

Math 110

Test 2 Sample

November 3, 2008

Be sure to provide explanations for your answers as indicated.

1. (20 pts.) Short answer.

- (a) Suppose that a scatter diagram is football shaped. What is it about the rms error of the regression line that makes the regression line special?
- (b) A die is tossed 6 times. What is the chance that exactly two of the tosses will be 5's?
- (c) George is playing roulette. For the last 50 spins of the wheel, he has bet \$1 on 17, his favorite number. Unfortunately, he has lost each time, losing \$50 in the process. Ever the optimist, George decides his luck must change on the next spin of the wheel, so he bets his remaining \$50 on 17. George's friend Martha, who always brings George back to earth, says he is talking non-sense and that he's likely to lose again.

Is George right, is Martha right, or are neither of them right? Explain your answer.

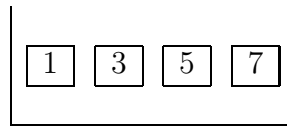
2. (20 pts.) The ACT is an alternative test to the SAT. In 2007, in Massachusetts, the average score on the English portion of the ACT test was 23.5 with an SD of 5.6. The average score on the mathematics portion of the test was 23.6 with an SD of 5.2. (Each test is scored out of total of 36 points.) The correlation coefficient English scores and mathematics scores was $r = 0.6$.

- (a) A total of 350 students in Massachusetts scored 31 on the English portion of the ACT. Estimate the average mathematics score for these 350 students and the SD for these scores.
- (b) Estimate how many of these 350 students scored below 25 on the mathematics portion of the ACT.

3. (20 pts.) The aces and kings from a deck of cards are placed in a stack of eight cards by themselves (so there are two hearts, two spades, two diamonds and two clubs). Three draws with replacement are made from this stack of cards.

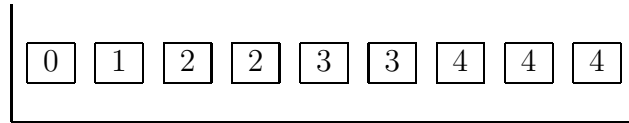
- (a) What are the chances that all three cards are spades?
- (b) What are the chances that none of the cards are spades?
- (c) What are the chances that there is a heart, club, or diamond among the three cards?

4. (20 pts.) Assume 125 draws with replacement are made from the following box:



- (a) What are the EV and SE for the sum of numbers on the drawn tickets?
- (b) What are the chances that sum of the numbers will be 480 or larger?

5. (20 pts.) Assume 300 draws with replacement are made from the following box.



- (a) What box model would you use in order to model the number of 4s that are chosen?
- (b) If 300 draws are made and 4s are drawn a total of 107 times. What is the chance error for the number of 4s for these 300 draws?
- (c) Would you consider the chance error from (b) to be a large chance error, roughly an average chance error, or a small chance error? Explain your answer. (*Hint:* You may want to do some calculations to decide on your answer.)