

# Worksheet V

Answer all the problems completely on a separate sheet of paper. Read all the problems closely, and ask if you have any questions on what a problem means. This worksheet is due at the start of class on **Wed**, Oct 22.

## Problem 1 (5 pts)

A 161 student comes to you and complains about **flicker** in his complex Java animation project. Why does this problem occur, and how can it be avoided? Explain your answer so that the student can understand the solution (but you should introduce and use terminology from this class).

## Problem 2 (5 pts)

- What is a **Quaternion**? Explain briefly (in a sentence or two).
- List two (2) advantages of using Quaternions instead of matrices to represent rotations in a 3D graphics system.

## Problem 3 (8 pts)

Consider the below **control points** for a **cubic Bezier curve**. Using *de Casteljau's Algorithm* (e.g., recursive subdivision), calculate the location of the points on the curve at parameter values  $t = 0.25$ ,  $t = 0.5$ , and  $t = 0.75$  (don't worry about simplifying fractions). Include a sketch of the final curve defined by these control points.

