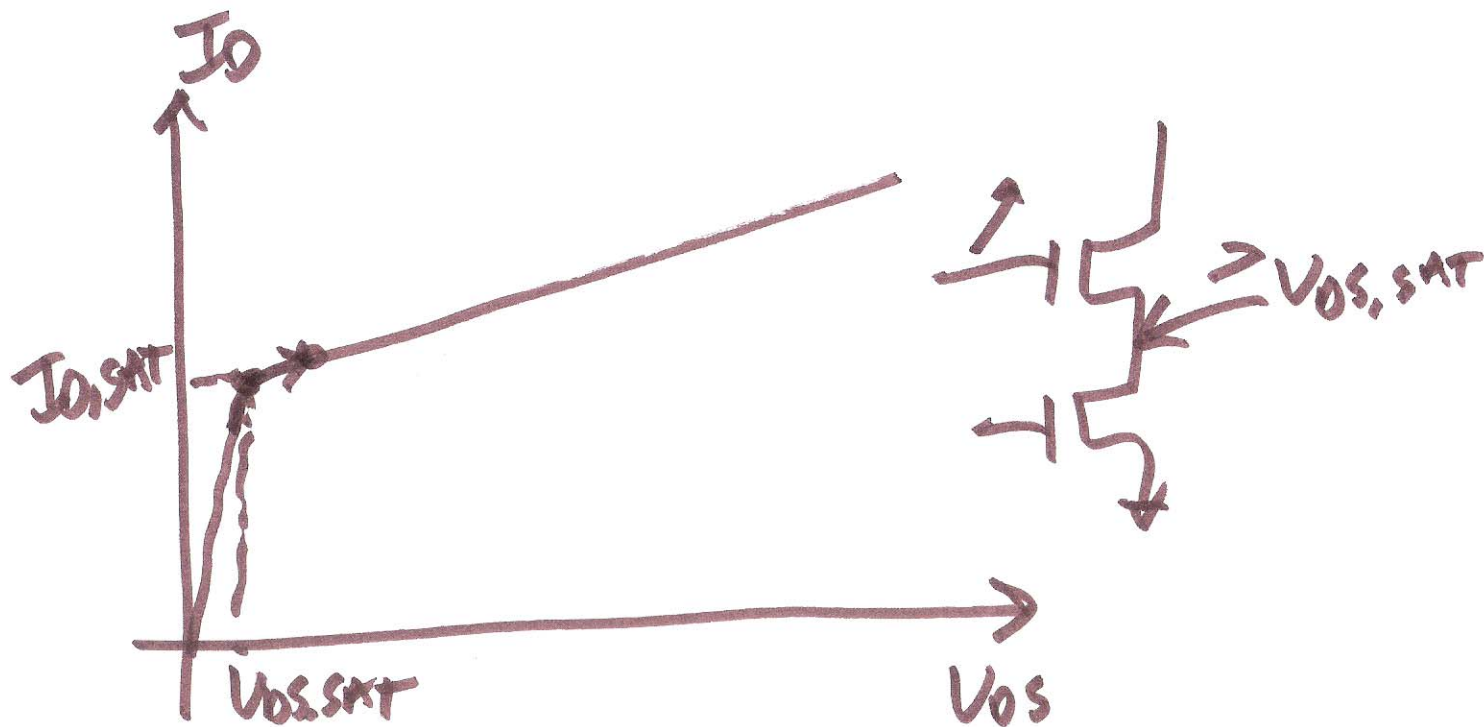


Wide-swing
CURRENT
MIRROR

4)



$$\begin{aligned}
 I &= \frac{K_P}{2} \frac{W}{L} (2V_{OS,SAT} + V_{THN} - V_{THN})^2 \\
 &= \frac{K_P}{2} \frac{W}{L} \cdot 4 (V_{OS,SAT})^2
 \end{aligned}$$



$$\frac{1}{5} \quad \frac{3}{7}$$

$$\frac{1}{20} \quad \frac{3}{7}$$

6)