Computer Problem 2 - Fourier Series

Consider the function $f(x) = x^2$. Use MatLab to create the computer graphics to show the following:

1. Find the Fourier sine series, including the Fourier coefficients, for $f(x)$ for $x \in [0, 3]$.

2. Graph the original function and the Fourier sine series, where you use 3, 5, 10, 20, and 100 terms. Show the graph for $x \in [-6, 6]$.

3. Find the Fourier cosine series, including the Fourier coefficients, for $f(x)$ for $x \in [0, 3]$.

4. Graph the original function and the Fourier cosine series, where you use 3, 5, 10, and 20 terms. Show the graph for $x \in [-6, 6]$.

5. In all graphs include the original function for $x \in [-4, 4]$. (Don't extend to the full interval.)