Solutions Mathematical Foundations for Data Analysis

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1 Chapter 1

1.1 A1.1

Consider the probability table below for the random variables X and Y. One entry is missing, but you should be able to derive it. Then calculate the following values.

1. $\Pr(X = 3 \ Y = 2) = 0.2$ 2. $\Pr(Y = 1) = 0.5$ 3. $\Pr(X = 2 \ Y = 1) = 0.1$
4. $\Pr(X = 2 — Y = 1) = \frac{Pr(X=2 \cap Y=1)}{Pr(Y=1)} = \frac{0.1}{0.5} = 0.2$

	X = 1	X = 2	X = 3
Y = 1	0.25	0.1	0.15
Y = 2	0.1	0.2	0.2

1.2 A1.2

$$E[D]$$

=

$$E[B + H]$$

=

$$E[B]$$

+

$$E[H]$$

$= (\frac{1}{4} * 1 + \frac{1}{4} * 3 + \frac{1}{4} * 4 + \frac{1}{4} * 7) + \int_{[-1,4]} f_X(x)dx = \frac{15}{4} + [\frac{1}{10}\text{x}^2](-1)_4 = 22.5\overline{_{10}}$

1.3 A1.3