Armstrong Atlantic State University
Engineering Studies
MATLAB Marina – 3D Plotting Exercises

1. Write a MATLAB program that will plot the curve traced by the functions: $x(\theta) = 6\cos(\theta)$, $y(\theta) = -6\sqrt{2}\sin(\theta)$, and $z(\theta) = -6\sin(\theta)$ for the angle range $0 \le \theta \le 2\pi$ radians. Hint: this is a 3D parametric plot.

2. Write a MATLAB program that will generate a surface plot of $f(x,y) = \dfrac{4x^2}{16} - \dfrac{3y^2}{16}$ for the range $-2.0 \le x \le 2.0$ and $-3.0 \le y \le 3.0$.

3. Write a MATLAB program that will generate a surface plot of the mass of a conic surface. The conic surface is defined by $z = 2\sqrt{x^2 + y^2}$ for $0.5 \le z \le 4$ and the mass is related to z by $m = 6 - z$. Hint: this problem is best solved using cylindrical polar coordinates (r, θ, z) rather than rectangular coordinates (x, y, z) for the underlying grid. Use z and θ for creating the initial grid, a grid for r can then be computed from the z and θ grids, grids for x and y can be computed from the r and θ grids, and m can be computed from z grid. Plot x versus y versus m.

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