

Name: \_\_\_\_\_

PID: \_\_\_\_\_

This is the first quiz of CSE255/DSE230

On your desk you should have only the exam paper and writing tools.

No hats or hoods allowed (unless religious items).

There is one question in this quiz.

Write your answer in the lines provided.

You have 5 minutes to complete the exam.

Start by writing your name and PID on this page.

Good Luck!

Suppose  $\vec{x}$  is drawn from a distribution  $D$  over  $R^d$ .

Let  $C$  be the co-variance matrix for the distribution. The PCA of  $C$  yields the eigen-vectors  $\vec{u}_1, \dots, \vec{u}_d$  with unequal eigen-values  $\sigma_1^2 > \sigma_2^2 > \sigma_3^2 > \dots > \sigma_d^2$ .

Let  $\vec{v} \in R^d$  be an arbitrary vector. Write an expression for the best approximation of  $\vec{v}$  using the top  $k$  eigen-vectors.

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