

Review Questions for the First Exam

Spring 20018
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1. Consider the following data set:

12 13 18 18 21

Find the mean, median, mode and standard deviation.

2. A random sample of 30 heights (in inches) from a population is given below:

65.78 71.51 69.39 68.21 67.78
68.69 69.80 70.01 67.90 66.78
66.48 67.62 68.30 67.11 68.27
71.09 66.46 68.64 71.23 67.13
67.83 68.87 63.48 68.42 67.62
67.20 70.84 67.49 66.53 65.44

Given that the mean is $\bar{x} = 68.07$ and the standard deviation is $s = 1.81$:

- (a) Find a 75% Chebyshev interval about the mean for the data set above.
(b) How many data values does Chebyshev's theorem predict will be within two standard deviations of the mean?
(c) How many of the data values are within two standard deviations of the mean? How does this compare to your result in Part (b)?
3. The following data represent the duration (in days) of U.S. space shuttle voyages for the years 1992-94.

8 9 9 14 8 8 10 7 6 9 7 8 10 14 11 8 14 11

- (a) Find the mode, the median, and the first and the third quartile.
(b) What percentile is the value 7?
4. Calculate the range, mean, median, first and third quartiles, interquartile range, mode, variance, and standard deviation for the following data.

47 59 50 56 56 51 53 57 52 49

5. An inspection of a random sample of 485 iPods shows that 18 have defective screens. What is the probability that an iPod selected at random does **not** have a defective screen?
6. The following data are based on a survey taken by a consumer research firm. In this table x stands for the number of televisions in a household and p stands for the percentages of U.S. households with that many television sets.

x	0	1	2	3	4	5 or more
p	3%	11%		39%	12%	7%

- (a) Complete the missing percentage.
(b) What is the probability that a household selected at random has fewer than three televisions?
(c) What is the probability that a household selected at random has more than four televisions?

- (d) Compute the expected value of the x distribution (round televisions of 5 or more to 5).
 - (e) Compute the standard deviation of the x distribution (round televisions of 5 or more to 5).
 - (f) Draw the histogram of this probability distribution.
7. At a carnival you pay \$2.50 to play the following game: You draw four cards, with replacement, out of an ordinary deck. For each heart you get you are paid a dollar. Is the carnival expected to make or lose money from this game? What are the expected earnings or loses if a thousand people play this game?
8. A survey of MTH 23 students was conducted regarding whether a student spent at least 3 hours per week on homework and whether the student passed the class. The results of the survey are summarized in the table below:

	At least 3 hours	Less than 3 hours	TOTAL
Passed class	68	22	90
Failed class	12	50	62
TOTAL	80	72	152

Compute the following probabilities:

- (a) Find the probability that a student selected at random will pass MTH 23.
 - (b) Find the probability that a student selected at random will pass MTH 23, given that they study for at least three hours per week.
 - (c) Find the probability that a student selected at random will pass MTH 23 **and** that they will study less than three hours per week.
 - (d) Find the probability that a student selected at random will pass MTH 23 **or** that they will study for more than three hours per week.
9. About 45% of those called for jury duty will find an excuse to avoid it. Suppose 8 people are randomly called for jury duty.

(a) Using the appropriate table, fill in the following chart:

r	0	1	2	3	4	5	6	7	8
$P(r)$									

- (b) Find the expected value μ and the standard deviation σ of this probability distribution.
- (c) Draw the histogram of this probability distribution.
- (d) Determine the probability that all 8 serve on jury duty.

10. Consider the experiment of rolling two dice. The following table lists all possible outcomes.

1 6	2 6	3 6	4 6	5 6	6 6
1 5	2 5	3 5	4 5	5 5	6 5
1 4	2 4	3 4	4 4	5 4	6 4
1 3	2 3	3 3	4 3	5 3	6 3
1 2	2 2	3 2	4 2	5 2	6 2
1 1	2 1	3 1	4 1	5 1	6 1

- (a) What's the probability that the outcome of at least one die is more than 4?
- (b) Let x stand for the sum of the two outcomes. Complete the following table of probabilities:

x	$P(x)$
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

- (c) Use the table you constructed in part (b) to compute the probabilities of the following events:
- i. The sum of the outcomes of the two dice is 8 or more.
 - ii. The sum of the outcomes of the two dice is less than 6.
 - iii. The sum of the outcomes of the two dice more than 5 but less than 8.
 - iv. The sum of the outcomes of the two dice is less than 10.
 - v. The sum of the outcomes of the two dice is even.
 - vi. The sum of the outcomes of the two dice is odd.
 - vii. The sum of the outcomes of the two dice is 7 or 11.
 - viii. The sum of the outcomes of the two dice is 7, **given** that the sum of the outcomes is odd.