1. Curtis takes medication. After t hours, the concentration of medication left in his bloodstream is given by $M(t) = 20(0.5)^{0.55t}$, where M is in milligrams per liter.

   (a) Write down $M(0)$ (2 marks)

   (b) Find the concentration of medication in his bloodstream after an hour and half (2 marks)

   (c) At 2:00pm, when there is no medication in his bloodstream, he takes his first pill. He can take his second pill when the medication concentration reaches 0.45 mg/L. What time can Curtis take his second pill? (5 marks)

Mark scheme:

(a) $M(0) = 20$ (A1)

(b) $M(1.5) = 20(0.5)^{(0.55)(1.5)}$ (M1)

$M(1.5) = 11.3$ mg/L (A1)

(c) $M(t) = 45$
$.45 - 20(0.5)^{.55t}$ (M1)
$.0225 = (0.5)^{.55t}$ (M1)
$\log_{.5}.0225 = .55t$ (A1)
$t = 9.95$ hrs (A1)
He can take his next pill at 12:00am (A1)