Name: Answer Key

PID:

1. For all questions on this quiz, let $\mathbf{x} = \langle 1,0,0 \rangle$ and $\mathbf{y} = \langle 1,2,3 \rangle$.

(a) What is $Lerp(\mathbf{x},\mathbf{y},\frac{1}{3})$ equal to?

$$\langle 1, \tfrac{2}{3}, 1 \rangle$$

(b) What is $Lerp(\mathbf{y},\mathbf{x},\frac{1}{3})$ equal to? *(note the reversed order of arguments)*

$$\langle 1, \tfrac{4}{3}, 2 \rangle$$

(c) What is $Lerp(\mathbf{x},\mathbf{y},-2)$ equal to?

$$\langle 1, -4, -6 \rangle$$

2. Let $\mathbf{x}$ and $\mathbf{y}$ be as above. What is the point $\mathbf{v}$ on the line containing $\mathbf{x}$ and $\mathbf{y}$ that is closest to the point $\mathbf{w} = \langle 1,2,0 \rangle$? For what value α is $\mathbf{v} = Lerp(\mathbf{x},\mathbf{y},\alpha)$?

$$\alpha = \frac{(\vec{w}-\vec{x})\cdot(\vec{y}-\vec{x})}{(\vec{y}-\vec{x})\cdot(\vec{y}-\vec{x})} = \frac{4}{13}$$

$$\vec{v} = \langle 1, \tfrac{4}{13}, \tfrac{8}{13} \rangle$$