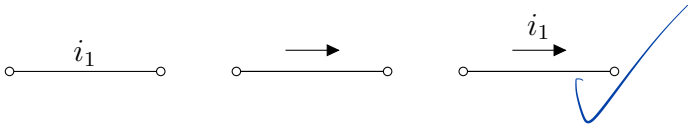
Exercises 01
-
Basic concepts

Exercise 1 - Current

- Does the current arrow indicate the actual direction of charge's moving?

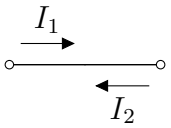
No.

- Which of the following is a correct definition of a current?



- What is the relationship between I_1 and I_2?

$I_1 = -I_2$



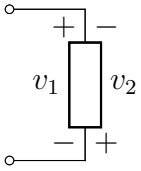
- If electrons are moving from left to right in the previous wire, which current is positive?

I_2

Exercise 2 - Voltage

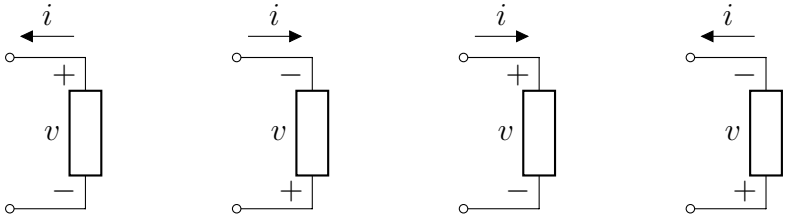
- What is the relationship between v_1 and v_2?

$V_1 = -V_2$



Exercise 3 - Power

Using the **passive sign convention**, give the formula expressing the power p for each of the following cases.



$-iv$ $-iv$ iv iv

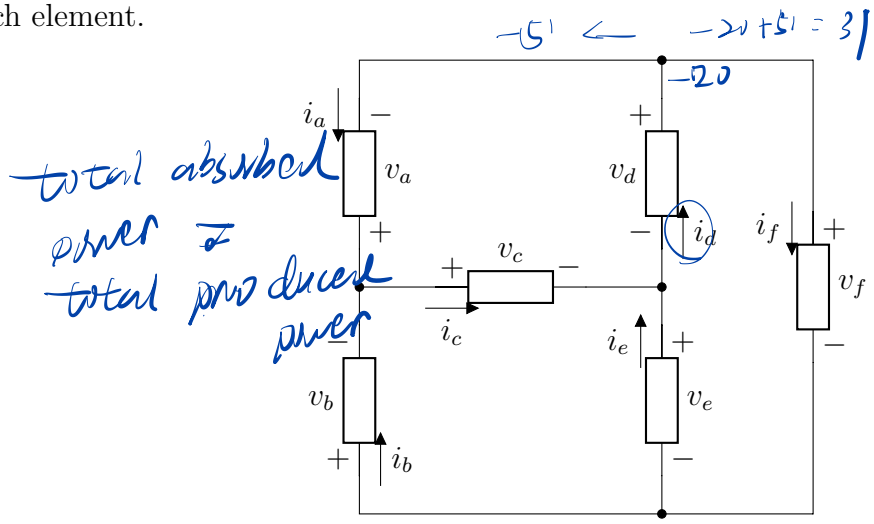
producing power

absorbing power

Supposing that the circuit elements are loaded with direct current (DC) $v = 5\,\text{V}$ and $i = 1.2\,\text{A}$ which elements are absorbing power and which ones are producing power?

Exercise 4 - Complex circuit

This complex circuit is working under DC conditions. Voltages and currents have been measured for each element.

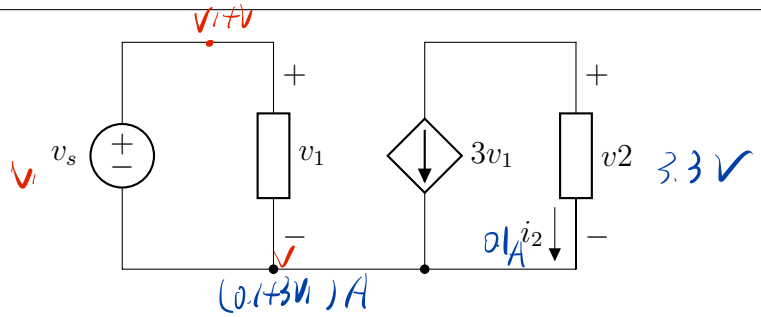


total absorbed power = total produced power

Element	Voltage (V)	Current (A)	Power (W)
a	-18	-51	
b	-18	45	
c	2	-6	
d	20	-20	
e	16	-14	
f	36	?	

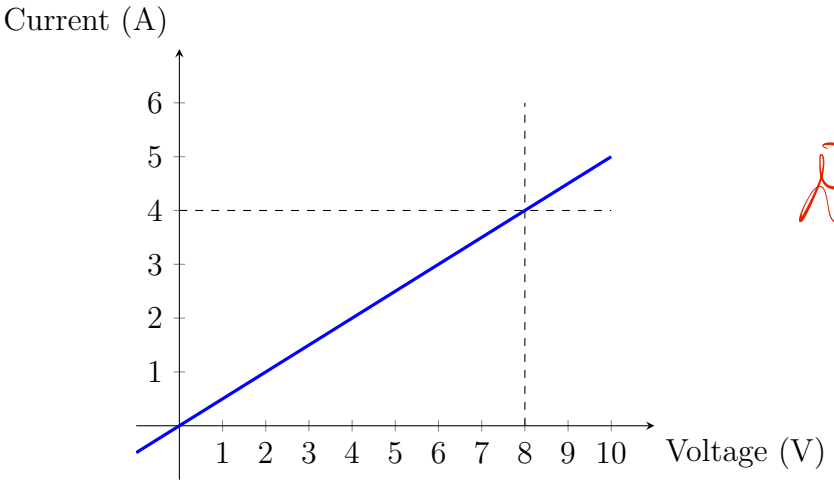
Determine the missing information in the table.

Exercise 5 - Dependent sources



Determine the voltage v_s knowing that $v_2 = 33i_2$ and $i_2 = 100\,\text{mA}$.

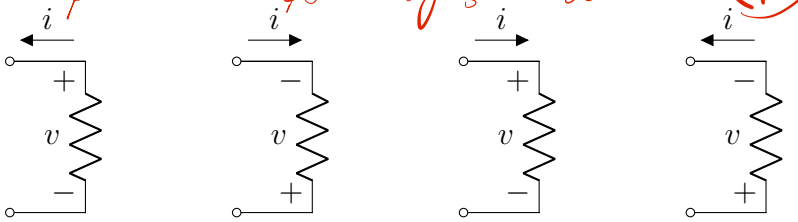
Exercise 6 - Resistor



This is the characteristic curve of a resistor. Determine the resistance value.

Exercise 7 - Power absorbed by a resistor

Determine the absorbed power by the resistors in the following 4 cases.



Conclusion?