

**11** The curve  $y = f(x)$  is defined by the function  $f(x) = e^{-x} \sin x$  with domain  $0 \leq x \leq 4\pi$ .

**(a)** **(i)** Show that the  $x$ -coordinates of the stationary points of the curve  $y = f(x)$ , when arranged in increasing order, form an arithmetic sequence.

**(ii)** Show that the corresponding  $y$ -coordinates form a geometric sequence. **[9]**

**(b)** Would the result still hold with a larger domain? Give reasons for your answer. **[1]**