

Math 155B — Computer Graphics — Spring 2017
Homework #1 — Due 9:00pm, Friday, April 21
Hand in via GradeScope

Please show work and label answers clearly.

1. Exercise VII.6, page 165.
2. Exercise VII.14, page 184.
3. Exercise VII.19, page 186.
4. Exercise VII.20, page 186. (This generalizes VII.19, so if you wish you may work just this problem and not the previous one!)
5. Exercise VII.24, page 191.
6. (Linear interpolation in homogeneous coordinates.) Suppose $w, v > 0$. Let $\langle w\mathbf{x}, w \rangle$ and $\langle v\mathbf{y}, v \rangle$ be homogeneous representations of two points \mathbf{x} and \mathbf{y} in \mathbb{R}^n . For $0 \leq u \leq 1$, define $\mathbf{q}(u)$ to be the point in \mathbb{R}^n represented in homogeneous coordinates by the $(n+1)$ -tuple

$$\text{LERP}(u, \langle w\mathbf{x}, w \rangle, \langle v\mathbf{y}, v \rangle).$$

Evaluate the first derivative $\mathbf{q}'(u)$ of $\mathbf{q}(u)$. What is $\mathbf{q}'(0)$ and $\mathbf{q}'(1)$? Does your answer agree with the case of ordinary linear interpolation where $v = w = 1$?