

- 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  $S_k > 50000$

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

$$k > \frac{\lg\left(\frac{12503}{3}\right)}{\lg\left(\frac{3}{2}\right)}$$
 (3)

- (c) Hence find the least value of  $k$  (1)

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