IQR and Outliers

IQR: Inner Quartile Range

- **Sort the data: 4 5 6 8 9 11 11 11 11 19**

- **The "middle" is the median**
- **Median: 10**
- **Q_1 is midway between the smallest number and the median**
- **Q_1: 6**
- **Q_3 is midway between the median and largest number**
- **Q_3: 11**

5 number summary

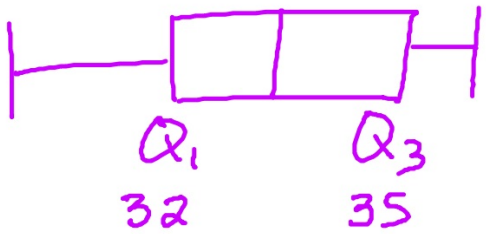
- **Minimum: 4**
- **Q_1: 6**
- **Q_2 (median): 10**
- **Q_3 : 11**
- **Maximum: 19**

Is 19 an outlier?

IQR

- **Inner-quartile range**

Q3 – Q1



This is the width of your box

Definition of an Outlier

- IQR: $Q_3 - Q_1$

- An outlier is any number that is below
- $Q_1 - 1.5 \times IQR$

$Q_1 - 1.5(IQR)$

- OR

- An outlier is any number that is above
- $Q_3 + 1.5 \times IQR$

$Q_3 + 1.5(IQR)$

Are they any values considered unusual?

5 number summary

4, 6, 10, 11, 19

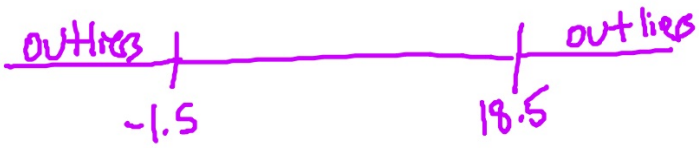
$IQR = Q_3 - Q_1$

$= 11 - 6$

$= 5$

Lower	Upper
$Q_1 - 1.5(IQR)$	$Q_3 + 1.5(IQR)$
$6 - 1.5(5)$	$11 + 1.5(5)$
-1.5	18.5

19 is an outlier



4th grade test scores

Boys: 22, 17, 18, 29, 22, 22, 23, 24
23, 17, 21

Girls: 25, 20, 12, 19, 28, 24, 22, 21
25, 26, 25, 16, 27, 22

Are any of the scores for the boys considered an outlier?

22, 17, 18, 29, 22, 22, 23, 24, 23, 17, 21

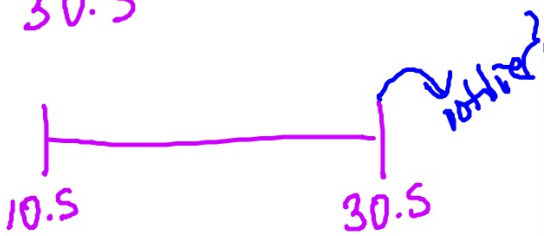
$Q_3 - Q_1$

$23 - 18$

5

Lower	Upper
$Q_1 - 1.5(IQR)$	$Q_3 + 1.5(IQR)$
$18 - 1.5(5)$	$23 + 1.5(5)$
10.5	30.5

No Outliers



Are any of the scores for the girls considered an outlier?

25, 20, 12, 19, 28, 24, 22, 21, 25, 26, 25, 16, 27, 22

$Q_3 - Q_1$

$25 - 20$

5

lower	upper
$Q_1 - 1.5(IQR)$	$Q_3 + 1.5(IQR)$
$20 - 1.5(5)$	$25 + 1.5(5)$
12.5 below	32.5 above

12 is an outlier