

TAKE IT TO THE MAT

A NEWSLETTER ADDRESSING THE FINER POINTS OF MATHEMATICS INSTRUCTION



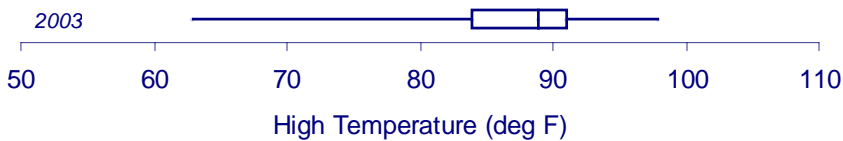
Southern Nevada Regional Professional Development Program
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rpdp.ccsd.net

In the October 2003 issue of *Take It to the MAT*, we looked at the process for constructing a boxplot. We did not do much interpretation of boxplots or see where their real power lies. In this edition, we will delve more deeply into boxplots, what they tell us, and where we can put them to good use.

The data we used last time were daily high temperatures in Las Vegas for August 2003. The table at right lists the daily high temperatures for October in 2003, 2002, and the normal high. The five-number summary—minimum, first quartile, median, third quartile, maximum—for October 2003 high temperatures is {63, 84, 89, 91, 98}. The boxplot for 2003 is shown below.

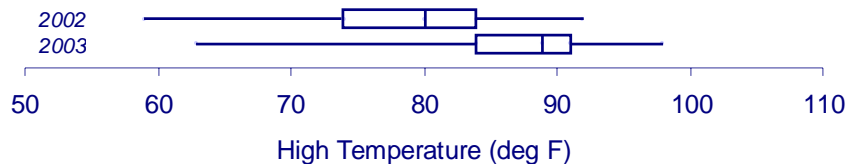
Las Vegas High Temperatures October (in °F)			
Day	2003	2002	Norm
1	98	76	88
2	94	59	88
3	86	73	88
4	85	77	88
5	88	82	87
6	90	86	87
7	91	88	87
8	89	89	87
9	96	91	86
10	89	92	84
11	83	85	84
12	89	81	82
13	86	83	81
14	83	84	80
15	91	83	80
16	88	85	80
17	90	74	80
18	91	80	79
19	90	80	79
20	92	80	78
21	94	83	78
22	92	79	78
23	89	77	77
24	87	77	77
25	81	74	76
26	80	62	76
27	84	66	75
28	88	75	75
29	84	72	74
30	71	71	74
31	63	73	73



The impression of Las Vegas residents is that October was unusually warm. Half of the days had high temperatures of 89° F or more and fully three-fourths of days were at or above 84°. The coolest high temperature was 63°, but after looking at the raw data that seems like an anomaly when compared to the rest. (More about that in a future issue.)

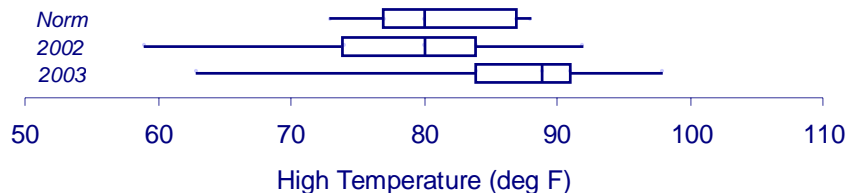
Was it really that warm in October 2003? How did it compare with the year before? One of the powers of boxplots is to answer questions about comparing distributions. In this case, we want to compare the highs in October 2003 with those from October 2002. The five-number summary for October 2002 is {59, 74, 80, 84, 92}.

Parallel boxplots for both Octobers 2002 and 2003 are shown at right.



The boxplots clearly show that October 2003 was warmer, on the whole, than October 2002. The median high temperature in October 2003 is 9 degrees warmer than in October 2002. The coolest three-fourths of high temperatures in 2002 were below the first quartile in 2003. The middle halves of each data set don't even overlap!

We know that October 2003 was much warmer than October 2002, but how does it compare with what is considered "normal?" (Normal is the average daily high temperature since 1937.) Consider the parallel boxplots at right and draw your own conclusions.



(Data from www.wrh.noaa.gov/lasvegas/index.shtml)