Data and Chance notes
Chapters 8 and 9

Below are terms from the readings. Write definitions and examples in the spaces provided. Answer the questions where indicated.

Chapter 8: Measuring

Valid measure:

Give an example of a clearly invalid way to measure intelligence.

Biased measure:

Reliable measure:

Accurate measure (There are two parts to being accurate.):

Give an example of a variable and a measurement that is reliable but not valid.

Rates vs. Counts: Consider the following table concerning Romanian and UK soldier fatalities in WWII. (source: 1996 Information Please Almanac)

	Soldiers killed	**Total soldiers in battle**
Romania	350,000	650,000
UK	357,116	5,896,000

If we compare the counts (first column), we could say that the two countries suffered relatively the same. However, find the rates of death for each country (number of deaths / number of soldiers in battle) and compare those. What do you find? Which country would you say suffered more?

Usually it is more valid to compare rates than counts. That is why, when we sample, we use the percentages or proportions of the sample and not the number of people. For example, I say 45% of my sample prefer chocolate ice cream and not that 23 people prefer it.

Predictive validity:

Give an example of a variable and a measurement that has predictive validity for that variable. (example: cholesterol level has predictive validity for occurrence of heart disease)

Simpson's paradox (discussed in chapter 24):

Chapter 9: Do the numbers make sense?

The main idea of chapter 9 is that we must look closely at statistics we are given. Sometimes they have been intentionally cooked. While others may simply be mistakes. Give an example of each from your text.

Recently in the news, it was proclaimed that 28 % of all motor vehicle crashes occur over the weekend. Therefore, you should avoid driving during these days to reduce your risk. What is the problem with that?

(source: *Calculated Risks: How To Know When Numbers Deceive You*, Gerd Gigerenzer, Simon & Schuster, June 2002; reported July 2002 on the Website www.dartmouth.edu/~chance/chance_news/news.html)

Absolute risks are often more informative than relative risk. Gigerenzer reports that women in Britain have gone through several "Pill scares." For example, an official statement said that "combined oral contraceptives containing desogestrel and gestoden are associated with around a two-fold increase in the risk of thromboembolism (blockage of a blood vessel by a clot). In terms of absolute risk, the chance of thromboembolism would be reported to increase from 1 to 2 in 14,000 women.

Which sounds worse: “two-fold increase” in the risk of thromboembolism or “increase from 1 in 14,000 (that’s .007 %) to 2 in 14,000 (that’s .014 %)”? If you were working for a company that sells an alternative birth control method, which phrasing would you use?