1. Section 2.1: Exercises 2, 3, 5, 6

2. Section 2.2: Exercises 2(a,b), 4(a)

3. For each MATLAB program below, determine the number of operations it performs. Express your answers in terms of $n$.

   (a) $v = \text{zeros}(n,1)$;
   \begin{verbatim}
   for i=1:n
   for j=1:i
   v(j) = 1 + v(i) + v(j);
   end
   if i>1
   v(i) = 2*v(1);
   end
   end
   \end{verbatim}

   (b) $v = \text{ones}(n,1)$;
   \begin{verbatim}
   for i=1:n
   for j=1:n
   for k=j+1:n
   v(k) = 2*v(j);
   end
   end
   end
   \end{verbatim}

4. Consider a lower triangular linear system

\[
\begin{align*}
    a_{11}x_1 &= b_1, \\
    a_{21}x_1 + a_{22}x_2 &= b_2, \\
    a_{31}x_1 + a_{32}x_2 + a_{33}x_3 &= b_3, \\
    \vdots & \\
    a_{n1}x_1 + a_{n2}x_2 + a_{n3}x_3 + \ldots + a_{nn}x_n &= b_n.
\end{align*}
\]

   (a) If $x_1, x_2, \ldots, x_{i-1}$ are known, what is $x_i$?

   (b) Write a MATLAB function that solves the above equations for $x_1, x_2, \ldots, x_n$, starting from $x_1$. The first line of your function should read

   \begin{verbatim}
   function x = solvesystem(a,b)
   \end{verbatim}

   where $a$ is an $n \times n$ array of coefficients (some of which are zero), $b$ is an $n \times 1$ array, and $x$ is an $n \times 1$ array.

   (c) Test your function on $a = \begin{bmatrix} 1 & 0 & 0 & 0; & 2 & 3 & 0 & 0; & 4 & 5 & 6 & 0; & 7 & 8 & 9 & 10 \end{bmatrix}$ and $b = \begin{bmatrix} 2; & 1; & 3; & -4 \end{bmatrix}$. Report the vector $x$ that you obtain.