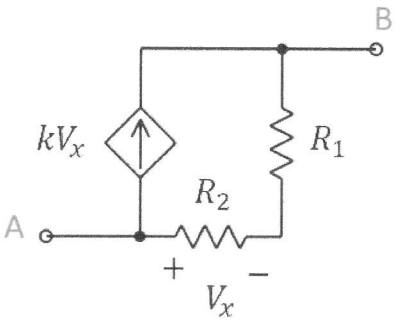
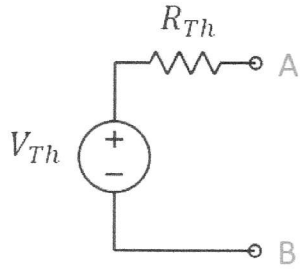
The circuit on the right represent the Thevenin model of the circuit on the left. Find the value of $V_{Th}$ and $R_{Th}$.



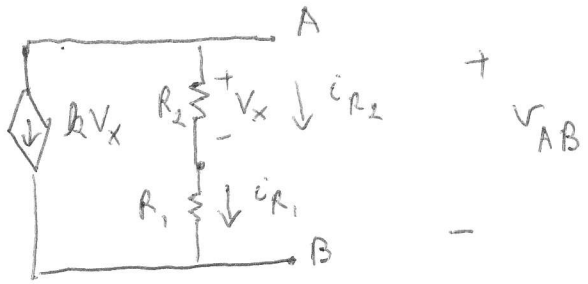




$R_1 = 4\,\Omega$

$R_2 = 2\,\Omega$

$k = -2\ \frac{A}{V}$

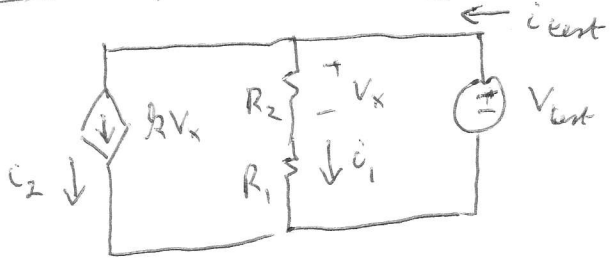
REDRAW:




(a) LEAVE A-B OPEN: KCL: $kV_x + \frac{V_x}{R_2} = 0 \Rightarrow \left(k + \frac{1}{R_2}\right) V_x = 0 \Rightarrow V_x = 0$

$\Rightarrow i_{R_2} = i_{R_1} = 0\,A \Rightarrow v_{AB} = 0 \Rightarrow \boxed{V_{TH} = 0\,V}$

(b) FOR $R_{TH}$, APPLY TEST VOLTAGE




$i_1 = \frac{V_{test}}{R_1 + R_2}$ (voltage divider)

$i_2 = kV_x = k\,V_{test}\,\frac{R_2}{R_1 + R_2}$

$i_{test} = i_1 + i_2 = V_{test}\,\frac{(1 + kR_2)}{R_1 + R_2}$

$\Rightarrow R_{TH} = \frac{V_{test}}{i_{test}} = \frac{R_1 + R_2}{1 + kR_2} = \frac{4+2}{1+(-2)2} = \frac{6}{-3}$

$\boxed{R_{TH} = -2\,\Omega}$