1. Solve the following system of equations using MATLAB’s backslash operator (see \texttt{help mldivide} if you need to):

\begin{align*}
2x + y + 5z &= 5 \\
2x + 2y + 3z &= 7 \\
x + 3y + 3z &= 6 .
\end{align*}

Verify your solution by matrix multiplication.

2. Write a MATLAB script to produce graphs of the functions \( y = \cos x \) and \( y = \cos(x^3) \) in the range \( x = -4 : 0.02 : 4 \) using the same axes. Use the Matlab functions \texttt{xlabel}, \texttt{ylabel} and \texttt{title} to annotate your graphs clearly.

3. The following program is a souped up version of the \texttt{fibonacci.m} we created in class. It can be found in the first chapter of the Moler book:

```matlab
function f = fibonacci(n)
    \%FIBONACCI Fibonacci sequence
    \% f = FIBONACCI(n) generates the first n Fibonacci numbers.
    f = zeros(n,1);
    f(1) = 1;
    f(2) = 2;
    for k = 3:n
        f(k) = f(k-1) + f(k-2);
    end
end
```

The statement
\[
\text{semilogy(fibonacci(18),'-o')}
\]
makes a logarithmic plot of Fibonacci numbers versus their index. The graph is close to a straight line. What is the slope of this line?

4. Another (recursive) program to compute the \( n \)-th Fibonacci number can also be found in Moler’s book:

```matlab
function f = fibnum(n)
    \%FIBNUM Fibonacci number.
    \% FIBNUM(n) generates the n-th Fibonacci number.
    if n <= 1
        f = 1;
    else
        f = fibnum(n-1) + fibnum(n-2);
    end
end
```

How does the execution time of \texttt{fibnum(n)} depend on the execution time for \texttt{fibnum(n-1)} and \texttt{fibnum(n-2)}? Use this relationship to obtain an approximate formula for the execution time of \texttt{fibnum(n)} as a function of \( n \). Estimate how long it would take your computer to compute \texttt{fibnum(50)}. Warning: you probably do not want to actually run \texttt{fibnum(50)}. 