7   Two students, Anna and Ben, are starting a revision programme. They will both revise for 30 minutes on Day 1. Anna will increase her revision time by 15 minutes for every subsequent day. Ben will increase his revision time by 10% for every subsequent day.

(a) Verify that on Day 10 Anna does 94 minutes more revision than Ben, correct to the nearest minute. [3]

Let Day X be the first day on which Ben does more revision than Anna.

(b) Show that X satisfies the inequality $X > \log_{1.1}(0.5X + 0.5) + 1$. [3]

(c) Use the iterative formula $x_{n+1} = \log_{1.1}(0.5x_n + 0.5) + 1$ with $x_1 = 10$ to find the value of X.

    You should show the result of each iteration. [3]

(d) (i) Give a reason why Anna's revision programme may not be realistic. [1]

    (ii) Give a **different** reason why Ben's revision programme may not be realistic. [1]