

**13.** Given that for all values of  $k$ , where  $0 < |k| < 1$ , the equation

$$\sin(nx) = k \quad n \in \mathbb{N}$$

has exactly 6 solutions in the interval  $0 \leq x < 2\pi$

(i) deduce the value of  $n$

**(1)**

(ii) deduce the number of solutions of the equation

$$\sin^2(nx) = k^2$$

in the interval  $0 \leq x < 5\pi$ , justifying your answer.

**(2)**