

Total: 30 pts. Please PRINT your name below. This sheet will be collected along with your output. Please staple them together with this on top.

Name: _____

Write a **single m-file divided into cells** (one for each question below), execute it, publish the result, and **submit a print-out** of it, along with this sheet. **Put your name** as a comment at the beginning of the m-file, before any cells. For the heading of each cell, put the **problem number** associated to the cell followed by **your name**. **Suppress** all output **but** the requested results and **label all axes**.

1. (10 pts.) Let $f(x) = x^3 + \sqrt{x}$. Have *MatLab* compute the first derivative of f and print its symbolic form.
2. (10 pts.) Plot the circle $x^2 + y^2 = 1$ parametrically using $x(t) = \cos(t)$, $y(t) = \sin(t)$ and the default line. On the same graph, using a dashed line, plot the cycloid $x(t) = t - \sin(t)$, $y(t) = 1 - \cos(t)$, for t between 0 and 4π . Title the graph **Circle and Cycloid**, include grid lines and a legend which indicates which curve is which. Make sure your circle looks like a circle and is shown fully.
3. (10 pts.) Let $f(x,y) = 4x^2 + y^2$. Plot the graph $z = f(x,y)$ for x and y each between -5 and 5, using arrays and 25 gridlines for each variable. On the same plot, show contour curves in the xy -plane and title the output **Paraboloid**.