

**Midterm Prep**

1. Consider the knot sequence  $0,0,0,0,1,2,3,3,3,3$ . Sketch a convex control polygon such that a cubic B-spline curve is defined. Sketch the curve.
2. What is the condition for a Bézier polygon to define a function (i.e., not a parametric curve)?
3. Sketch the cubic Lagrange polynomials over uniform knots.
4. Sketch a convex degree five Bézier polygon and the degree elevated degree six one.
5. For the curve from 4., sketch the second derivative at  $t=0.2$ . (Ignore possible factors for its magnitude).
6. What is the dimension of the spline space of piecewise quadratics over  $0,0,0,3,3,4,5,5,5$ ?
7. Consider the Bézier control polygon  $[1,0]$ ,  $[0,0]$ ,  $[0,2]$ ,  $[1,2]$ . Sketch its first derivative curve with corresponding control polygon.
8. Find a 3D cubic Bézier polygon (nonplanar) whose projection into the  $x, y$ -plane defines a (degree elevated) quadratic curve. Sketch and print the control point coordinates.