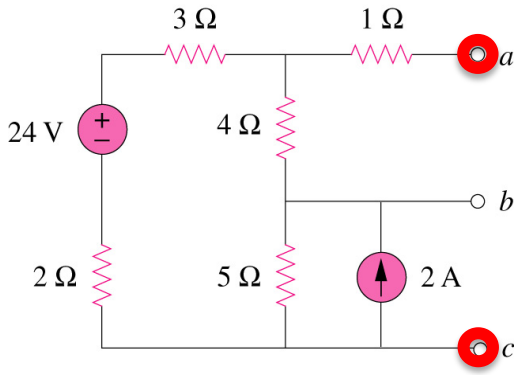
EGR 220 HW 5 Due March 5

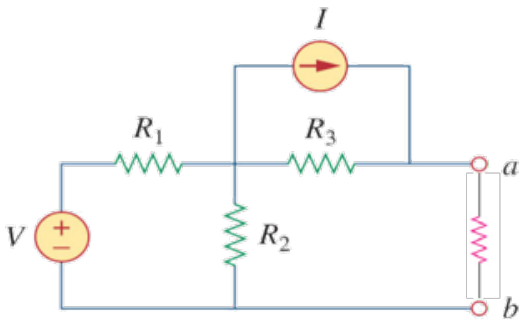
Problem 1

Continuing from the sample problem posted on the webpage, now find the Thevenin equivalent circuit from terminal *a* to *c*. Be sure to draw and label your final Thevenin equivalent circuit.



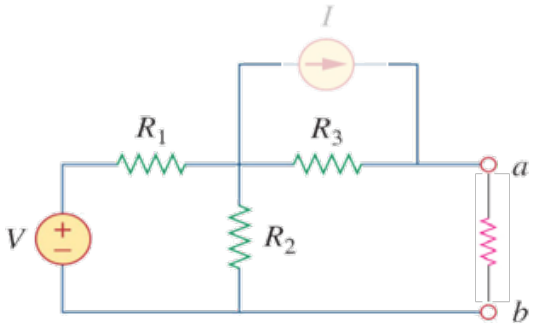
Problem 2

Find and draw the Thevenin equivalent circuit from nodes *a*-*b* for the circuit below.



Problem 3

For the circuit in problem 2, set the current source equal to 0A, Find the Thevenin equivalent circuit from nodes *a*-*b*.



Problem 4

Now assume the element values for the circuits in Problems 3 and 4 are as shown below.

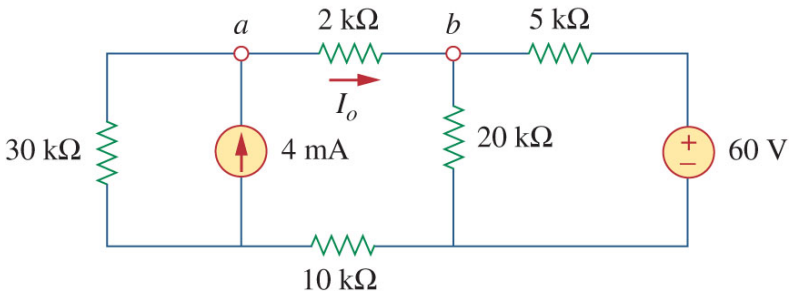
- What is the maximum power that can be delivered to a load resistor in each case (problem 2 and problem 3)?
- (The purpose of these three problems is to gain more practice with Thevenin equivalent circuits, the maximum power transfer, and to gain more confidence with the role of a resistor in the position of R_3 when it is and is not energized.)

V_{source}	5V
I_{source}	2mA
R_1	10kΩ
R_2	25kΩ
R_3	5kΩ

Problem 5

Consider the circuit below. An ammeter with internal resistance R_m is inserted between a and b to measure I_0. Find the Thevenin equivalent circuit at terminals a-b and then use this equivalent circuit to determine the reading of the ammeter if:

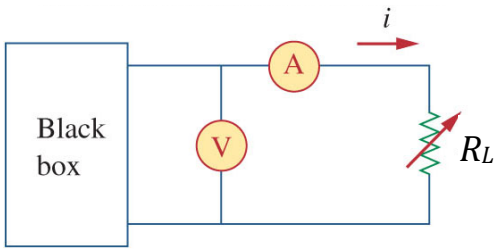
a) $R_m = 500\Omega$
b) $R_m = 0\Omega$



Problem 6

A black box with a circuit in it is connected to a variable resistor. An ideal ammeter (with zero resistance) and an ideal voltmeter (with infinite resistance) are used to measure current and voltage as shown in the figure below. The results of these measurements are shown in the table below.

a) What current, I, will be measured when $R_L = 15k\Omega$?
b) Determine the maximum power that can be delivered from the box.



R_L (Ω)	I (mA)
5k	1.2
8k	1.0
15k	?