Subject: Session 10 Problems

Year. Month. Date. ( )

1 (a)

$$|Av| = \sqrt{\left(\frac{x}{\sqrt{2}} - \frac{y}{\sqrt{2}}\right)^2 + \left(\frac{x}{\sqrt{2}} + \frac{y}{\sqrt{2}}\right)^2} = \sqrt{x^2+y^2}$$

(b) $$\begin{pmatrix} x/\sqrt{2} - y/\sqrt{2} \\ x/\sqrt{2} + y/\sqrt{2} \end{pmatrix} \cdot \begin{pmatrix} x \\ y \end{pmatrix} = \frac{x^2 - yx + xy + y^2}{\sqrt{2}}$$

$$\Rightarrow \frac{A \cdot v}{|A||v|} = 1/\sqrt{2}.$$

(c) $$v \times Av = \begin{vmatrix} i & j & k \\ x & y & 0 \\ \frac{(x-y)}{\sqrt{2}} & \frac{(x+y)}{\sqrt{2}} & 0 \end{vmatrix} = \frac{x^2+y^2}{\sqrt{2}} k$$