

Homework 0 for COMS 4771 Fall 2016

Problem 2: (a) False

10 pts,
(5 pts each part) (b) False

Problem 3: (a) 1

6 pts
(1 pt each part)

(b) $A\vec{u} + B\vec{v} = \begin{bmatrix} \vec{v} & 2\vec{v} \end{bmatrix} \begin{bmatrix} 2 \\ 1 \end{bmatrix} + 4\vec{v} = 8\vec{v} = \begin{bmatrix} 8 \\ 16 \end{bmatrix}$

(c) $\begin{bmatrix} 2 & 1 \end{bmatrix} \begin{bmatrix} 2 & 2 \\ 1 & 4 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \end{bmatrix} = \begin{bmatrix} 4 & 8 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \end{bmatrix} = 20$

(d) $\sqrt{2^2 + 1^2} = \sqrt{5}$

(e) $2(A+B)\vec{v} = \begin{bmatrix} 18 \\ 36 \end{bmatrix}$

(f) minimizer is $\vec{x} = \frac{1}{\sqrt{5}} \begin{bmatrix} 2 \\ -1 \end{bmatrix}$ or $\vec{x} = -\frac{1}{\sqrt{5}} \begin{bmatrix} 2 \\ -1 \end{bmatrix}$
value at minimizer is 4.

Problem 4: 11 pts
(1 pt each part, except (c), which is 6 pts)

(a) A&B, A&C

(b) 0.4

(c)

x	P(X=x)
1	11/36
2	9/36 = 1/4
3	7/36
4	5/36
5	3/36 = 1/12
6	1/36

(d) 91/36

(e) 5

(f) $\frac{n-4}{1024}$

Problem 5: 7 pts
(1 pt each part, except (b), which is 2 pts.)

(a) $\lambda = \frac{\ln 2}{10^6} \approx 6.9 \times 10^{-7}$

(b) $\mathbb{E}X = 0, \mathbb{E}Y = 1$

(c) $c = 2$

(d) $P(X_2 \geq X_1) = \frac{3}{4}$

(e) No, not independent

$\mathbb{E}Y = -\frac{3}{4}$

(f) Yes, they are independent.

$\mathbb{E}X_1 Z = 0$