P. 63 2. $\langle (3,2,2), (0,1,0) \rangle = \|(3,2,2)\| \, \|(0,1,0)\| \cos\theta$

$2 = \sqrt{9+4+4} \cdot 1 \cdot \cos\theta, \quad \cos\theta = \frac{2}{\sqrt{17}}$

$\theta = \cos^{-1}\left(\frac{2}{\sqrt{17}}\right) \approx 1.06435 \text{ rad} \approx 60.98^\circ$

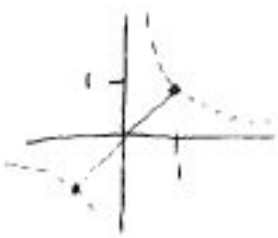
P. 70 5. $x \in C[0,1] \qquad \|x\|_\infty = 1$

$\sqrt{\langle x, x \rangle} = \sqrt{\int_0^1 x^2 \, dx} = \sqrt{\frac{x^3}{3}\Big|_0^1} = \frac{1}{\sqrt{3}} \neq 1.$

P. 98 13. $\{(a,b,c,d) \in R^4 : \langle (a,b,c,d), (1,0,1,1) \rangle = 0 \text{ \& } \langle (a,b,c,d), (-1,2,0,0) \rangle = 0\}$

$a + c + d = 0 \text{ \& } -a + 2b = 0$

One basis is $\{(2,1,-3,0), (2,1,0,-2)\}$

27. 

$\sqrt{1^2+1^2} = \sqrt{2}$

Extra: Show $\|\ \|_\infty$ on R^n does not come from any $\langle\ ,\ \rangle$ on R^n.

Assume $\langle x, x \rangle = (\|x\|_\infty)^2$. Can do an example on R^2 & uses 0's to get R^n.

$1^2 = \langle (1,.5), (1,.5) \rangle = \langle (1,0) + (0,.5), (1,0) + (0,.5) \rangle$

$= \langle (1,0), (1,0) \rangle + 2\langle (1,0), (0,.5) \rangle + \langle (0,.5), (0,.5) \rangle$

$= 1 + 2\langle (1,0), (0,.5) \rangle + \left(\frac{1}{2}\right)^2$

$\langle (1,0), (0,.5) \rangle = -\frac{1}{8}$

Extra. continued

$$1^2 = \langle (1,1), (1,1) \rangle = \langle (1,0), (1,0) \rangle + 2\langle (1,0), (0,1) \rangle + \langle (0,1), (0,1) \rangle$$

$$= 1^2 + 2\langle (1,0), (0,1) \rangle + 1^2$$

$$\langle (1,0), (0,1) \rangle = -\frac{1}{2}$$

$$a\langle (1,0), (0,.5) \rangle = \langle (1,0), a(0,.5) \rangle = \langle (1,0), (0,1) \rangle$$

$$\Rightarrow 2 \cdot \left(-\frac{1}{8}\right) = -\frac{1}{2}$$

$$\Rightarrow -\frac{1}{4} = -\frac{1}{2} \Rightarrow \Leftarrow .$$