Worksheet 11

1

$Yes,\ because\ the\ dot\ product\ of\ each\ two\ vectors\ is\ zero.$

3

(a)

$d \times 2 \quad 2 \times d \quad d \times d \quad d \times d$

(b)

$1\ and\ 3:\ projection$

$2\ and\ 4:\ reconstruction$

4

a

$mean(X \cdot u) = 6/\sqrt{3}$

$Var(X \cdot u) = 8/3$

b

$Vector\ 3,\ 4,\ 6$

$(0, 0, 1),\ (1/\sqrt{2})(1, 1, 0),\ and\ (1/\sqrt{2})(1, -1, 0)$

c

$\lambda_3 = 4$

$\lambda_4 = 2$

$\lambda_6 = 8$

d

$\lambda_6 = 8,\ (1/\sqrt{2})(1, -1, 0)$

$\lambda_3 = 4,\ (0, 0, 1)$

e

$(4/\sqrt{2},\ 2)$

f

$(2, -2, 2)$