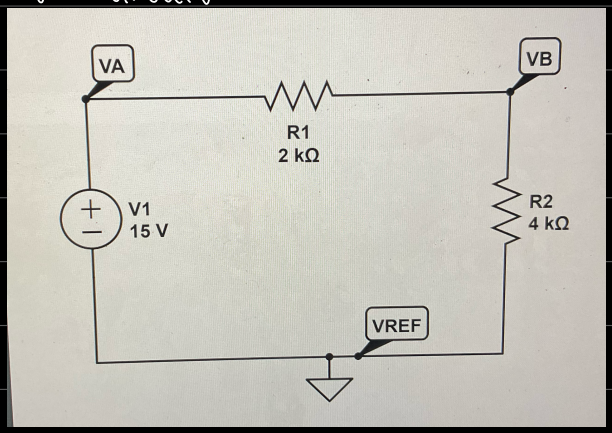
Homework 1

① The circuit



The values:

V(VA)	15.00 V
V(VB)	10.00 V
V(VREF)	0.000 V
V(VA)-V(VB)	5.000 V
P(V1)	-37.50 mW
P(R1)	12.50 mW
P(R2)	25.00 mW

My Calculations

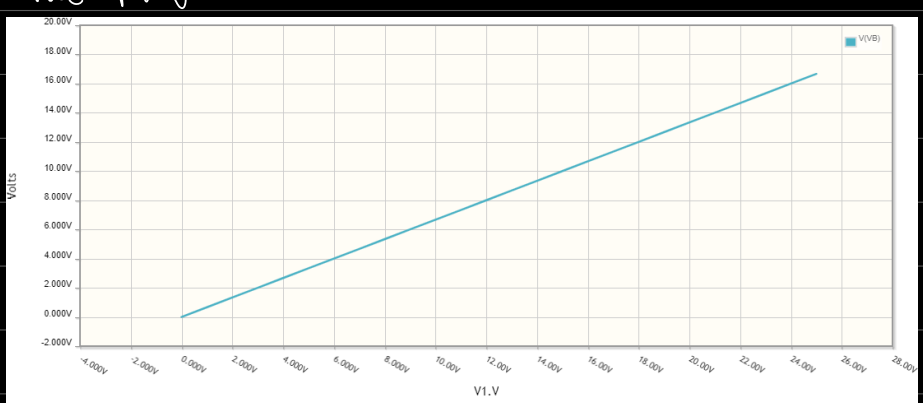
(a) $P_{V_1} = V1 = 15V \times -2.5mA = -37.50mV$

(b) $P_{R_1} = I^2R = 2.5^2 \times 2000 = 12.5mW$

(c) $P_{R_2} = I^2R = 2.5^2 \times 4000 = 25.0mW$

∴ No Discrepancies.

② The Plot:



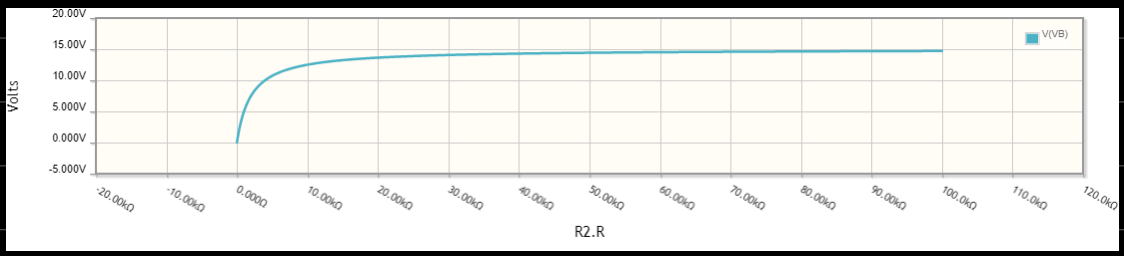
Recorded Voltage is 185.2mV

My Calculations:

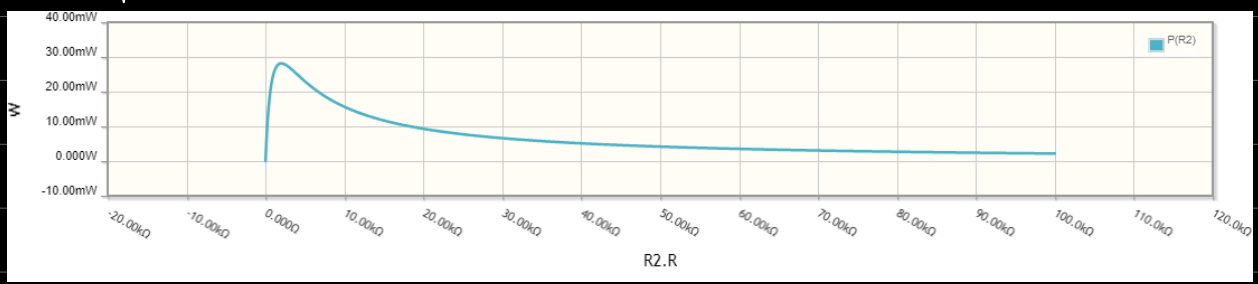
Voltage divider $= V \times \frac{R_2}{R_1+R_2} \Rightarrow 25 \times \frac{4}{6} = \frac{50}{3} = 16.67mV$

∴ My value is smaller. I don't know why. I probably did not get the calculation right.

(3) The plot:



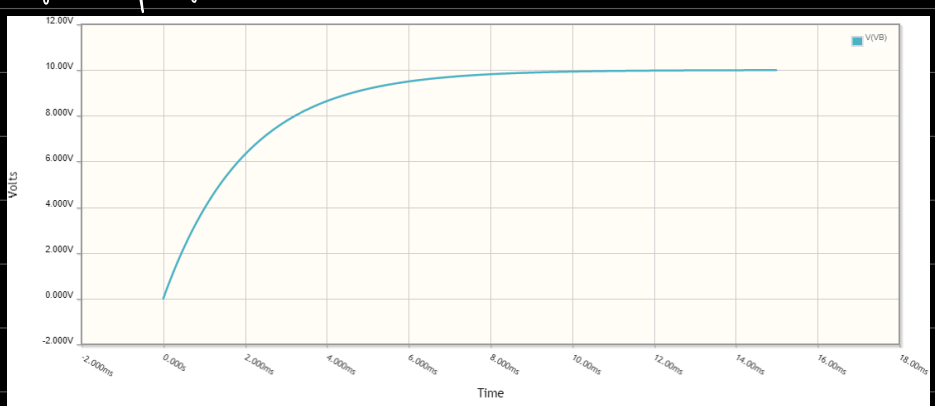
The plot for the power:



Recorded values: $R_2 = 1.700 k\Omega$, Power $= 27.94 mW$

The value of R_2 is smaller than R_1.

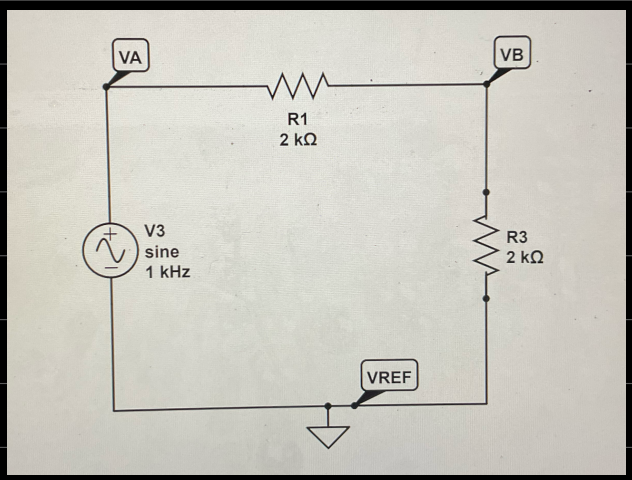
(4) The plot:



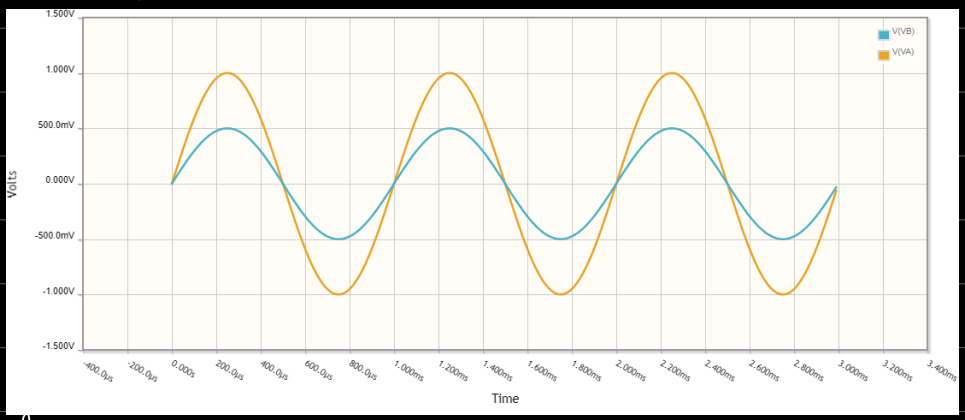
$T = RC = 2 \times 10^{3} \times 1 \times 10^{-6} = 2 \times 10^{-3}$

$5T = 10.00 ms$

(5) The circuit



The plot:



Peak voltage of VA = 1.000V

Peak voltage of VB = 500.0mV

The phase relationship is 0 rad because they are on the same frequency.