

Relative Position Exercises

<u>Pages</u>	<u>Suggested Reading</u>
61 – 66	Sections 2.5 and 2.6

<u>Pages</u>	<u>Problems</u>
83 – 85	(Section 2.11) 2 – 16 (I know that you'll be doing some review in here...it'll help you tie all of the ideas thus far together...here are videos for question 3 and question 4)
86	(Section 2.12) 3 (try them all...again, good review)
87 – 100	(Section 2.13) 1(e-k), 4(d) , 10 , 11 , 15(a,b,d), 16(a) , 20(all except b) , 21, 22(d) , 27
148	(Section 3.12) 7, 8

Percentiles are often foisted on you in the news without your knowing it. For example:

"29 percent of poll respondents reported that they do not have a credit card." (source: CreditCards.com "scientific poll")

This implies, with respect to the number of credits cards, that $P_{29} = 0$ credit cards (the other 71 percent have at least one). Here's another:

"Eighty-four percent of the student population overall have credit cards." (source: Sallie Mae, "How Undergraduate Students Use Credit Cards," April 2009).

This is a bit more interesting, no? 84% have credit cards, so 16% don't. This means that $P_{16} = 0$.

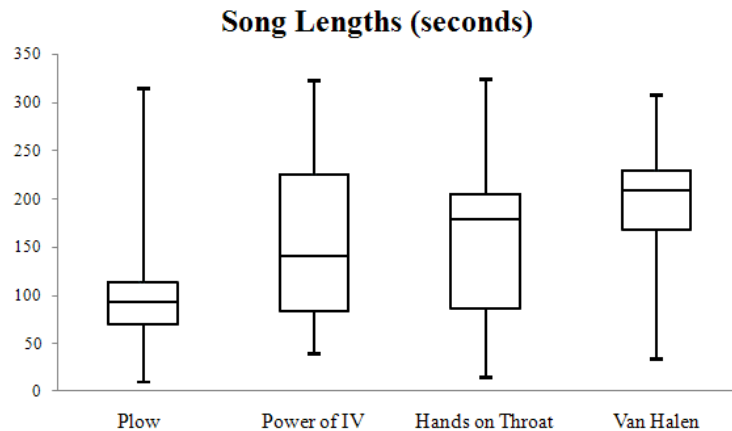
You try some: *"4 out of every 5 people who quit smoking gain some weight...half the people who quit smoking gain less than 10 pounds, and 1 out of ten ex – smokers gain at least 25 pounds."* (source: Moffat cancer center and research institute)

E1. $P_{20} =$

E2. $P_{50} =$

E3. $P_{90} =$

Here are some boxplots from a few musical groups. In each, there are a random sample of songs drawn from that band's collective discography:



E4. Approximately what percent of Plow's sample songs were shorter than 110 seconds?

E5. Approximately what percent of Power of IV's sample songs were longer than 240 seconds?

E6. Look at Hands On Throat's boxplot. Which of their sample songs show more variability: those between Q1 and the median, or those between the median and Q3? How can you tell?

E7. All of these boxplots start and end at roughly the same time values; however, they couldn't be more different. On "average" (your choice), list the bands in order (shortest to longest) according to "typical song length". Explain your order.

Answers.

E1. 0

E2. 10

E3. 25

E4. 75%

E5. 25%

E6. Those between Q1 and the median. You can tell because that part of the box is wider, thus indicating that the song lengths are more spread over the number line, therefore more varied.

E7. I can't *wait* to hear what you say here!



Relative Position Quizzes

Quiz 1.

The distribution at left below represents the IQ scores of 40 randomly selected individuals. Find, to one decimal, if needed:

IQ score	Frequency
70 to 79	2
80 to 89	6
90 to 99	6
100 to 109	10
110 to 119	8
120 to 129	4
130 to 139	4

1. **(2 points)** the mean of the sample.
 2. **(2 points)** the median of the sample.
 3. **(2 points)** the standard deviation of the sample.
 4. **(2 points)** the lower quartile of the sample.
 5. **(2 points)** the upper quartile of the sample.
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Quiz 2.

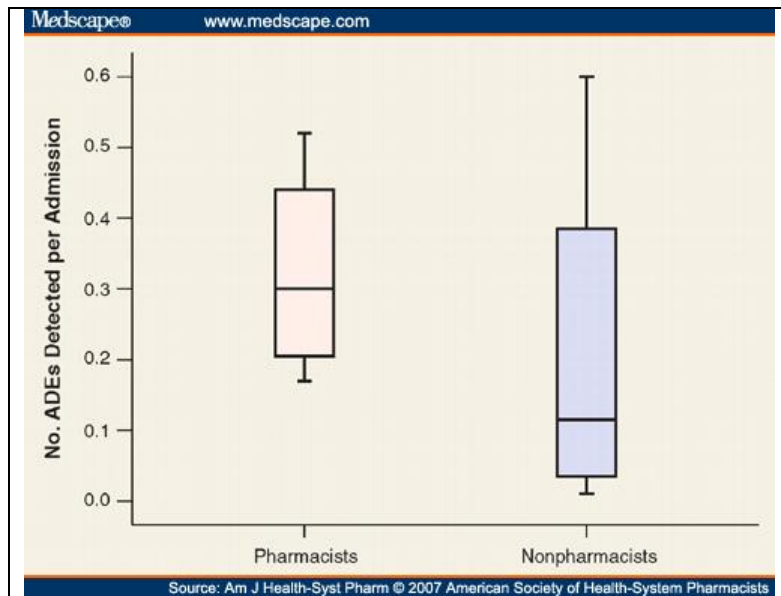


Diagram at left: Box plots of adverse drug event (ADE) rate detected by pharmacists (left) and nonpharmacists (right) serving as medical chart reviewers.

The following questions refer to the box plots above (taken from *Pharmacists versus Nonpharmacists in Adverse Drug Event Detection: Results*, American Journal of Health-System Pharmacy. 2007;64(8):842-849. © 2007 American Society of Health-System Pharmacists).

1. (1 point) Which group had the higher median number of ADEs detected per admission, Pharmacists or Nonpharmacists?
 2. (2 points) What was their median, approximately?
 3. (1 point) Which group had the highest number of ADEs detected per admission... Pharmacists or Nonpharmacists? Not "on average" – just the highest
 4. (1 point) Which statistic is the closest in value between the two groups, Q_1 , Q_2 , or Q_3 ?
 5. (1 point) Which group shows more variability in their data? Choose one.
 6. (4 points) Explain your previous answer.
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Quiz 3.

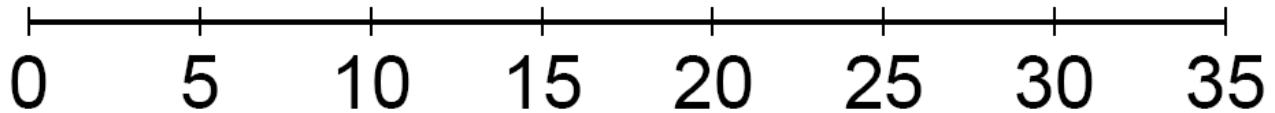
4	27	28	21	17	8
23	14	12	18	30	34
5	13	29	7	12	10
25	25	5	34	16	2
19	31	4	22	25	8

For the given batch of data above,

1. (5 points...1 for each) find the 5 – number summary.

Min _____ Q₁ _____ Med _____ Q₃ _____ Max _____

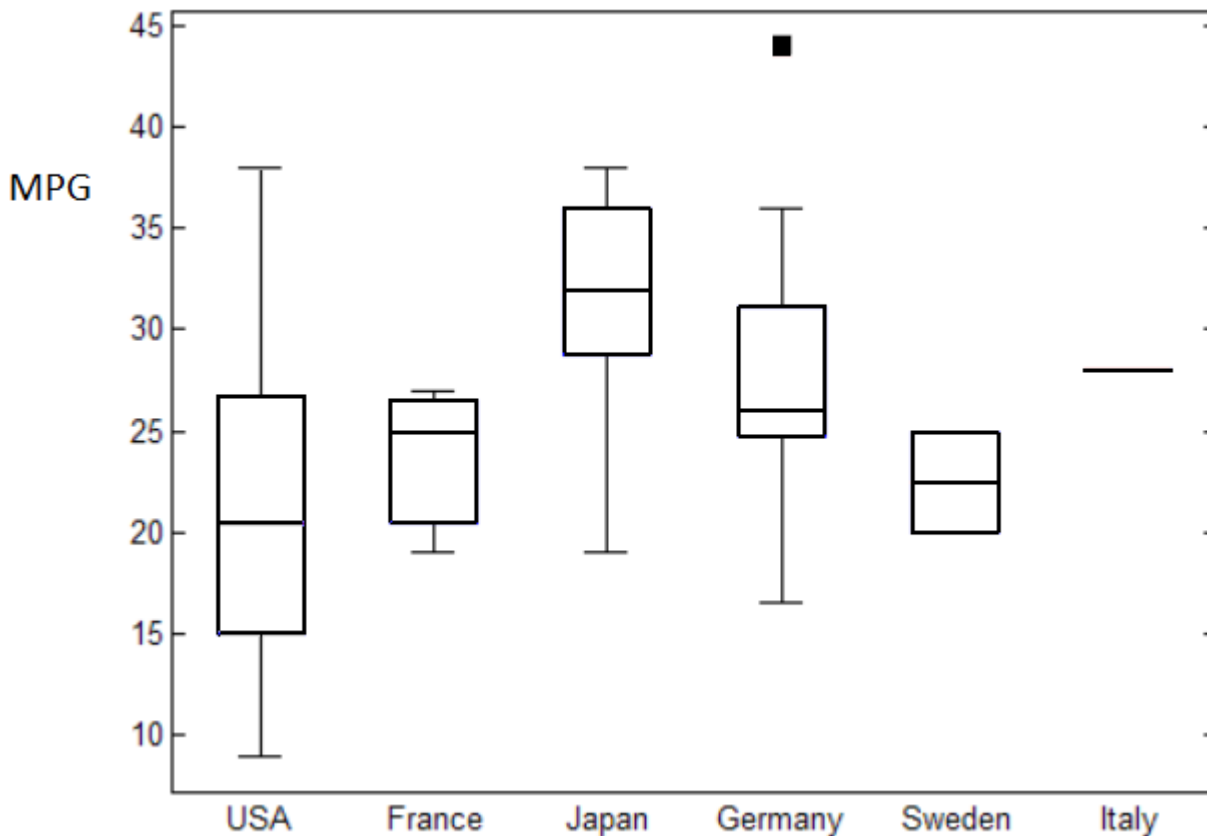
2. (2 points) Draw the box plot (please copy and paste the axes below if you like). If you prefer to use software, go for it! Excel kinda sucks at doing these (without addins), but there's a big web out there that can help you! Ask if you need some help!



3. (3 points) Add the dot plot of the data to your boxplot.

Quiz 4.

The following boxplots show average fuel economy (in miles per gallon, or MPG) for random samples of model year 2009 small cars from several different countries. Each data set consists of 20 sample cars. Use it to answer the questions following.



- (2 points)** What percent of the US sample cars exceed 15 MPG?
- (2 points)** 75% of Japanese sample cars get less than _____ MPG (ish!).
- (1 points)** Rank the following countries in order of increasing median (1 = smallest, 3 = biggest):
___ France ___ Japan ___ USA
- (1 points)** Rank the following countries in order of increasing variation (1 = smallest, 3 = biggest):
___ France ___ Japan ___ USA
- (2 points)** The Swedish boxplot, as you may have noticed, has no whiskers. What does this mean about the minimum MPG value for Swedish cars? The maximum MPG value? Use terms like “minimum value”, “maximum value” and “quartile” in your answer.
- (2 points)** What’s going on with the Italian “boxplot”? Assume there are, indeed, 20 data points represented there. What could explain it?