

Midterm (75 minutes)

No calculators allowed. Just set up your answers, for example,  $P = 49/52$ . If you want extra time, you can buy time at a price of 1 point a minute; for example, if your test is handed in 10 minutes after the scheduled finish time, 10 points will be subtracted from your test score.

1. The Census Bureau regularly estimates the lifetime earnings of people by age, sex, and education. Using these estimates, the *Cape Cod Times* (July 7, 1983) reported that  
*18-year-old men who receive a college education will be “worth” twice as much as peers who don’t complete high school. On the average, that first 18-year-old can expect to earn just over \$1.3 million while the average high-school dropout can expect to earn about \$601,000 between the ages of 18 and 64.*  
Mike O’Donnell was getting poor grades in high school and was thinking of dropping out and going to work for his family’s construction firm. But his father read this article and told Mike that dropping out would be a \$700,000 mistake. Is Mike’s dad right?
2. A study of athletics at small liberal arts colleges like Pomona found that more students participate in the sports that have the largest budgets. The study concluded that spending more money on sports would increase participation. Why is this evidence unconvincing?
3. You draw 5 cards from a well-shuffled standard deck of 52 playing cards. From these 5 face-down cards you select 2 cards. What is the probability that they are both Jacks?
4. Six people are going on a kayak trip with three identical kayaks and two persons per kayak. How many possible ways are there to pair up these six people?

5. The daily returns on the S&P 500 index of stock prices over the 50-year period, 1962-2012 had a mean of 0.031% and a standard deviation of 1.026%. If these daily returns were normally distributed with this mean and standard deviation, what is the probability of a daily return as low as  $-20.3\%$ , which happened on October 19, 1987?
6. In July 1983, Congressmen Gerry Studds (a Massachusetts Democrat) and Daniel Crane (an Illinois Republican) were censured by the House of Representatives for having had sex with teenage pages. A questionnaire in the Sunday (July 17) *Cape Cod Times* asked readers whether Studds should “resign immediately,” “serve out his present term, but not run for reelection,” or “serve out his present term, and run for reelection.” Out of a Sunday circulation of 51,000 people, 2,770 returned this questionnaire. Of these:
- |  |               |
|--|---------------|
| resign immediately                         | 1,259 (45.5%) |
| serve out his term but not seek reelection | 211 (7.5%)    |
| serve out his term and run for reelection  | 1,273 (46%)   |
| undecided                                  | 27 (1%)       |

Why might these survey results be misleading?

7. Use some specific hypothetical numbers to explain why these data do not necessarily justify this conclusion by the magazine *California Highways*:
- A large metropolitan police department made a check of the clothing worn by pedestrians killed in traffic at night. About four-fifths of the victims were wearing dark clothes and one-fifth light-colored garments. This study points up the rule that pedestrians are less likely to encounter traffic mishaps at night if they wear or carry something white after dark so that drivers can see them more easily.*

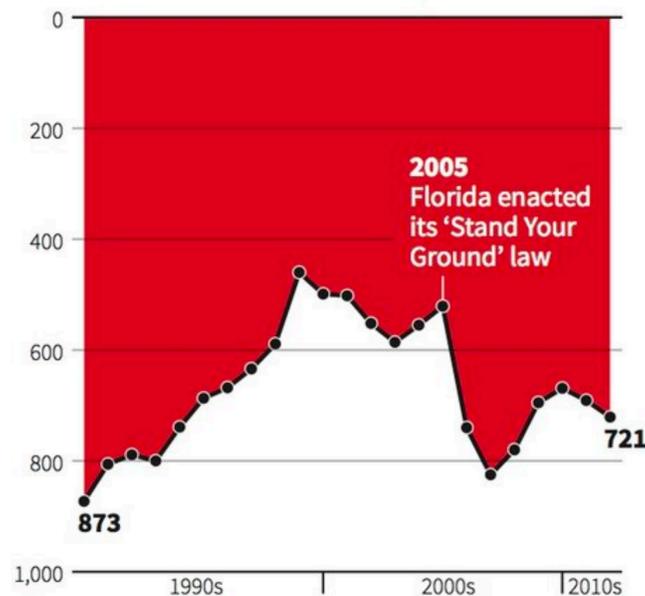
8. In the board game, Settlers of Catan, players take turns rolling a pair of normal 6-sided dice, with every player eligible to receive “resources” based on the number rolled. In one recent game, three of the first six rolls were 3 (a 1 on one die and a 2 on the other die). What are the chances of three or more 3s in six rolls?

9. After having lost election contests for Governor of the State of Washington in 2004 and 2008, Dino Rossi ran for the U. S. Senate in 2010. A *Washington Post* columnist wrote, “Is the argument for Dino Rossi basically that, by the law of averages, he has to win something eventually?” As a statistician, how would you respond?

10. What is misleading about this graph?

## Gun deaths in Florida

Number of murders committed using firearms



Source: Florida Department of Law Enforcement

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Reuters

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