CHEM 116 February 13, 2018

Unit 2, Extra Notes

Numerical Methods and Statistics

The purpose of this document is to show you how English sentences represent probability equations
Consider the probability distribution

$$\mathrm{P}(X = x, Y = y, Z = z) \tag{1}$$

with no assumptions of independence, the following is true

Sentence	Equation
What is the probability of $X = 2$, $Y = 2$, and $Z = 0$?	$\mathrm{P}(X = 2, Y = 2, Z = 0)$
What is the probability of $X = 1$, $Y = 5$?	$\mathrm{P}(X = 1, Y = 2) = \sum_z \mathrm{P}(X = 1, Y = 2, Z = z)$
If $Z = 4$, what is the probability of $X = 2$, $Y = 4$?	$\mathrm{P}\left(X = 2, Y = 4 \,\middle|\, Z = 4\right)$
What is the probability of $X = 2$, $Y = 4$, given Z is 4?	$\mathrm{P}\left(X = 2, Y = 4 \,\middle|\, Z = 4\right)$
If $Y = 2$ and $Z = 0$, what is the probability of X?	$\mathrm{P}\left(X = x \,\middle|\, Y = 2, Z = 0\right)$