1. Due to Alex's severe allergies, she takes 30 mg of a drug every day. Her doctor informs her that the amount of the drug will decrease in her bloodstream by 12% each hour.

   (a) Model this information in the form $D(t) = a(b)^t$ for the constants a and b that give the quantity of the drug, in milligrams, that remain in the bloodstream t hours after she takes the medicine.   (2 marks)

   (b) Find the amount of the drug that remains in her bloodstream after 1 day.   (2 marks)

   (c) Find how long it will take for half of the drug to be out of her bloodstream.   (3 marks)

Mark scheme:

   (a) $D(t) = 30(.88)^t$ (A1)(A1)
        A1 for the 30 and A1 for the .88

   (b) $D(24) = 30(.88)^{24}$ (M1)

        $D(24) = 1.40 \, mg$ (A1)

   (c) $15 = 30(.88)^t$ (M1)
        $0.5 = (.88)^t$
        Solve by graphing or using logs

        For example: $\log_{0.88} 0.5 = t$ (M1)
        $t = 5.42$ hours   (A1)