Quiz #1 (CSE4190.667)

September 25, 2017 (Monday)

Name: _____ **Dept:** _____ **ID No:** _____

1. (10 points) Let a cubic Bézier curve $\mathbf{x}(t)$, $0 \leq t \leq 1$, be given with the following conditions:

$$\mathbf{x}(0) = \begin{bmatrix} 0 \\ 0 \end{bmatrix}, \quad \mathbf{x}(0.5) = \begin{bmatrix} 3 \\ 0 \end{bmatrix}, \quad \mathbf{x}'(0.5) = \begin{bmatrix} 6 \\ -4.5 \end{bmatrix}, \quad \mathbf{x}(1) = \begin{bmatrix} 6 \\ 0 \end{bmatrix}.$$

Find the four control points $\mathbf{b}_0$, $\mathbf{b}_1$, $\mathbf{b}_2$, $\mathbf{b}_3$, for the cubic Bézier curve $\mathbf{x}(t)$, $0 \leq t \leq 1$.

2. (15 points) Let a cubic Bézier be given by the following four control points:

$$\mathbf{b}_0 = \begin{bmatrix} -3 \\ 0 \\ 1 \end{bmatrix}, \quad \mathbf{b}_1 = \begin{bmatrix} 0 \\ 3 \\ 2 \end{bmatrix}, \quad \mathbf{b}_2 = \begin{bmatrix} 0 \\ -3 \\ 3 \end{bmatrix}, \quad \mathbf{b}_3 = \begin{bmatrix} 3 \\ 0 \\ 4 \end{bmatrix}.$$

Degree reduce the cubic Bézier curve to degree two.