DSCI 35600 – HW 10 (12 pts) Due: Wednesday, 4/17 Name Key

Problem 1. Assume that PCA was performed on a dataset containing 4 features: x1, x2, x3, and x4. The resulting four principal components are:

- pc1 = [0.478, -0.400, 0.180, 0.761]
- pc2 = [-0.731, -0.463, -0.395, 0.309]
- pc3 = [-0.480, 0.423, 0.678, 0.363]
- pc4 = [0.083, 0.669, -0.594, 0.440]

The mean of each of the four original features is given by the array [3.58, 5.53, 7.98, 2.29]

Two observations are transformed to new coordinates using the PCA decomposition. The transformed coordinates of these observations are given below. Convert each observation back into its original x1, x2, x3, and x4 coordinates.

Round your final answers (but not your intermediate steps) to 2 decimal places. Box your final answers.

- [3.63, -1.03, -0.31, -0.81]

$3.63 \cdot pc1 = [1.735, -1.452, 0.653, 2.762]$

$-1.03 \cdot pc2 = [0.753, 0.477, 0.407, -0.318]$

$-0.31 \cdot pc3 = [0.149, -0.131, -0.210, -0.113]$

$-0.81 \cdot pc4 = [-0.067, -0.542, 0.481, -0.356]$

$\mu = [3.58, 5.53, 7.98, 2.29]$

$\boxed{[6.15, 3.88, 9.31, 4.27]}$

- ~~[0.33, -1.54, -0.67, 2.13]~~

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