

Math 153 - Quiz 8

October 4, 2018

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

(5 points) The data below show the annual numbers of tornadoes in Missouri and Illinois from 1980 to 2008. For each state, find the quartiles, the interquartile range, and the outlier cutoff values. Construct and compare the modified boxplots, indicating outliers with asterisks.

Year	Illinois	Missouri
1980	14	10
1981	33	33
1982	35	77
1983	14	22
1984	34	40
1985	15	13
1986	22	17
1987	22	6
1988	20	17
1989	15	13
1990	50	31
1991	32	17
1992	23	23
1993	34	43
1994	20	35
1995	76	35
1996	62	27
1997	29	12
1998	99	23
1999	64	41
2000	55	27
2001	21	39
2002	35	29
2003	120	84
2004	80	68
2005	19	32
2006	124	102
2007	23	42
2008	47	87

ILLINOIS

$$Q_1 = 20.5$$

$$Q_2 = 33$$

$$Q_3 = 58.5$$

$$IQR = 58.5 - 20.5 = 38$$

OUTLIER CUTOFFS :

$$20.5 - 1.5(38) = -36.5$$

$$58.5 + 1.5(38) = 115.5$$

* 120, 124 are OUTLIERS

MAX VALUE THAT'S NOT AN OUTLIER : 99

MIN VALUE THAT'S NOT AN OUTLIER : 14

MISSOURI

$$Q_1 = 17$$

$$Q_2 = 31$$

$$Q_3 = 41.5$$

$$IQR = 41.5 - 17 = 24.5$$

OUTLIER CUTOFFS :

$$17 - 1.5(24.5) = -19.75$$

$$41.5 + 1.5(24.5) = 78.25$$

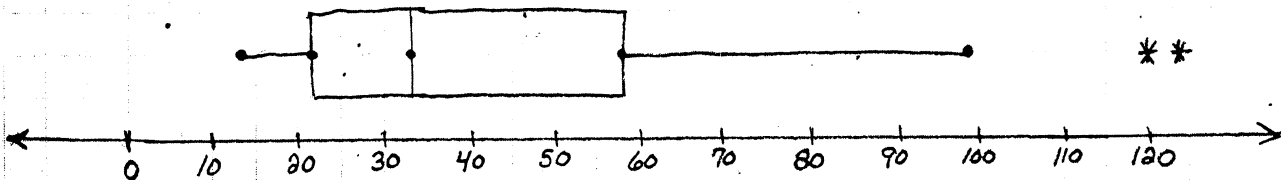
* 84, 102, 87

ARE OUTLIERS

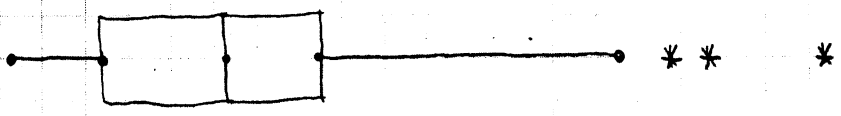
MAX VALUE THAT'S NOT AN OUTLIER : 77

MIN VALUE THAT'S NOT AN OUTLIER : 6

ILLINOIS



Missouri



THE LOWER HALVES OF THE TWO DATA SETS ARE QUITE SIMILAR. HOWEVER, THE UPPER HALVES ARE VERY DIFFERENT. THE UPPER HALF OF THE ILLINOIS DATA IS SIGNIFICANTLY MORE SPREAD OUT THAN THE UPPER HALF OF THE MISSOURI DATA. THIS MEANS THE NUMBER OF TORNADOES IN ILLINOIS IS MUCH MORE DIFFICULT TO PREDICT, RELATIVE TO MISSOURI, WHEN THERE ARE LOTS OF TORNADOES.