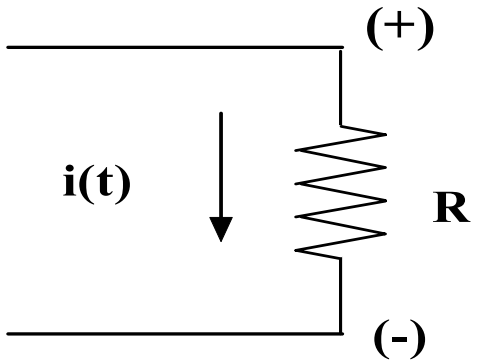
Passive sign convention

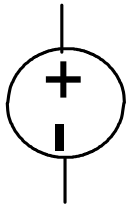
Current flow from the positive to the negative terminal.



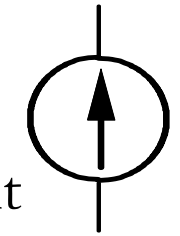
- Power can be absorbed or supplied by an element.
- Power is absorbed (or dissipated) by an element if the sign of power is (+)
- Power is supplied (delivered or generated) by an element if the sign of power is (-)

Circuit Active Elements:

There are 4 types of active elements (sources):

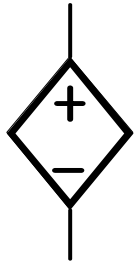


1. Independent voltage source:
   It is a 2-terminal sources that maintains a specific voltage across its terminals regardless of the current through it



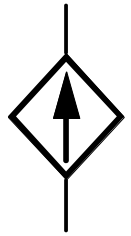
2. Independent current source:
   It is a 2-terminal sources that maintains a specific current through it regardless of the voltage across it terminals.

3. Dependent voltage source:
   It is a 2-terminal sources that generates a voltage that is determined by a voltage or current at a specified location in the circuit.



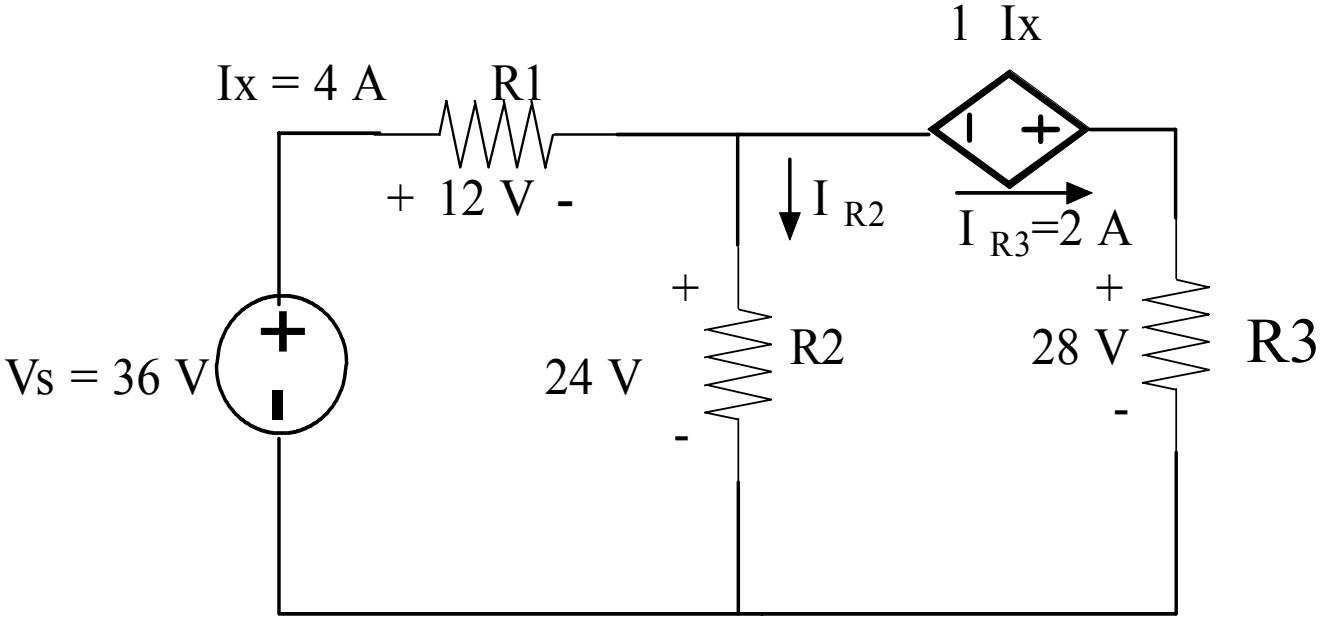
4. Dependent current source:

It is a 2-terminal sources that generates a current that is determined by voltage or current at a specified location in the circuit.



Example :

Compute the power that is absorbed or supplied by each of the elements in the following circuit



$$P_{vs} = V_s\, I_x = (36)(-4) = -144\text{W} \quad \text{(supplies)}$$

$$P_{R1} = V_{R1}\, I_x = (12)(4) = 48\text{W} \quad \text{(absorbs)}$$

$$P_{R2} = V_{R2}\, I_{R2} = V_{R2}\,(I_x - I_{R3}) =$$
$$(24)(4-2) = 48\text{W} \ \text{(absorbs)}$$

$$P_{Ds} = V_{Ds}\, I_{R3} = (1I_x)(I_{R3}) = (4)(-2) = -8\text{W} \ \text{(supplies)}$$

$$P_{R3} = V_{R3}\, I_{R3} = (28)(2) = 56\ \text{W} \quad \text{(absorbs)}$$

Prefixes For Engineering Notation

POWER OF 10	PREFIX	SYMBOL
10^{12}	tera	T
10^{9}	giga	G
10^{6}	mega	M
10^{3}	kilo	k
10^{-3}	milli	m
10^{-6}	micro	μ
10^{-9}	nano	n
10^{-12}	pico	p