Here are some sample questions, mostly from old tests. Most of the test will be quite similar to these, but other topics that we covered are still fair game.

1. Write a MATLAB **script** program to plot the functions $f(x) = x + \sin(x)$ and $g(x) = x^2$ on the same graph, on the interval $[1, 7]$. Include comments.

2. The function $f(x) = 3x^2 - 5$ is continuous and $f(-1) < 0 < f(7)$, so it has a zero on the interval $[-1, 7]$. Perform 3 iterations of the bisection method to narrow down this interval.

3. For $f(x) = x^2 - 5$, do 2 iterations of the bisection method, starting with $[a, b,] = [2, 3]$. What is the relative error? About how many more steps would be needed to make the error less than 10^{-6}?

4. Write a MATLAB **function** program to do n steps of the bisection method for a function f with starting interval $[a, b]$. If $|f(x)| > tol$ after n iterations, print a warning. Let f, a, b, n, and tol be the inputs and the final x be the output. Include comments.

5. Write a MATLAB **function** program to do n steps of the Regula Falsi method for a function f with starting interval $[a, b]$. Let f, a, b and n be the inputs and the final x be the output. Include comments.

6. For $f(x) = 3x^2 - 4$, do 2 iterations of Newton's method, starting with $x_0 = 1$.

7. For $f(x) = x^2 - 5$, do 2 iterations of Newton's method, starting with $x_0 = 2.0$. What is the relative error of x_2? About how many more steps would be needed to make the error less than 10^{-16}?

8. Write a MATLAB **function** program to do Newton's method for a function f until $|f(x)| < tol$. Let f, f', x_0 and tol be the inputs and the final x be the output. Include comments.

9. List your 10 least favorite MATLAB commands.

10. Write a MATLAB **function** program that calculates the sum of the squares of the first n integers.

11. Write a MATLAB **function** program that will find the roots of a function f on an interval $[a, b]$.