Pre-Lab1

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1.3 Prelab Assignment:

1- a) Use Graph (1.1) to plot the **i-v characteristic** of a **3.3 kΩ** resistor, and a **10 kΩ** resistor.
b) Use your plots to find the **missing data** in the following table.

Resistor	Voltage across (V)	Current through (mA)	Power absorbed (mW)
3.3 kΩ	10	3	30
10 kΩ	10		10
3.3 kΩ	3.3	1	3.3
10 kΩ	10	1	10

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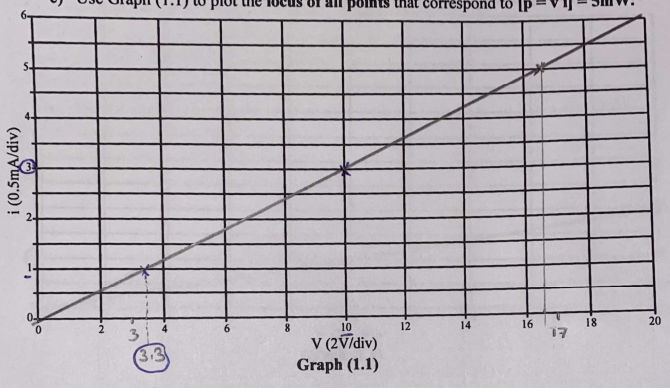
1 a),b)

3.3 KΩ

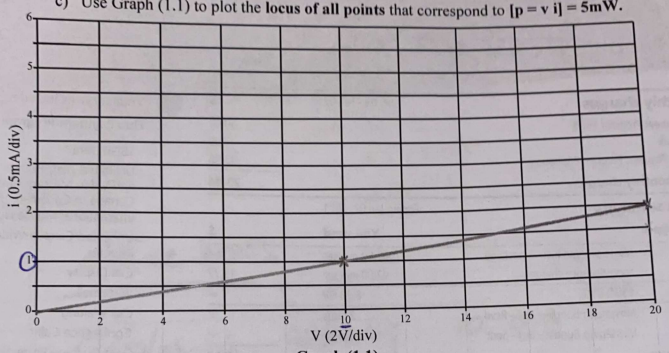
c) Use Graph (1.1) to plot the **locus of all points** that correspond to **[p = v i] = 5mW.**



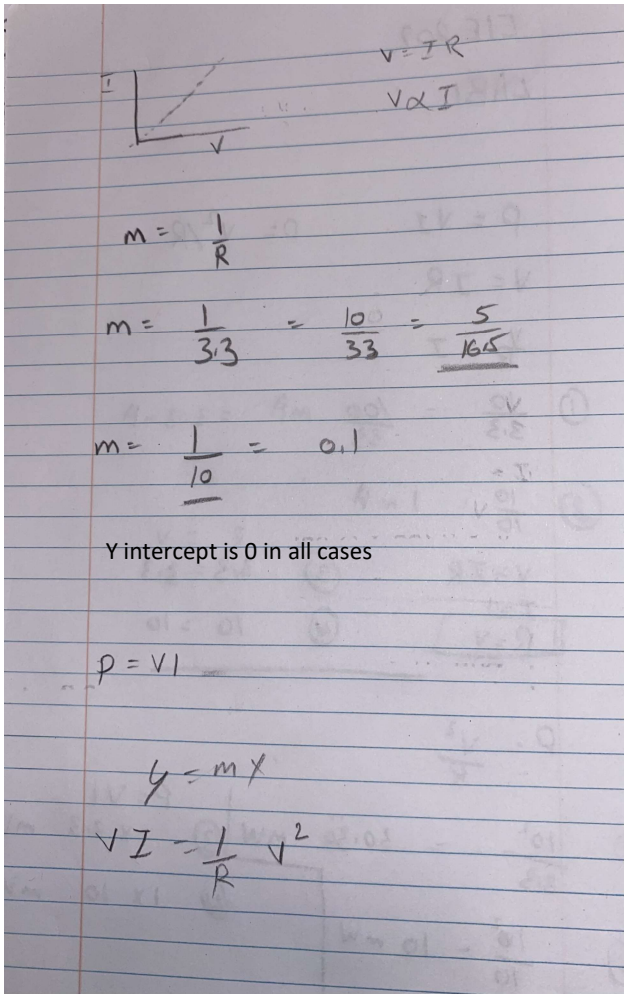
Graph (1.1)

10 KΩ

c) Use Graph (1.1) to plot the **locus of all points** that correspond to **[p = v i] = 5mW.**



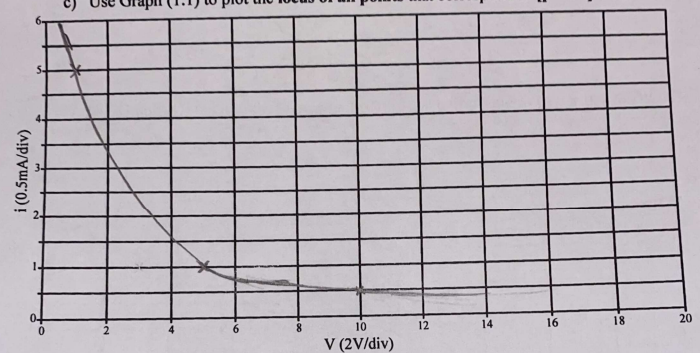
Graph (1.1)



Y intercept is 0 in all cases

P=5 I*V=5

c) Use Graph (1.1) to plot the **locus of all points** that correspond to **[p = v i] = 5mW.**



Graph (1.1)

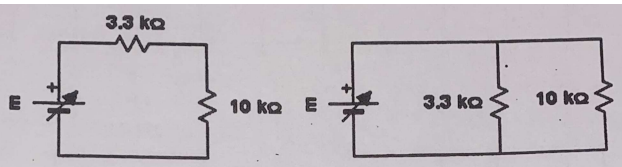


Fig (1.1) **Fig (1.2)**

2- Consider the simple series circuit shown in Fig (1.1).
   a) Find the value of the voltage source "**E**" that is required to provide a **10V** across the **10kΩ** resistor. What are the values of **[V_{10k}/E]** and **[$V_{3.3k}$/V_{10k}]**?
   b) Determine the amount of power supplied by the voltage source when **E = 20V.** What are the values of **[$P_{3.3k}$/P_{10k}]** and **[$P_{3.3k}$/P_{supply}]**?

3- Consider the simple parallel circuit shown in Fig (1.2).
   a) Find the value of "**E**" that is required to provide a **2mA** current through the **10kΩ** resistor. What are the values of **[$I_{3.3k}$/I_{10k}]** and **[$I_{3.3k}$/I_{supply}]**?
   b) Determine the amount of power supplied by the voltage source when the voltage across the **3.3 kΩ** resistor is **10V.** What are the values of **[$P_{3.3k}$/P_{10k}]** and **[$P_{3.3k}$/P_{supply}]**?

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2a) 3.3 kΩ, 10 kΩ

V=10 V
R=10kΩ
I=?
V=IR
10 = I × 10×10³
I = 0.001Amps

V=?
R=3300
I=0.001
V=IR
V = 3300 × 0.001
V = 3.3 V

E = V₁ + V₂ = 13.3 V

$\frac{V_{10k}}{E} = \frac{10}{13.3}$ $\frac{V_{3.3k}}{V_{10k}} = \frac{3.3}{10}$

2b) V=20
I=?
R = 13.3 kΩ

$\frac{V}{R} = I$

I = 1.5038 mA

$P_{supply} = 20 \times 1.5038 \times 10^{-3} = 0.030075$ W

$P_{3.3k} = I^2R = \left(\frac{200}{133}\right)^2 \times 3.3 = 0.00746$W

$P_{10k} = I^2R = \left(\frac{200}{133}\right)^2 \times 10 = 0.0226$ W

$\frac{P_{3.3k}}{P_{10k}} = \frac{7.46}{22.61}$ $\frac{P_{3.3k}}{P_{supply}} = \frac{7.46}{30}$

= 0.3299 = 0.2487

3a) 3.3kΩ, 10kΩ

V=?
I=0.002
R=10000
V=IR = 0.002 × 10 000 = 20

E=20

V=20 $\frac{V}{R} = \frac{20}{3300} = I$
R=3.3kΩ I = 0.006061
I=?

$\frac{I_{3.3k}}{I_{10k}} = \frac{0.006061}{0.002} = 3.03$

$\frac{I_{3.3k}}{I_T} = \frac{0.006061}{0.008061} = 0.752$

3b) V=10
I=?
R=3300
V=IR
I = 0.00303

$P_{3.3k} = 0.0303$
$P_{10k} = 0.01$

$\frac{P_{3.3k}}{P_{10k}} = 3.03$

V=10
I=?
R=10000
I=0.001

$\frac{P_{3.3k}}{P_T} = \frac{0.0303}{0.0403} = 0.752$