1. Suppose we assume that, for some natural number \( n \geq 4 \), \( n^2 \leq 2^n \).

Prove that \((n+1)^2 \leq 2^{n+1}\).

Hint: Don’t “expand” \((n+1)^2\) in the usual way (don’t “FOIL”).
Think multiplicatively. Factor: \( n + 1 = n(\ldots) \)

2. Let \( f \) be a function whose domain is the interval \([-3, 2]\) defined as follows:
For \(-3 \leq x < 2\), let \( f(x) = x^2 \). \( f(2) = 94 \).
Prove that \([1, 5]\) is a subset of \( \text{Im}(f) \).
Prove this directly and simply. DO NOT assume you know what the image of \( f \) is for this particular case. Prove using the definition of image and the standard way of proving that one set is a subset of another.