

## CS 580 – Homework 1

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### Problem 1

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This is the second paragraph of the first problem. This equation  $c^2 = a^2 + b^2 - 2ab \cos(\theta_C)$  is an example of in-line math.

And this is an example of display mode math:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

This is an example of the `align*` environment, which can be helpful for mathematical expressions with multiple steps:

$$\begin{aligned} r &= 1/2 + 1/3 + 1/4 + 1/5 + 1/6 + 1/7 + 1/8 + \dots + 1/n \\ &< 1/2 + 1/4 + 1/4 + 1/8 + 1/8 + 1/8 + 1/8 + \dots + 1/n \\ &= \sum_{i=1}^{\log n} \frac{2^{i-1}}{2^i} \\ &= 1/2 \log_2(n) = O(\log n) \end{aligned}$$

This is an example of matrices in L<sup>A</sup>T<sub>E</sub>X:

$$\begin{aligned}\sigma_x &= \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \\ \sigma_y &= \begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix} \\ \sigma_z &= \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}\end{aligned}$$

[illegible]

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However, it will end eventually, and the next problem should continue on an odd numbered page.

**Problem 2**

**a)** This is the second problem, first question. This is the second problem, first question. This is the second problem, first question. This is the second problem, first question. This is the second problem, first question. This is the second problem, first question.

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**c)** This is the second problem, third question. This is the second problem, third question. This is the second problem, third question. This is the second problem, third question. This is the second problem, third question. This is the second problem, third question.

**Problem 3**

This is an introduction to the the third problem.

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**d)** This is the third problem, fourth question. This is the third problem, fourth question. This is the third problem, fourth question. This is the third problem, fourth question. This is the third problem, fourth question. This is the third problem, fourth question.