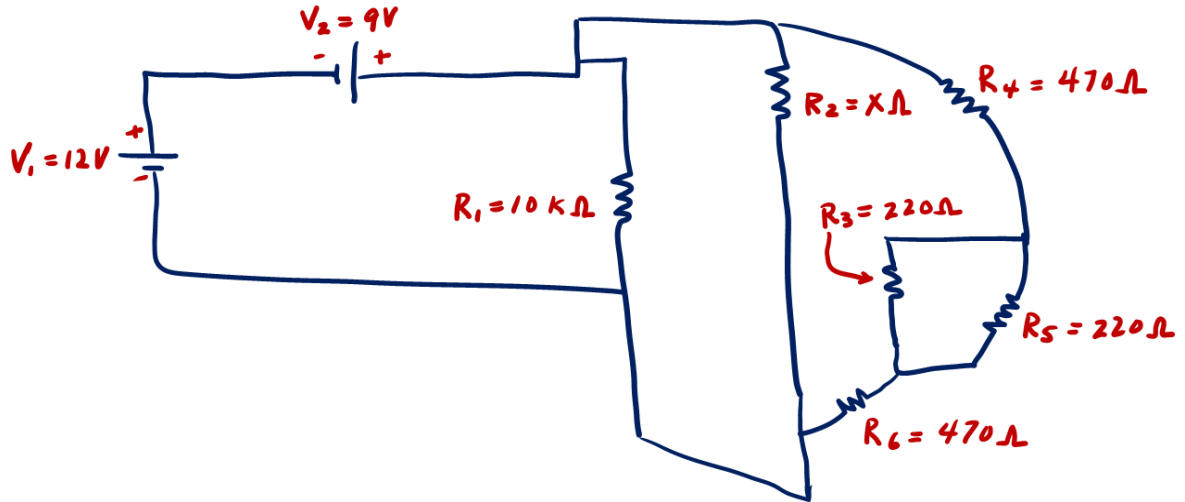


# Mathcad Example of Functions and Plots

Mathcad is used to explore the behavior of the circuit below as R2 is varied from 100Ω to 10,000Ω.



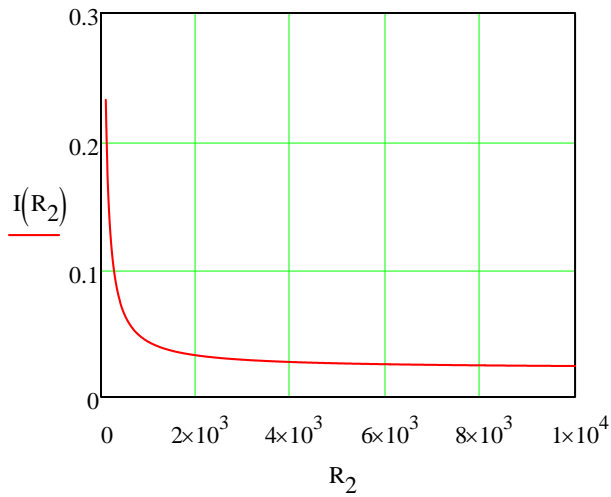
## Keystrokes

$R_1 := 10000\Omega$	R.1 : 10000* $\Omega$ <enter>
$R_3 := 220\Omega$	R.3 : 220* $\Omega$ <enter>
$R_4 := 470\Omega$	R.4 : 470* $\Omega$ <enter>
$R_5 := 220\Omega$	R.5 : 220* $\Omega$ <enter>
$R_6 := 470\Omega$	R.6 : 470* $\Omega$ <enter>
$V_1 := 12V$	V.1 : 12*V <enter>
$V_2 := 9V$	V.2 : 9*V <enter>
$V_3 := V_1 + V_2$	V.3 : V.1 + V.2
$R_{eq1} := \frac{1}{\frac{1}{R_3} + \frac{1}{R_5}}$	R.eq1 : 1 / 1 / R.3 <space> + 1 / R.5 <enter>
$R_{eq2} := R_4 + R_{eq1} + R_6$	R.eq2 : R.4 + R.eq1 + R.6
$R_{eq3}(R_2) := \frac{1}{\frac{1}{R_1} + \frac{1}{R_2\Omega} + \frac{1}{R_{eq2}}}$	R.eq3(R.2) : 1 / 1 / R.1 <space> + 1 / R.2* $\Omega$ <space> + 1 / R.eq2 <enter>
$I(R_2) := \frac{V_3}{R_{eq3}(R_2)}$	I(R.2) : V.3 / R.eq3(R.2) <enter>
$R_2 := 100, 110.. 10000$	R.2 : 100 , 110 ; 10000 <enter>

**To insert the plot:**

Insert > Graph > XY Plot

Type in R.2 and I(R.2) in the placeholders



**Keystrokes**

$I(220) = 0.118 \text{ A}$       $I(220) =$

$I(470) = 0.067 \text{ A}$       $I(470) =$

$I(1000) = 0.043 \text{ A}$       $I(1000) =$

$I(10000) = 0.024 \text{ A}$       $I(10000) =$

**Play with range variables a little:**

**Keystrokes**

`a := 0, 1 .. 10`

`a : 0, 1; 10 <enter>`

a =

0
2
4
6
8
10

a =

**Keystrokes**

`a := 0, 2 .. 10`

`a : 0, 2; 10 <enter>`

a =

0
2
4
6
8
10

The spacing between the 1st and 2nd number defines the increment in the array of numbers.