

- 7 Two arithmetic progressions, A and B , each have 100 terms denoted by a_i and b_i respectively, where $i = 1, 2, 3, \dots, 100$.

The common difference of A is d , where d is a positive integer.

The two progressions have the following properties.

- $a_1 = b_{100} = 4$
- $b_1 = a_{100}$

- (a) You are given that there is at least one value of i for which $b_i = 10 + a_i$.

Show that, in this case,

$$i = \frac{101}{2} - \frac{5}{d}. \quad [6]$$

- (b) Hence show that it is impossible for the equation $b_i = 10 + a_i$ to hold unless d takes certain values, which should be stated. [2]