

Name: _____
Last, First

EXAM C
Math 13 (Laney, Summer 2005)
Fred Bourgoin

You have 75 minutes to answer all 6 questions. You may use a calculator. Partial credit will be awarded if and when deserved, so **SHOW YOUR STEPS**.

1. (*22 points*) Recall that a roulette wheel has 18 red slots, 18 black slots, and 2 green slots. Consider the following events:

Event R: the wheel lands on red

Event B: the wheel lands on black

Event G: the wheel lands on green

- (a) Compute the probabilities of the following events.

$$P(R)=$$

$$P(G)=$$

- (b) Are events R and B complementary? Justify.

- (c) Are events R and G compatible? Explain.

- (d) Compute $P(R \text{ or } B)$.

- (e) Compute $P(B \text{ \& } G)$.

2. (*15 points*) You toss a biased coin (with 60% probability of heads) 10 times. Let success be defined as heads.

(a) Is this a binomial procedure? Justify.

(b) What is the probability of getting heads 6 times?

(c) What is the expected value of the observed success rate?

3. (*13 points*) Homer is playing roulette in Las Vegas. He notices that 20 of the last 22 spins have been black. He tells his daughter Lisa, “Thanks to the law of averages, I can safely bet your college fund on red!” What advice should Lisa, who is very smart and knows statistics, give her dad?

4. (11 points) In an ABC News poll conducted June 2–6, 2004, 21% of the 1001 adults polled said that a law making voting mandatory (with a small fine for those who don't vote) would be good. (Source: www.pollingreport.com) Write a sentence giving a 95% confidence interval for the percentage of American adults who think such a law would be good.

5. (15 points) Consider the following data and events.

	Male	Female	Total
Under 18	6	8	14
18 to 21	14	20	34
Over 21	12	20	32
Total	32	48	80

Event F: picking a female student
Event A: picking a student that's 18 to 21

- (a) Compute $P(F, \text{ given } A)$.
- (b) Compute $P(F, \text{ given not } A)$.
- (c) Compute $P(A, \text{ given } F)$.
- (d) Are the events A and F independent? Justify.

6. (24 points) Consider your favorite binomial procedure with 200 trials and probability of success 62%. Suppose you want to find the probability that the number of successes is between 128 and 132.

(a) Can you use a normal curve to find the probability? Why, or why not?

(b) Find the mean and the standard deviation for the number of successes.

(c) Using the provided standard normal distribution table, find the probability that the number of successes is between 128 and 132. (Show your steps.)

- (d) What is the (exact) probability that the observed success rate is within 1.5 standard deviations of the mean?

Extra Credit. If two independent events have respective probabilities 35% and 83%, what is the chance that both will occur together?