

Answer on Question #69664 – Math – Differential Equations

Question

One hundred grams of cane sugar in water are being converted into dextrose at a rate which is proportional to the amount unconverted. Find the differential equation expressing the rate of conversion after t minutes.

Solution

Let q be the amount (in grams) of sugar converted in t minutes.

Then $(100 - q)$ is the number of grams unconverted.

The rate of conversion is given by the following formula:

$$\text{the rate of conversion} = \frac{dq}{dt} = k(100 - q),$$

where k is the constant of proportionality.

Answer: $\frac{dq}{dt} = k(100 - q)$.