

Let me know about any HW Questions 

## Warm Up


On the first day of class you were given an IB Formula Packet. Look through it and find the Formula for "Percent Error". Use it to calculate the %error if a 34.6 kg suitcase is estimated at 32 kg.

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 "the approx. value"

 the "exact value"

## Topic I—Number and algebra

1.2	Percentage error	$\varepsilon = \left  \frac{v_A - v_E}{v_E} \right  \times 100\%$ , where $v_E$ is the exact value and $v_A$ is the approximate value of $v$
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$$\varepsilon = \left| \frac{32 - 34.6}{34.6} \right| \times 100 = 7.51\%$$

## HW Questions

3 A school has conducted a survey of 60 students to investigate the time it takes for them to travel to school. The following data gives the travel times to the nearest minute.

12 15 16 8 10 17 25 34 42 18 24 18 45 33 38  
 45 40 3 20 12 10 10 27 16 37 45 15 16 26 32  
 35 8 14 18 15 27 19 32 6 12 14 20 10 16 14  
 28 31 21 25 8 32 46 14 15 20 18 8 10 25 22

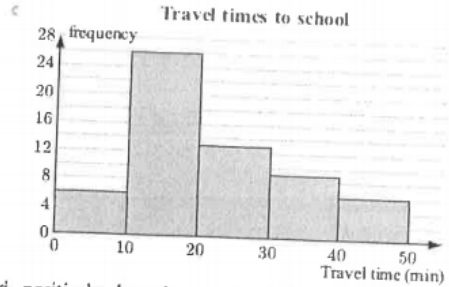
- a Is travel time a discrete or continuous variable?
- b Construct a frequency table for the data using class intervals  $0 \leq t < 10$ ,  $10 \leq t < 20$ , ...,  $40 \leq t < 50$ .
- c Hence draw a histogram to display the data.

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Solutions to Day 4 HW

3 a continuous

Travel time (min)	Tally	Frequency
$0 \leq t < 10$		6
$10 \leq t < 20$		26
$20 \leq t < 30$		13
$30 \leq t < 40$		9
$40 \leq t < 50$		6
Total		60



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$$\frac{5+9+11+12+13+14+17+x}{8} = 12 \Rightarrow \frac{81+x}{8} = 12 \Rightarrow 81+x=96 \Rightarrow x=15$$

page 175, ..., 1

- a)  $\bar{x} = \$163,770$  median  $\$147,200$   
 mean was affected by the two very large values.
- b) A vendor would use the mean since it is higher  
 A buyer would use the lower median of course

**EXERCISE 6E.3**

1 The table alongside shows the results when 3 coins were tossed simultaneously 30 times.

Calculate the:

- a mode
- b median
- c mean.

Number of heads	Frequency
0	4
1	12
2	11
3	3
<i>Total</i>	30

2 The table shows the petrol sales in one day by a number of city service stations.

- a How many service stations were involved in the survey?
- b Estimate the total amount of petrol sold for the day by the service stations.
- c Find the approximate mean sales of petrol for the day.

Petrol sold, L (litres)	Frequency
$2000 \leq L < 3000$	4
$3000 \leq L < 4000$	4
$4000 \leq L < 5000$	9
$5000 \leq L < 6000$	14
$6000 \leq L < 7000$	23
$7000 \leq L < 8000$	16

Pol 82,000. 4

speed	f
80-85	8
85-90	14
90-95	22
95-100	6

midInterval

speed x	f	f.x
82,5	8	
87,5	14	
92,5	22	
97,5	6	

$\Sigma f \rightarrow 50$        $\Sigma fx \rightarrow 4505$

$$\bar{x} = \frac{\Sigma fx}{\Sigma f}$$

$$= \frac{4505}{50}$$

← critical total

$$= 90.1 \text{ km/hr}$$

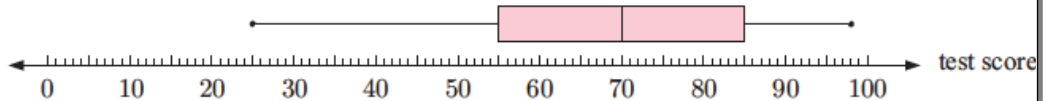
- 2 The times spent (in minutes) by 20 people waiting in a queue at a bank for a teller were:
- 3.4 2.1 3.8 2.2 4.5 1.4 0 0 1.6 4.8  
1.5 1.9 0 3.6 5.2 2.7 3.0 0.8 3.8 5.2
- Find the median waiting time and the upper and lower quartiles.
  - Find the range and interquartile range of the waiting times.
  - Copy and complete the following statements:
    - "50% of the waiting times were greater than ..... minutes."
    - "75% of the waiting times were less than ..... minutes."
    - "The minimum waiting time was ..... minutes and the maximum waiting time was ..... minutes. The waiting times were spread over ..... minutes."



$P_{0.184} \text{ on } 2$   
GF

- a) median = 2.45 min  $Q_1 = 1.45 \text{ min}$   $Q_3 = 3.8 \text{ min}$
- b) range = 5.2 min IQR = 2.35 min
- c) 50% of the wait times were greater than 2.45 min  
75% " " " were less than 3.8 min  
The min time was 0 min and the max time was 5.2 min. The range of times was 5.2 min.

- 2 The boxplot below summarises the class results for a test out of 100 marks.

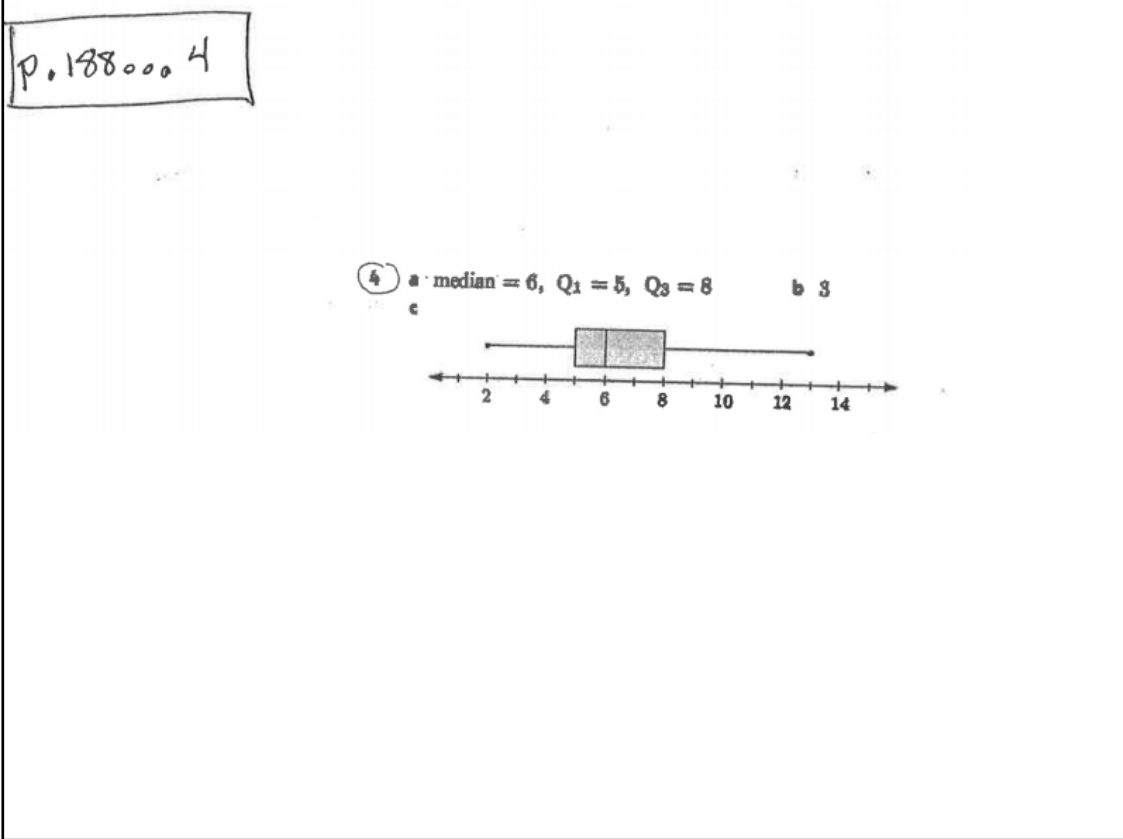


- Copy and complete the following statements about the test results:
  - The highest mark scored for the test was ....., and the lowest mark was ....
  - Half of the class scored a mark greater than or equal to ....
  - The top 25% of the class scored at least .... marks for the test.
  - The middle half of the class had scores between .... and .... for this test.

$P_{0.188} \text{ on } 2$

- (a)
- 98 marks, 25 marks
  - 70 marks
  - 85 marks
  - 55 marks and 85 marks

- (b) range = 73 marks (c) IQR = 30 marks (d) Estimate of the mean is 60 to 69 marks



# A look back at Frequency Tables

They can represent both discrete and  
continuous data

We use *Frequency Tables* often  
 (shows how many of each type)

Number of peas/pod	Tally	Frequency
1		0
2		2
3		11
4		19
5		29
6		51
7		25
8		12
9		1

↙ Sometimes the data can be grouped

Number of cars	Tally	Frequency
0 to 9		1
10 to 19		5
20 to 29		10
30 to 39		9
40 to 49		4
50 to 59		1
Total		30

Notice this data is *discrete* (countable)

$$50 \leq w < 60$$

Weight interval	Frequency
50 -	2
60 -	7
70 -	9
80 -	5
90 -	3

*Continuous* Data (measured, not countable)

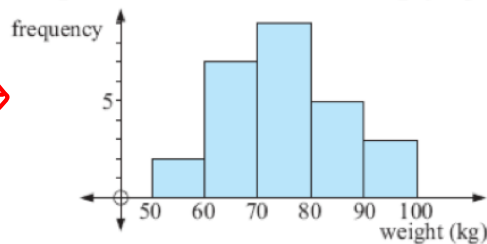
# From Frequency Tables you can make two types of graphs

The frequency table would be:

<i>Weight interval</i>	<i>Frequency</i>
50 -	2
60 -	7
70 -	9
80 -	5
90 -	3

We could use a histogram to represent the data graphically.

Weights of the students in the rugby squad



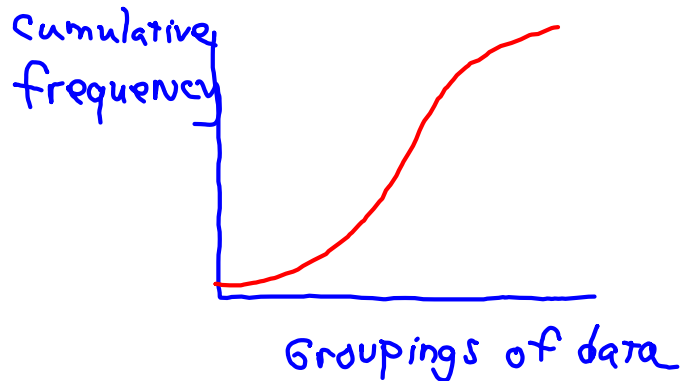
**HISTOGRAMS**

Cumulative  
frequency  
Graphs



## Cumulative Frequency Graphs

- is just a graph of the cumulative frequencies



today's  
AIM

Construct Cumulative Frequency Graphs.

Use them to determine quartiles &

percentiles and analyze the population.

ppt•

Pick Up The  
Handout

**I** 120 people were surveyed and asked how many hours they used a computer last week.

b) On the grid, draw a cumulative frequency graph for your table.

A) Complete the cumulative frequency table.

Number of hours (h)	Frequency	Cumulative Frequency
$0 < h \leq 2$	10	10
$2 < h \leq 4$	15	25
$4 < h \leq 6$	30	55
$6 < h \leq 8$	35	90
$8 < h \leq 10$	25	115
$10 < h \leq 12$	5	120

c) Use the graph to estimate the median # of hours  
6.2 hours

d) Find an estimate for the number of hours at the 25th percentile  
4.8 hours

at the 60th percentile  
6.9 hours

**II**

Objective: Can we use grouped data to create a cumulative frequency graph?

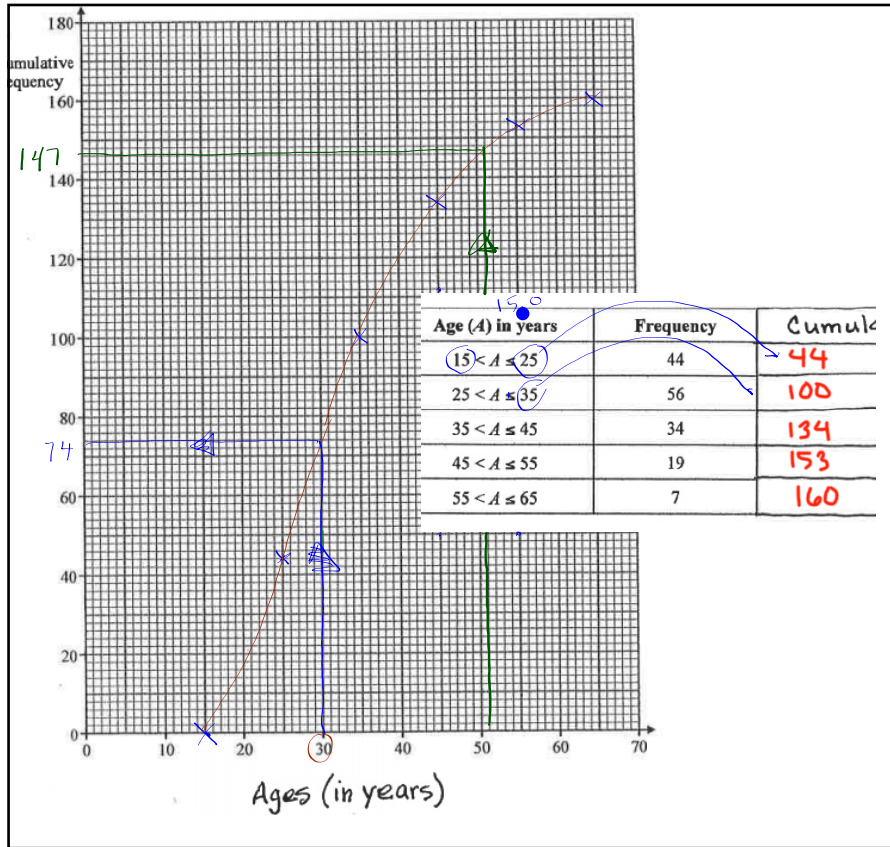
The table gives information about the ages of 160 employees of an IT company.

Age (A) in years	Frequency	Cumulative Freq
$15 < A \leq 25$	44	44
$25 < A \leq 35$	56	100
$35 < A \leq 45$	34	134
$45 < A \leq 55$	19	153
$55 < A \leq 65$	7	160

(a) Write down the modal class interval.  $25 < A \leq 35$

(b) Complete the cumulative frequency table.

(c) Draw a cumulative frequency graph.

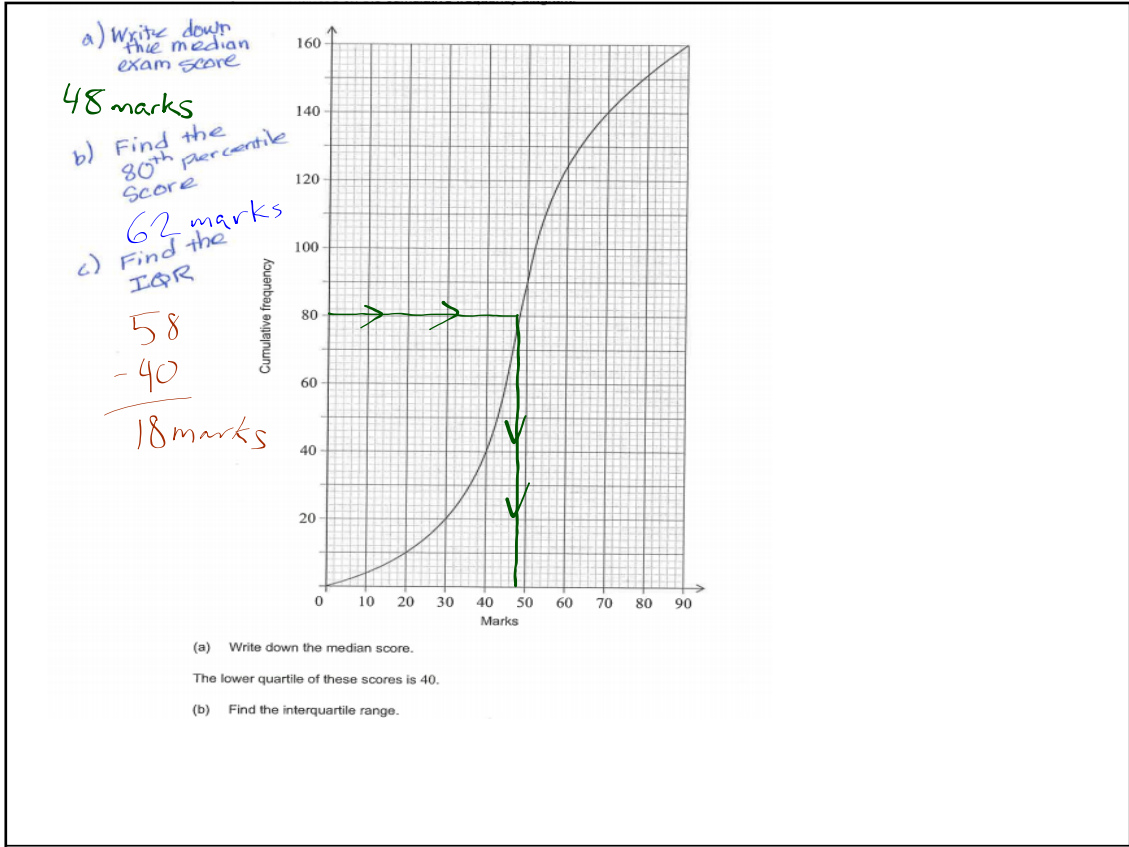


d) Use your graph to estimate the number of employees that are younger than 30

74 employees

e) Estimate, using the graph, the number older than 52.

$160 - 147 = 13$  are older



Po 182,000. 4

speed	f
80-85	8
85-90	14
90-95	22
95-100	6

→

midInterval speed x	f	f.x
82.5	8	
87.5	14	
92.5	22	
97.5	6	
	50	4505

↻

$$\bar{x} = \frac{\sum fx}{\sum f}$$

$$= \frac{4505}{50}$$

← critica total

$$= 90.1 \text{ km}$$

You'll be asked to go one step further on the HW. That is, you will be required to set up your own graph on graph paper.

Brain Break  
and then a LCQ



Assignment (HH Ch 6 packet)

p. 174..... #15

p.182.....#5

p.190... #1

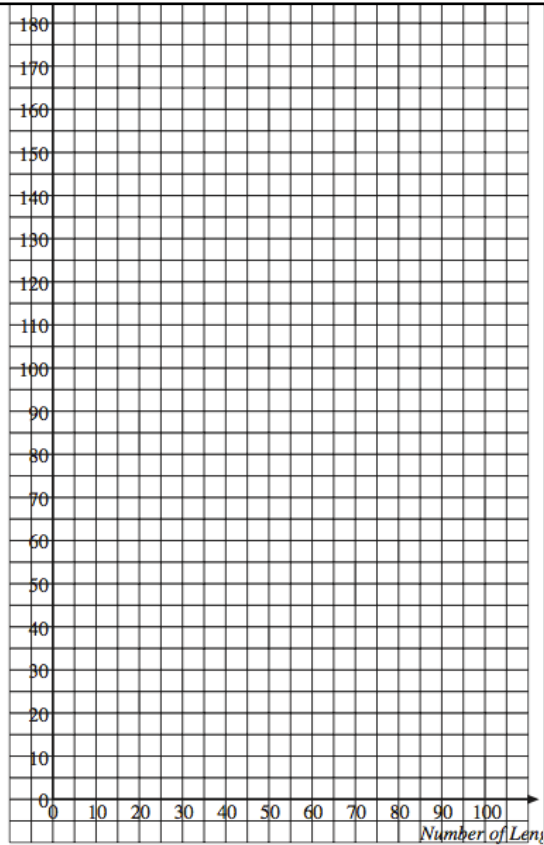
p.195.....#1 and #2

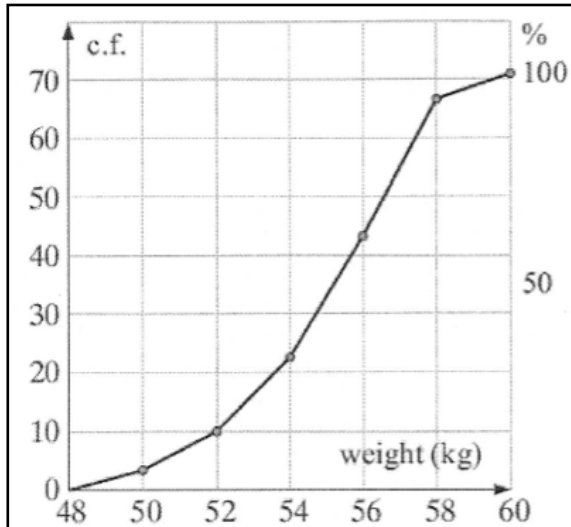
page 199.... 3

Use graph paper

number of lengths swum by children in a sponsored  
are listed in the table.

<i>Number of Lengths</i>	<i>Frequency</i>	<i>Cumulative Frequency</i>
1 - 10	3	
11 - 20	17	
21 - 30	24	
31 - 40	18	
41 - 50	29	
51 - 60	30	
61 - 70	33	
71 - 80	17	
81 - 90	20	
91 - 100	9	





The cumulative frequency graph shows the cumulative frequency of the weights of a herd of 12-month old female alpacas.

- How many alpacas were in the herd?
- What percentage of alpacas have weights under 52 kg?
- Determine the median weight from the graph.
- Determine the 20<sup>th</sup> percentile weight.