

## S.2 Homework Answers

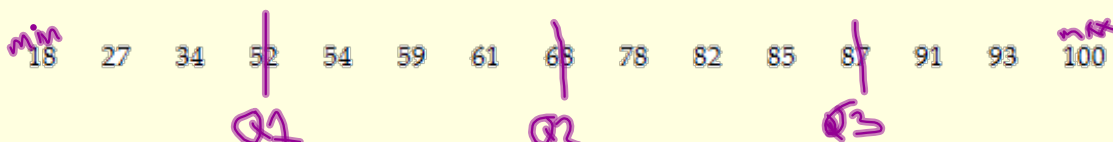
1. a) mean = 45.2; median = 46.5; mode = 46. Low value skews mean down. Median is best.  
b) mean = 56.2; median = 55; mode = 55. All close; no extreme values.
  2. 7-day: mean = 14.6; median = 15; mode = 15. All close; no extreme values.  
9-day: mean = 24.6; median = 15; mode = 15. Extreme values skew mean up. Median is best.
  3. a) A would increase. B would remain the same.  
b) A would decrease. B would remain the same.  
c) A would decrease. B would decrease.
  4. Examples only – there are many correct answers  
a) 1 3 3 3 5  
b) 1 2 3 20 50  
c) 1 2 50 60 7  
d) 1 2 3 10 10  
e) -10 -5 0 7 8
  5. a)  $a = 5$   
b) median = 5
- 
6. mean = 15.6; median class = 12.6 – 16.5; modal class = 12.6 – 16.5
  7. mean = 4.66; median class = 5; modal classes = 1 & 2
  8. mean = 13.1; median class = 12 - 15; modal class = 15 – 18
  9. mean = 50.0; median class = 49.9; modal class = 49.9
  10. mean = 1.74
  11.  $k = 4$
  12. a) 49.6  
b) 48.9

## S.3 Measures of Dispersion

### S.3 Measures of Dispersion: Percentiles and Box-and-Whisker Plots

Last class, we investigated the mean, median, and mode of raw and grouped data. Today, we will explore more ways of looking at the "middle" of data.

Here is some data listed out in order:



Divide this data into two equal parts.

Now divide each half into two equal parts.

You have divided the data into four equal parts.

The boundary of each quarter of the data is called a quartile.

Q1 is the boundary of the lower qv.. It is also called the 25<sup>th</sup> percentile.

Q2 is another name for the median. It is also called the 50<sup>th</sup> percentile.

Q3 is the boundary of the upper qv.. It is also called the 75<sup>th</sup> percentile.

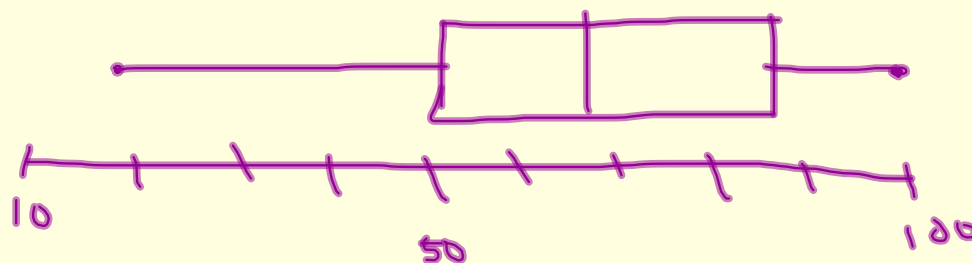
The five-number summary of a set of data includes the minimum, Q1, Q2, Q3, and the maximum.

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A box-and-whisker plot is used to show the five-number summary:

$$IQR = 87 - 52 = 35$$

☺

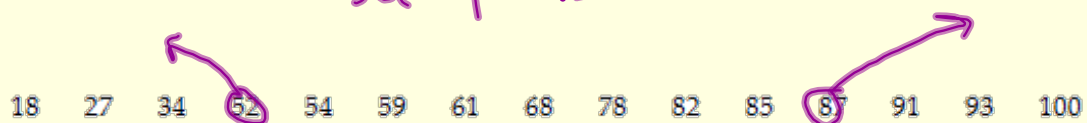


The range of a set of data is the difference between the maximum and minimum values.

Range = Maximum - Minimum

The interquartile range of a set of data is the difference between the upper and lower quartiles. IQR = Q3 - Q1

Extreme or distant data values are called outliers. An outlier is any value at least ( $1.5 \times$  IQR) above Q3 or below Q1.  $35(1.5) = 52.5$



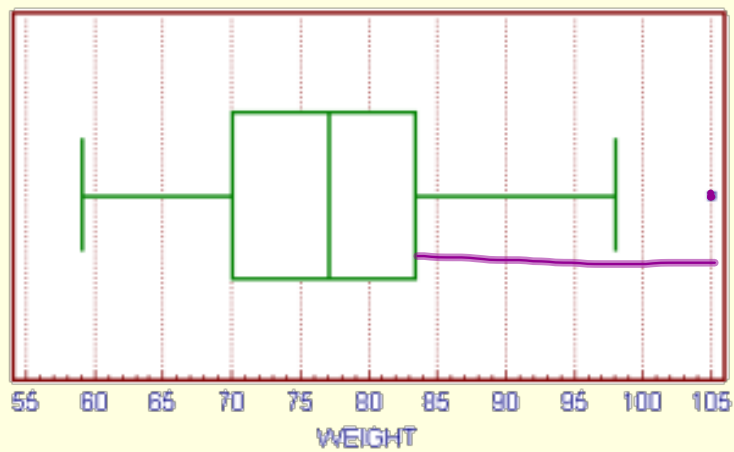
Find the range and interquartile range of the set of data above.

$$100 - 18 = 82$$

$$100$$

Determine whether 18 is an outlier.

no



Minimum: 59

Q1: 70

IQR: 13

Maximum: 105

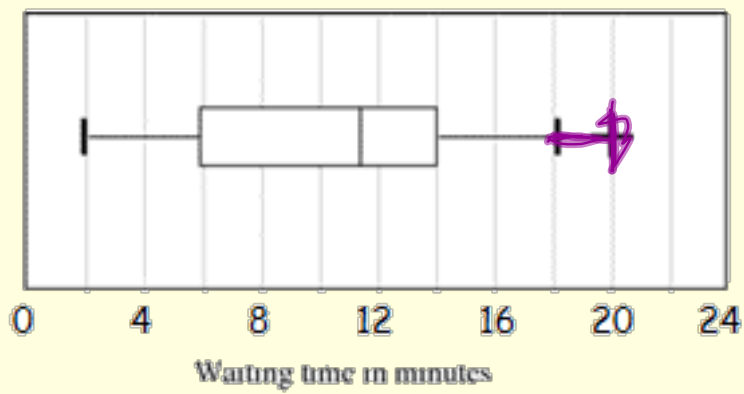
Q2: 77

Outlier:  $13(1.5) = 19.5$

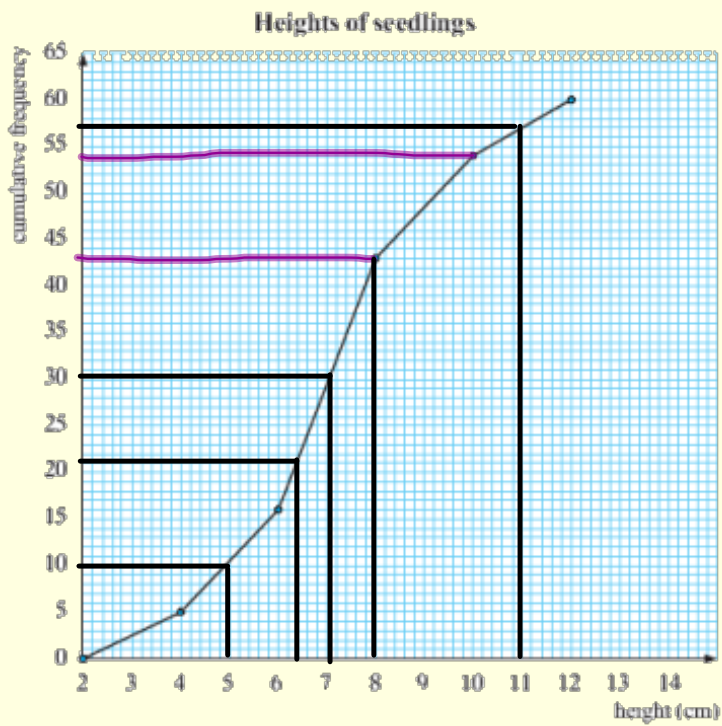
Range: 46

Q3: 83

yes, 105



Minimum: 2	Q1: 6	IQR: 8
Maximum: 20	Q2: 11	Outlier? $8(1.5) = 12$
Range: 18	Q3: 14	no



Heights	Cumulative Frequency
2	0
4	5
6	15
8	43
10	54
12	60

Heights	Frequency
2	0
4	5
6	10
8	28
10	11
12	6

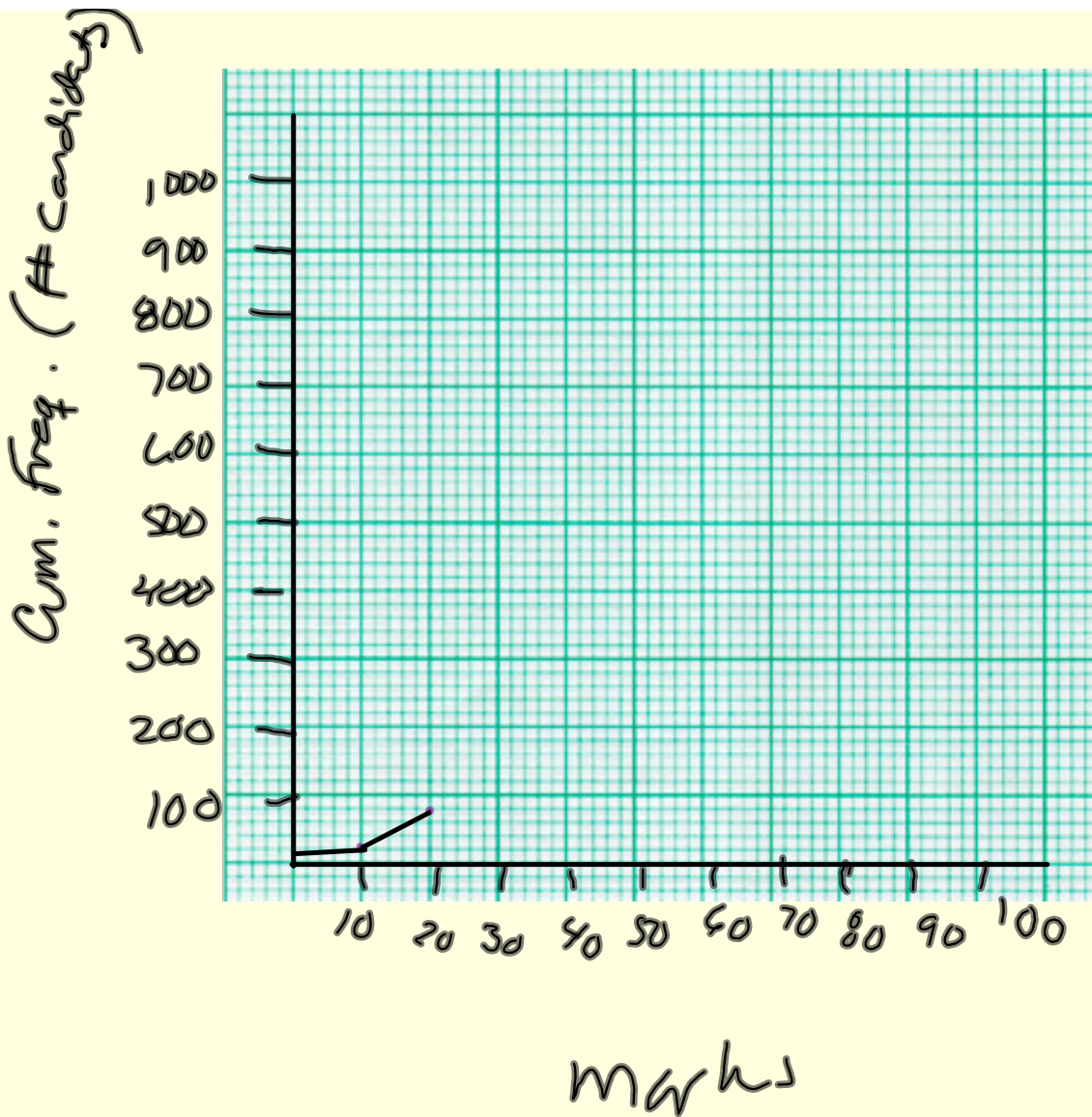


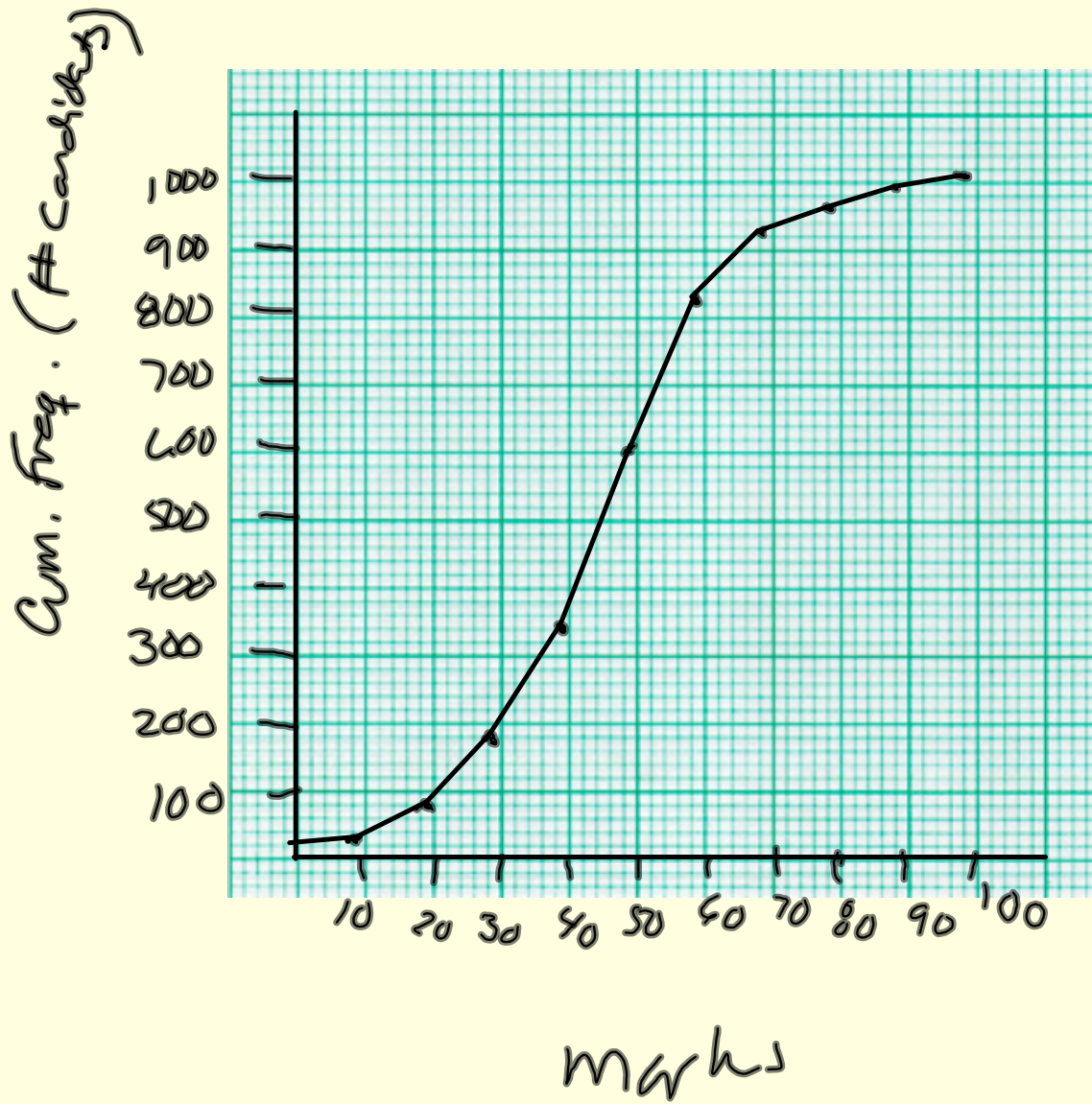
One thousand candidates sit an examination. The distribution of marks is shown in the following grouped frequency table.

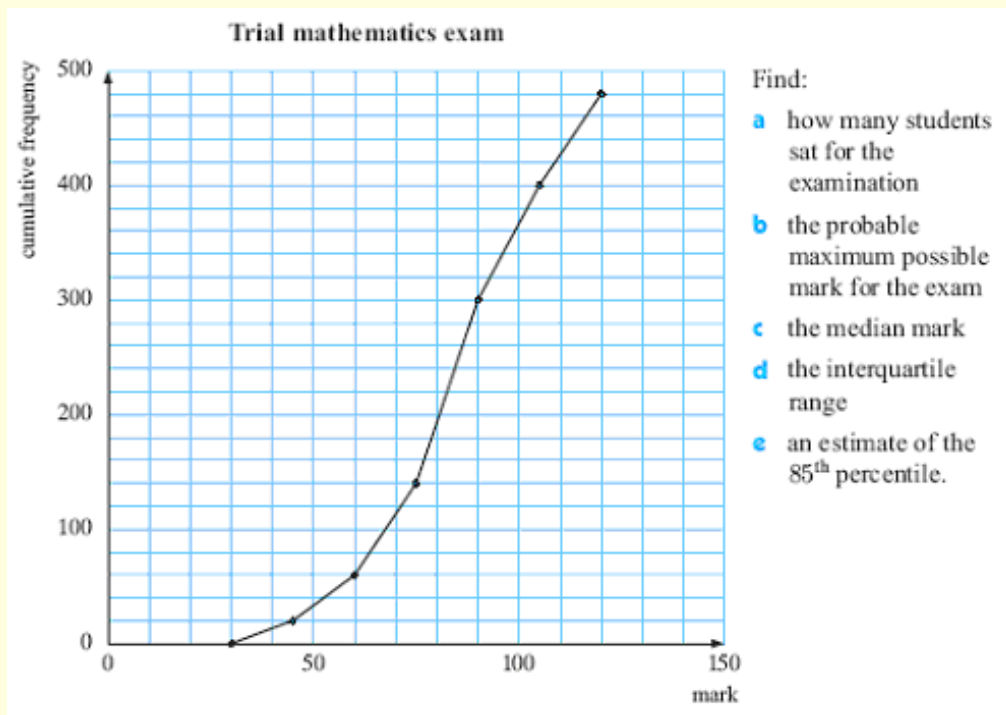
Marks	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Number of candidates	15	50	100	170	260	220	90	45	30	20

(a) Copy and complete the following table, which presents the above data as a cumulative frequency distribution. [3 marks]

Mark	$\leq 10$	$\leq 20$	$\leq 30$	$\leq 40$	$\leq 50$	$\leq 60$	$\leq 70$	$\leq 80$	$\leq 90$	$\leq 100$
Number of candidates	15	65	165	335			905			







Speed $v$	Number of cars
$v \leq 60$	0
$60 < v \leq 70$	7
$70 < v \leq 80$	25
$80 < v \leq 90$	63
$90 < v \leq 100$	70
$100 < v \leq 110$	71
$110 < v \leq 120$	39
$120 < v \leq 130$	20
$130 < v \leq 140$	5
$v > 140$	0

