

# Math 153 - Test 2

March 5, 2015

Name \_\_\_\_\_

Score \_\_\_\_\_

Show all work to receive full credit. Supply explanations where necessary.

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- (15 points) Professor Granger has taught a statistics course every semester for many years. The following list gives the numbers of students enrolled each semester, in the order in which they occurred.

29	27	27	21	34	24	24
32	27	25	10	25	28	26
29	37	32	23	20	29	21

Determine the five-number summary, the IQR, and the cutoffs for outliers. Then sketch the modified boxplot on graph paper.

- (6 points) Heights of adult U.S. women are normally distributed with mean 65.5 in and standard deviation 2.5 in. Men's heights are similarly distributed with mean 69.0 in and standard deviation 2.9 in. A certain man is 78 in tall and a woman is 73.75 in tall. Compute their  $z$ -scores and determine which person is relatively taller.

3. (9 points) For each part of this problem, sketch a boxplot that would correspond to a data set with the given characteristics.

(a) There is more spread in the upper extreme than in the lower half.

(b) There is one outlier in the lower extreme.

(c) The IQR is one-half of the range.

4. (3 points) Stan took a standardized test and obtained an unusually high score. Nonetheless, quite a few people scored higher than Stan. Give an example of a  $z$ -score that could represent Stan's score. Explain.

5. (4 points) In his 1964 fight against Sonny Liston, the odds against Cassius Clay (Muhammad Ali) were 8 to 1. What were the odds in favor of Ali? What was his probability of winning?

6. (9 points) The prices of 40 homes listed for sale in the Saratoga Falls subdivision are given on the attached sheet.

(a) Find the percentile for \$221,000.

(b) Determine the price at the 80th percentile.

(c) Determine the price at the 42nd percentile.

7. (6 points) Mary is getting very frustrated with her cell phone service. In her last 52 calls, 38 of them were dropped.

(a) What number should Mary assign to the probability that a call is dropped?

(b) Is Mary's probability an example of a theoretical, experimental, geometric, or subjective probability? (Choose one.)

(c) After spending several days arguing with customer service representatives, Mary told Stan that there was less than a 1% chance that her cell phone company would help fix her problem. What type of probability is this?

8. (2 points) What does it mean for two events to be mutually exclusive?
9. (10 points) Suppose a letter is selected at random from the word *ASSEESSE*.
- (a) What is the sample space for this experiment?
  
  
  
  
  
  
  
  
  
  
  - (b) Is your sample space uniform? Explain.
  
  
  
  
  
  
  
  
  
  
  - (c) Determine the probability of each outcome in your sample space.
  
  
  
  
  
  
  
  
  
  
  - (d) Are your probabilities above experimental, theoretical, or subjective?
  
  
  
  
  
  
  
  
  
  
  - (e) What are the odds in favor of selecting a vowel?
10. (6 points) A fair, six-sided die is rolled three times. What is the probability that at least one 3 is rolled?

11. (5 points) There are 75 students in a room. 35 are taking a math class, 50 are taking an English class, and 25 are taking both. If a student in the room is selected at random, what is the probability that the student is taking a math class OR an English class?
12. (3 points) Jake and Sarah are planning to have 3 children. They determined that the probability of having three boys is  $1/8$ . What does that make the probability of having at least one girl?
13. (10 points) Suppose  $A$  and  $B$  are events such that  $P(A) = 0.52$ ,  $P(\overline{B}) = 0.36$ , and  $P(A \cup B) = 0.68$ .
- (a) Compute  $P(B)$ .
- (b) Compute  $P(A \cap B)$ .
- (c) Are  $A$  and  $B$  mutually exclusive? Explain.
- (d) What are the odds against  $A$ ?

14. (12 points) A letter is selected at random from the first box and placed into the second box. Then a letter is selected from the second box.

A A B B B

B B C

- (a) Sketch the probability tree associated with this two-stage experiment and find the probability of each outcome (along each path).

- (b) Are the probabilities above theoretical or experimental? Explain your reasoning.

- (c) What is the probability of selecting the letter B from the second box?

- (d) What are the odds against selecting a B from the second box?

## Housing Prices in Saratoga Falls

(In thousands of dollars)

143	145	186	192	192	192	194	195	199	201
202	202	205	209	219	221	221	221	230	232
233	235	238	240	245	246	249	257	268	270
271	272	272	275	280	287	324	345	346	387

