

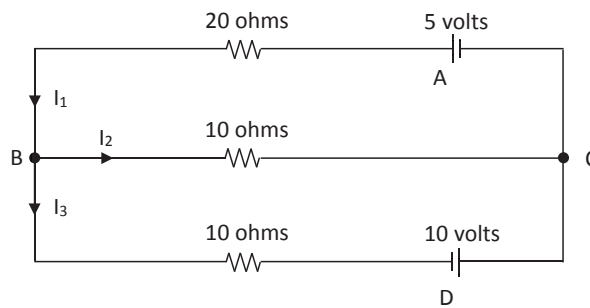
# Applications of Systems of Linear Equations

**Exercise 1:** Find the equation of the parabola passing through the three points:

$$(1, 6), (-1, 12), (2, 9)$$

Write your answer in the form  $y = ax^2 + bx + c$ .

**Exercise 2:** Consider the following electric network.

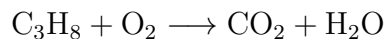


Ohm's Law and Kirchhoff's laws govern the flow of current, whereby the currents  $I_1$ ,  $I_2$  and  $I_3$  (measured in amps) satisfy the equations

$$\begin{cases} I_1 - I_2 - I_3 = 0 \\ 20I_1 + 10I_2 = 5 \\ -10I_2 + 10I_3 = 10 \end{cases}$$

Determine the currents  $I_1$ ,  $I_2$  and  $I_3$  for the circuit.

**Exercise 3:** Balance the chemical equation:



**Exercise 4:** NASA is planning a mission to Mars and their dieticians must design a food supplement that provides 120 mg of magnesium, 220 mg of Vitamin C and 620 mg of calcium. The three possible ingredients have:

	Ingredient 1	Ingredient 2	Ingredient 3
magnesium	10	30	20
Vitamin C	20	50	30
calcium	60	130	70

where these numbers are milligrams per unit of food. Is it possible to design such a supplement from these ingredients? If so, how much of each ingredient must be used?