MATH.2720 Introduction to Programming with MATLAB
Homework Problems on 3D Plots and Data Input/Output (Due 3/9)

1. Plot the curve given by the parametric equations
$x = (1 + t^2)\sin(20t),\ y = (1 + t^2)\cos(20t),\ z = t$ for $-5 \le t \le 5$.
Be sure to use lots of points.

2. Graph the surface given by $z = x^2 - y^2$ for $-3 \le x \le 3,\ -3 \le y \le 3$.

3. Graph the surface given by the parametric equations
$x = r\cos(\theta),\ y = r\sin(\theta),\ z = 9 - r^2$ for $0 \le \theta \le 2\pi,\ 0 \le r \le 3$.

4. Create a script file that first asks the user to input an array of numbers and then calculates the average value of the array entries. The output from your script should be two lines:

```
Your array contains XX entries
The average value of your array entries is YY
```

where XX is the number of entries in the array and YY is the average value of the array entries. Use the format 2.0f for XX and 4.1f for YY.

Try your code on the array [-2, 3, 5, 7, -9, 13].

5. The wind chill temperature, T_{wc}, is calculated by

$$T_{wc} = 35.74 + 0.6215T - 35.75v^{0.16} + 0.4275Tv^{0.16}$$

where T is the temperature in degrees Fahrenheit and v is the wind speed in miles per hour. Calculate the wind chill temperature, rounded to the nearest degree, for the following temperature/wind velocity combinations:
$[-10, 10], [0, 10], [10, 10], [20, 10], [30, 10], [-10, 20], [0, 20], [10, 20], [20, 20], [30, 20]$.

a) Display the results in a three-column table where the first column is the temperature, the second is the wind velocity, and the third is the wind chill temperature.

b) Write the results to an Excel file named windchill.xlsx.

6. Read the data in the Excel file HW6.xlsx from the Homework Assignments page on our course web site and print out the maximum value, the minimum value, and the average value.