Cole Hensley
Quiz 16
math 351

1. Show that the expression $\langle \vec{u}, \vec{v} \rangle = u_1 v_1 + 2u_2 v_2 - u_3 v_3$ does not define an inner product on $\mathbb{R}^3$

3) $\langle \vec{u}, \vec{v} \rangle \geq 0$ fails

$\vec{u} = \langle 0, 0, 1 \rangle$ $\quad \langle \vec{u}, \vec{v} \rangle = -1$
$\vec{v} = \langle 0, 0, 1 \rangle$

2. Let $\mathbb{R}^2$ have the weighted inner product $\langle \vec{u}, \vec{v} \rangle = \frac{1}{4} u_1 v_1 + u_2 v_2$. Let $\vec{u} = \langle 1, 3 \rangle$ and $\vec{v} = \langle 4, 5 \rangle$

a) compute

$\langle \vec{u}, \vec{v} \rangle$ $\qquad \|\vec{v}\|$

$\frac{1}{4}(1)(4) + (3)(5)$ $\qquad \sqrt{16+25} = \sqrt{41}$
$= 16$ $\qquad = 6\sqrt{5}$

$d\langle \vec{u}, \vec{v} \rangle = \frac{d^2}{du\,dv} = \frac{1}{4} + 1 = 1\frac{1}{4}$

b) sketch unit circle