# Higher Maths
# SQA 2023 Paper 2
# Question 13

Higher Maths
Maths.scot

A patient is given a dose of medicine.

The concentration of the medicine in the patient's blood is modelled by

$$C_t = 11e^{-0.0053\,t}$$

where:

- $t$ is the time, in minutes, since the dose of medicine was given
- $C_t$ is the concentration of the medicine, in mg/l, at time $t$.

(a) Calculate the concentration of the medicine 30 minutes after the dose was given. **1**

The dose of medicine becomes ineffective when its concentration falls to 0.66 mg/l.

(b) Calculate the time taken for this dose of the medicine to become ineffective. **3**

Answers:

(a) 9.38 mg/l

(b) 530.8 minutes