1) Start MATLAB.
Enter the following commands to plot A and B functions versus theta.

\[
\text{theta} = -\pi/2:0.01:\pi/2; \\
B = 7.5*\cos(\text{theta}); \\
Ax = 0.6*B-3*\sin(\text{theta}); \\
Ay = 3*\cos(\text{theta})-0.8*B; \\
A = \sqrt{(Ax.^2+Ay.^2)}; \\
\text{plot}([\text{theta} \ B, \text{theta} \ A]), \text{grid} \\
\text{xlabel}('\theta_{0} \ (\text{rads})') \\
\text{ylabel}('\text{Force \ (kN)}')
\]

Try to use different colors for each plot.

2) the growth of the US population between 1790 to 2000 is given by

\[
P(t) = \frac{197,273,000}{1 + e^{-0.0313(t-1913.25)}}
\]

where \( t \) is the date, in years. What population is predicted in the year 1800?

Ans:

\[
t = 1790:2000; \\
\text{term} = 1 + \exp(-0.0313*(t - 1913.25)); \\
P = 197273000./\text{term}; \\
\text{plot}([\text{t} \ P], \\
\text{xlabel}'\text{year}', \text{ylabel}'\text{population}') \\
P1800 = 197273000/(1 + \exp(-0.0313*(1800 - 1913.25)))
\]

Use appropriate title for the plot.

3) Use the following MATLAB commands to plot

\[
Z = 5x^2 + 3y^2
\]

Interval \( x \in [-1,1] \) and \( y \in [-1,1] \)

\[
[x, y] = \text{meshgrid}([-1:0.1:1, -1:0.1:1]); \\
z = 5*x.^2 + 3*y.^2; \\
\text{contour}(x, y, z); \\
\text{prism}; \\
\text{mesh}(x, y, z) \\
\text{surf}(x, y, z) \\
\text{view}([10 30])
\]

The mesh grid function creates a 'mesh grid' of \( x \) and \( y \) values ranging from -1 to 1 in steps of 0.1. If you look at \( x \) and \( y \) you might get a better idea of how \( z \) (a 2D array) is created. The mesh function displays \( z \) as a wire mesh and surf displays it as a faceted surface. Prism simply changes the set of colors in the contour plot.