

Math 118, Summer Session 2, 2004

Hour Exam 2

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You have 50 minutes to complete this test. Answer **all** questions. Show **all** work. Full marks = 60 points.

1. (8 points) On the following page you will find a data set with a list of the 25 countries worldwide which have the highest per capita cinema attendance.
 - (a) Summarise this data in a frequency table, using classes of width 400 and starting at 1300.
 - (b) Draw a histogram summarising this data.
 - (c) Describe this histogram - for example, what is its overall shape? Are there any other noteworthy features?

2. (16 points) The scores of students on the 2001 SAT Verbal exam have a distribution that is approximately normal with mean $\mu = 506$ and standard deviation $\sigma = 110$.
- (a) Choose one student at random. What is the probability that his or her score is higher than 726?
 - (b) What range of values cover the middle 50% of all scores?
Suppose that a group of 25 students is picked at random and their mean score on the exam is calculated.
 - (c) What is the probability that their mean score is greater than 506?
 - (d) What is the probability that their mean score is less than 484?

3. (8 points) Alice plays the following gambling game. She rolls one die (which is balanced so that all sides are equally likely to land face up).
If 1 or 2 comes up, Alice wins 5 dollars.
If 3, 4, 5 or 6 comes up, Alice loses 2 dollars.
- (a) What is the probability of Alice winning? Of Alice losing?
 - (b) What are Alice's mean winnings for one play?
 - (c) What is the standard deviation of this probability model?

4. (8 points) A website assigns its users User-ID's that are 7 symbols long and that may contain the digits 0 to 9 as well as the letters a to z , with repeats allowed.
- (a) What is the probability that a User-ID starts with the letter a ?
 - (b) What is the probability that a User-ID does not contain any repeated symbols? (That is, no letter is used twice and no digit is used twice.)

It is not necessary to multiply out your answers.

5. (4 points) The presence of an outlier in a data set strongly affects which ones of the following:
- (a) Mean.
 - (b) Mode.
 - (c) Median.
 - (d) Standard Deviation.

6. (8 points) Draw a boxplot for the following data set:

6, 8, 7, 4, 19, 12, 2, 3, 6, 9, 15, 11, 10, 6, 5, 10

7. (4 points) (Multiple Choice) Suppose we have drawn a scatterplot and that all of the points in our scatterplot lie close to the line $y = -0.7+2x$. Then the correlation for these points is
- (a) close to -0.7.
 - (b) close to +0.7.
 - (c) close to -1.
 - (d) close to +1.
 - (e) close to +2.
 - (f) close to -2.
8. (4 points) Suppose that A, B and C are disjoint events in a sample space S and that $P(A) = 0.3$ and $P(B) = 0.45$, where $P(A)$ is the probability of event A , etc.. Suppose $P(A \text{ or } B \text{ or } C) = 1$.
- (a) What is the probability of either A or B happening?
 - (b) What is the probability of A not happening?
 - (c) What is $P(C)$?