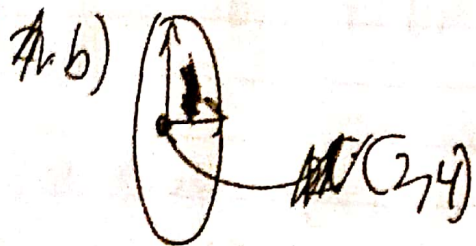


Ethan Seal

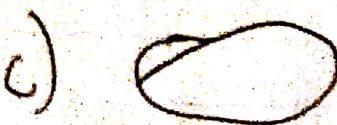
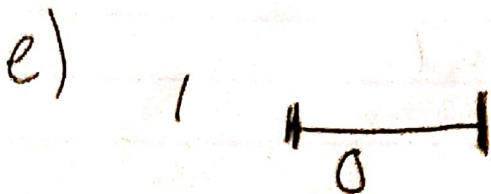
$$7. a) \frac{1}{2\pi^{1/2} \cdot 8^{1/2}} = \frac{1}{\cancel{16} 4\sqrt{2} \cdot \pi^{1/2}} e^{-\frac{1}{2} [x-2, y-4] \begin{bmatrix} 1/2 & 0 \\ 0 & 1/4 \end{bmatrix} \begin{bmatrix} x-2 \\ y-4 \end{bmatrix}}$$

$$\frac{1}{4\sqrt{2} \cdot \pi^{1/2}} e^{-\frac{1}{2} \begin{bmatrix} x-2 \\ y-4 \end{bmatrix} \begin{bmatrix} 1/2 & 0 \\ 0 & 1/4 \end{bmatrix} \begin{bmatrix} x-2 \\ y-4 \end{bmatrix}}$$



c)

$$\begin{matrix} 0 - & 4 \\ 1 - & 2 \end{matrix}$$



3. a) Eigenvectors are rows of V^T

$$\frac{s_i^2}{N-1} \quad 16.76, 15.92, \dots, 1.96$$

27.15%, 26.46%, 22.58%, 14.51%, 9.29%

b) 27.15, 53.61, 76.19, 90.7, 100

c) ~~Drop the last one~~ as
Can't drop any and stay above 95%.

4. b) Columns of B
Rows of V^T

c) Sign of 3'd is flipped
Still orthogonal

d) They are transposed w/ same absolute value

e) No

f) Yes

g) No

h) X needs to be symmetric & square.

vidDisplay.cpp

hw.py

```
1  import numpy as np
2
3  X = np.matrix([[0,-4,4],
4                [-4,7,-3],
5                [4,-3,8]])
6  cov = (X.T * X)/(3-1)
7  a, B = np.linalg.eig(cov)
8  U,S,V= np.linalg.svd(X)
9
10 print("B", B)
11 print("U", U)
12 print("V.T",V)
```

I