

NORTHERN ILLINOIS UNIVERSITY

PHYSICS DEPARTMENT

Physics 374 – Junior Physics Lab

Spring 2021

Problem Set #2

Problem Set Due: Thurs., Feb. 4, 2021

Read Bevington: Chapter 1&2

Show explicitly all your work for full credit.

Chapter 1:

1. Bevington 1.8 page 16

Chapter 2:

2. The discrete probability distribution of the sum of the points showing on a pair of dice is given by

$$P(x) = \begin{cases} \frac{x-1}{36} & 2 \leq x \leq 7 \\ \frac{13-x}{36} & 7 \leq x \leq 12 \end{cases}$$

- (a) Plot the discrete probability distribution as a function of x .
- (b) Show that the discrete probability distribution is normalized (hint: read the last sentence on page 31).
- (c) Find the mean of the discrete distribution.
- (d) Find the standard deviation of the discrete distribution.
- (e) Find the median of the discrete distribution.
- (f) Similar to Figures 1.3 and 2.1, show where the mean, median, and mode lies and illustrate what the standard deviation means in your plot.

(g) Assume the probability distribution is continuous of the form

$$P(x) = \begin{cases} \frac{x-1}{35} & 2 \leq x \leq 7 \\ \frac{13-x}{35} & 7 \leq x \leq 12 \end{cases}$$

(h) Show that this continuous probability distribution is normalized.

(i) Find the mean, standard deviation, and median of this continuous probability distribution.