**8** The sum to $n$ terms of an arithmetic series $A$ is $S_n$

The sum of the first four terms of $A$ is 42 and the fifth term of $A$ is 23

(a) Show that $S_n = \sum_{r=1}^{n} (Pr - Q)$ where $P$ and $Q$ are prime numbers.

**(6)**

$S_{2n} - 3U_n = 1062$ where $U_n$ is the $n$th term of $A$

(b) Find the value of $n$

**(4)**

**Question 8 continued**

**(Total for Question 8 is 10 marks)**