Q1

Part A

```
function seconds = hms2s( h, m, s );
%H2MS    Converts a time expressed in  hours, minutes, seconds to a time in seconds
%     H2MS( H, M, S ) returns 3600*H + 60*M + S
%     H  = hours
%     M  = minutes
%     S = seconds
seconds = 3600*h+60*m+s;
```

Part B

```
function [h, m, s] = s2hms( seconds );
%S2HMS   Takes an input argument in seconds and returns the hour, minutes,
%and second equivalent
%     [H, M, S] = s2hms( SECONDS )
%     SECONDS = number of input seconds
%     H  = maximum number of hours in SECONDS
%     M  = maximum number of minutes in SECONDS, after max hours are removed
%     S = number of seconds remaining after max hours and max minutes removed
```

```
h = floor( seconds/3600 );
m = floor( mod( seconds, 3600 )/60 );
s = mod( mod(seconds, 3600), 60 );
```

Part C Command Window entries and output

```
s  = hms2s( 7, 45, 13 )
s =
       27913
[h, m, s ] = s2hms( 3682 )
h =
     1
m =
     1
s =
    22
```

Q2

Part A

```
function ave = average(data)
[rows,columns] = size(data);
sum = 0;
for i = 1:rows;
    for j = 1:columns;
        sum = sum + data(i,j);
    end
end
ave = sum/(rows*columns);
```

Part B

```
%vectorized function
function sd = stdDev(data)
[rows,columns] = size(data);
av = average(data);
data = data - av;
data = data .^ 2;
Sum = sum(sum(data));
sd = Sum/(rows*columns);
```

```
%Alternate solution:  nonvectorized function
%function sd = stdDev(data)
%[rows,columns] = size(data);
%av = average(data);
%sum = 0;
%for i = 1:rows
%   for j = 1:columns
%       data(i,j) = ((data(i,j) - av)^2);
%       Sum = Sum + (data(i,j));
%   end
%end
%sd = Sum/(rows*columns);
```

Q3

```
function [ volume, surfaceArea ] = myCylinder( ratio );
% MYCYLINDER  Calculate volume and surface area of a randomly generated cylinder.
% [V, S] = MYCYLINDER(RATIO)  randomly generates a real number in the range [0, 1]
%        as the diameter d of the circular end of the cylinder.
%        The height of the cylinder is d*ratio.
%        volume = the volume of the cylinder
%        surfaceArea = the surface area of the cylinder

d = rand;    % generate diameter in the range [0, 1]
height = d*ratio;
surfaceArea = 2*0.25*pi*d^2 + pi*d*height;
volume = 0.25*pi*d^2*height;
```

Q4

```
% Program segment assumes value of NUM is given
maxletter = 'Z';
minletter = 'A';
numletters = maxletter - minletter + 1;

letters = char( floor( minletter + rand(1, num)*( numletters ) ) );
relfreq = zeros(1,  numletters );

for ii = 1: num
   %increment the count of the letter in relfreq for each occurrence
   relfreq( letters( ii ) - minletter + 1 ) = ...
                         relfreq(  letters( ii ) - minletter+ 1 ) + 1;
end

relfreq = relfreq/num
```