Quiz

IQR and Finding Outliers

Warmup

Find the five number summary of the following set of data

13 17 18 21 22 24 26 28 29 30 33

min 13
Q_1 18
med 24
Q_3 29
max 33

Interquartile Range (IQR) - $Q_3 - Q_1$

29 - 18 = 11

Find the IQR of the data set above

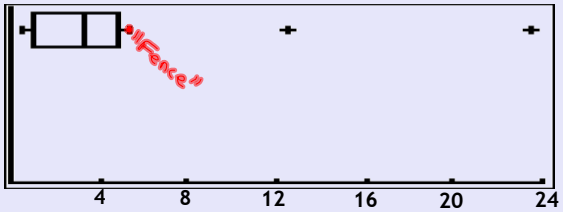
The IQR gives us a measure of SPREAD

the box 50%

Finding Outliers

Player	Salary (in $ million)	Player	Salary (in $ million)
Shaquille O'Neal	23.6	Derek Fisher	3.0
Kobe Bryant	12.4	Samaki Walker	1.5
Robert Horry	5.3	Kareem Rush	1.0
Devean George	4.6	Brian Shaw	1.0
Rick Fox	3.9	Mark Madsen	0.8
Tracy Murray	3.7	Jannero Pargo	0.4

Here is our boxplot from yesterday



How can we be sure that Shaq and Kobe are outliers?

We're going to make a fence to put in our boxplot.
Everything outside the fence is an outlier

All you need to remember is (1.5)(IQR)

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1-Var Stats
n=12
 minX=.4
 Q1=1
 Med=3.35
 Q3=4.95
 maxX=23.6
```

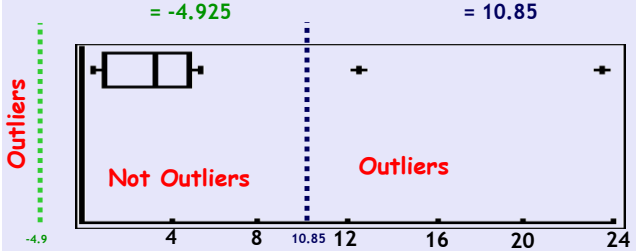
$IQR = Q_3 - Q_1$
$= 4.95 - 1$
$= 3.95$

$(1.5)(IQR) = 1.5(3.95)$
$= 5.925$

We need two sides to our fence.
One side will be at the lower edge of our numbers,
the other side will be at the upper edge.

Lower Edge = $Q_1 - 1.5(IQR)$
$= 1 - 5.925$
$= -4.925$

Upper Edge = $Q_3 + 1.5(IQR)$
$= 4.925 + 5.925$
$= 10.85$



a) $IQR = Q_3 - Q_1 = 3.95$

$= 4.95 - 1$

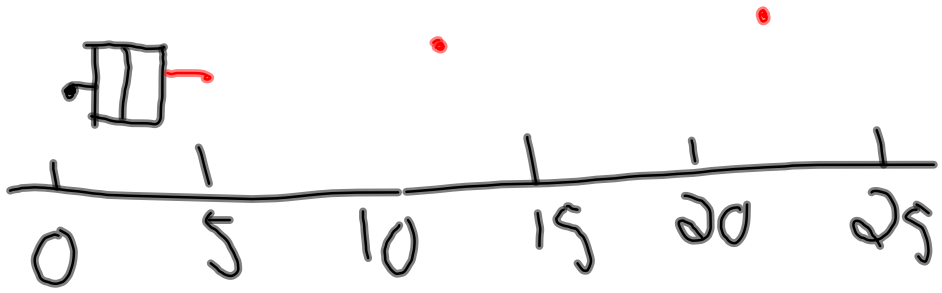
b) $1.5\,IQR = 1.5(3.95) = 5.925$

c) $Q_1 - 1.5\,IQR$

$1 - 5.925 = -4.925$

d) $Q_3 + 1.5\,IQR$

$4.95 + 5.925 = 10.875$



IQR and Finding Outliers

The five number summary of this class's heights is:

What is the IQR?

Where are the upper and lower fences (cutoff points) to determine if your height is an outlier?

Are there any outliers?

The following is the list of Barry Bonds' home run totals for each season of his career through his record breaking season

16 19 24 25 | 25 33 33 34 | 34 37 37 40 | 42 46 49 73

min = 16
Q1 = 25
MED = 34
Q3 = 41
MAX = 73

a) IQR = Q3 − Q1 = 16

b) 1.5 IQR = 24

c) Q1 − 24 = 1

d) Q3 + 24 = 65

Did he have any outliers?

YES

How do you know for sure?

73 is higher than our fence # of 65.

If you include the final six years of Bonds' career, his home run totals are:

5 16 19 24 25 25 26 28 33 33 34 34 37 37 40 42 45 45 46 46 49 73

$Q_1 = 25$

$Q_3 = 45$

a) $IQR = Q_3 - Q_1 = 20$

b) Make the fence

$Q_1 - 1.5IQR$

$25 - 30 = -5$

$Q_3 + 1.5IQR$

$45 + 30 = 75$

— No Outliers —

Are there still outliers?

IQR and Finding Outliers

1. The summary statistics for the number of inches of rainfall in Los Angeles for 117 years, beginning in 1877, are shown below.

N	MEAN	MEDIAN	TRMEAN	STDEV	SE MEAN
117	14.941	13.070	14.416	6.747	0.624

MIN	MAX	Q1	Q3
4.850	38.180	9.680	19.250

(a) Describe a procedure that uses these summary statistics to determine whether there are outliers.

(b) Are there outliers in these data? _____

Justify your answer based on the procedure that you described in part (a).

(c) The news media reported that in a particular year, there were only 10 inches of rainfall. Use the information provided to comment on this reported statement.

IQR and Finding Outliers