9 A geometric series G has common ratio r where $r > 0$

The third term of G is $\frac{27}{2}$ and the sum of the first three terms of G is $\frac{57}{2}$

Given that the sum to n terms of G is S_n

(a) show that $S_n = \sum_{j=1}^{n} 4\left(\frac{3}{2}\right)^j$

(8)

Given that $S_k > 50\,000$

(b) show that the least value of k is given by

$$k > \frac{\lg\left(\frac{12\,503}{3}\right)}{\lg\left(\frac{3}{2}\right)}$$

(3)

(c) Hence find the least value of k

(1)

Question 9 continued

Question 9 continued

Question 9 continued

(Total for Question 9 is 12 marks)