

Stat 328 Quiz

Summer 2000

Prof. Vardeman

1. Below are the differences between Des Moines mean daily temperatures on May 1 and May 31 for the years 1994 through 1999 (in °F).

32, 17, 7, 22, 15, 6

(a) Find the sample mean and sample standard deviation for these values. (You may use a calculator or computer to do this, but show some work if you want partial credit in the event you mess up.)

$$\bar{y} = \underline{\hspace{2cm}} \qquad s = \underline{\hspace{2cm}}$$

(b) The relationship between Fahrenheit and Centigrade temperatures is

$$tempC = .5556tempF - 17.7778$$

Show how to convert your Fahrenheit mean and standard deviation in part (a) to a Centigrade mean and standard deviation.

$$\text{Centigrade mean} = \underline{\hspace{2cm}} \qquad \text{Centigrade standard deviation} = \underline{\hspace{2cm}}$$

It is hard to reach definitive conclusions on as few as 6 plotted points, but given this difficulty, a normal plot of these 6 temperature differences is "reasonably linear."

(c) If one adopts an "independent sampling from a single normal distribution" model for differences like those above, give 95% two-sided confidence limits for the distribution mean. (No need to simplify, but show me the correct formula with correct numbers plugged in.)

(d) You must predict the year 2000 difference in Des Moines mean daily temperatures May 1 to May 31, and are again willing to use an "independent sampling from a single normal distribution" model. What will you give your boss as two-sided limits for this year's difference using "95% prediction confidence"? (You just returned from the far East and don't know what May 1 was like this year.) (No need to simplify, but show me the correct formula with correct numbers plugged in.)

(e) Suppose that after analysis of all existing records on Des Moines May temperatures you come to the conclusion that (global warming concerns notwithstanding) a sensible model for the year 2005 difference in May 1 and May 31 mean temperatures is normal with $\mu = 15$ and $\sigma = 11$. Using this model, how likely is it that in 2005 May 31 is colder than May 1 (this is the possibility of a negative temperature difference).

2. I go to the Story County Recorder and look up the last 10 home sales prices recorded in the county. They are (in \$1000's of dollars):

192, 119, 127, 80, 360, 173, 75, 131, 77, 78

Attached to this exam is a JMP-IN printout of a simple descriptive analysis of these data.

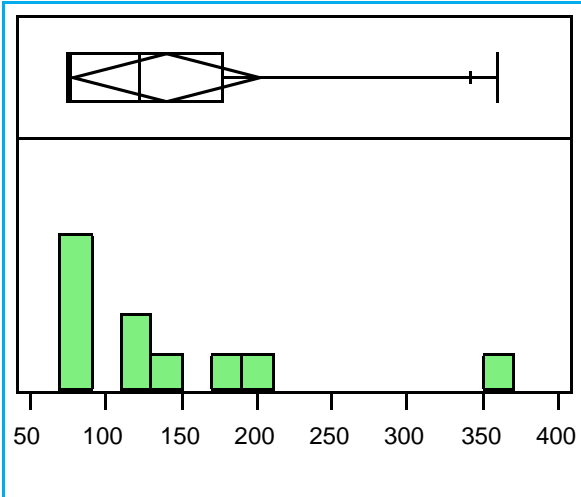
(a) Using Vardeman's convention (not the JMP convention) what is the first quartile of this data set?

At least over a relatively short period, it is perhaps sensible to think of home sales prices recorded at the Story County Courthouse as independent draws from a fixed continuous distribution.

(b) What about the printout suggests to you that a *normal* distribution model may not be a good one for Story County home prices?

(c) How "sure" are you that the next home sale price recorded at the Story County Courthouse will be in the range \$75,000 to \$360,000?

Column 1



Quantiles

maximum	100.0%	360.00
	99.5%	360.00
	97.5%	360.00
	90.0%	343.20
quartile	75.0%	177.75
median	50.0%	123.00
quartile	25.0%	77.75
	10.0%	75.20
	2.5%	75.00
	0.5%	75.00
minimum	0.0%	75.00

Moments

Mean	141.2000
Std Dev	87.2465
Std Error Mean	27.5898
Upper 95% Mean	203.6129
Lower 95% Mean	78.7871
N	10.0000
Sum Weights	10.0000