

c)  $IQR = 17,5 - 6 = 11,5$

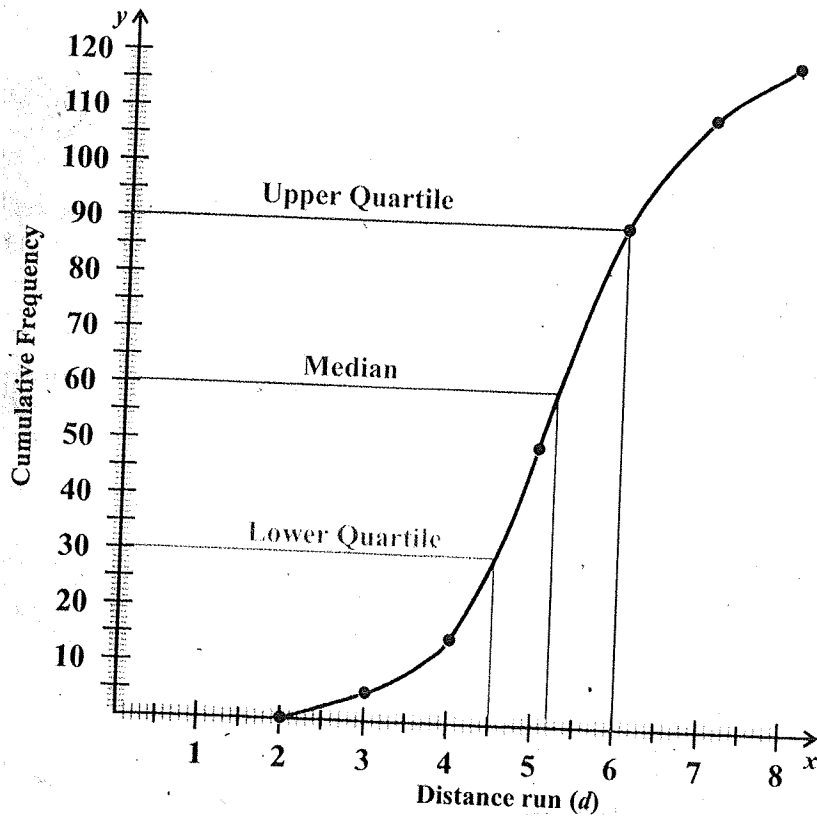
$Q_1 - (1,5 \times IQR) = 6 - (1,5 \times 11,5) = -11,25$

$Q_3 + (1,5 \times IQR) = 17,5 + (1,5 \times 11,5) = 34,75$

There are no values less than  $-11,5$  or greater than  $34,75$ . Therefore, there are no outliers in the data set.

### EXAMPLE OF DETERMINING OF OGIVE CURVE

Distance ( $d$ )	Frequency	Cumulative Frequency
$2 \leq d < 3$	5	5
$3 \leq d < 4$	10	$15 \rightarrow 5 + 10$
$4 \leq d < 5$	35	$50 \rightarrow 15 + 35$
$5 \leq d < 6$	40	$90 \rightarrow 50 + 40$
$6 \leq d < 7$	20	$110 \rightarrow 90 + 20$
$7 \leq d < 8$	10	$120 \rightarrow 110 + 10$



Lower quartile position:  $120 \times \frac{1}{4} = 30$

$\therefore$  lower quartile = 4,5 km (read off the graph)

Median position:  $120 \times \frac{1}{2} = 60$

$\therefore$  median = 5,2 km (read off the graph)

Upper quartile position:  $120 \times \frac{3}{4} = 90$

$\therefore$  upper quartile = 6 km (read off the graph)

You can now calculate the inter-quartile range:  
 Inter-quartile range =  $Q_3 - Q_1 = 6 - 4,5 = 1,5$  km

The  $x$ -values are the actual lower quartile, median, and upper quartile times.

Downloaded from Stanmorephysics.com  
 $\therefore$  Calculate the  $y$ -value of the lower quartile, median and upper quartile

$$\text{Lower quartile position: } 172 \times \frac{1}{4} = 43$$

$\therefore$  lower quartile = 30 (read off the graph)

$$\text{Median position: } 172 \times \frac{1}{2} = 86$$

$\therefore$  median = 46 (read off the graph)

$$\text{Upper quartile position: } 172 \times \frac{3}{4} = 129$$

$\therefore$  upper quartile = 62 (read off the graph)

### ESTIMATED MEAN

Time	Frequency ( $f$ )	Midpoint ( $x$ )	Frequency $\times$ midpoint ( $f \cdot x$ )
$0 \leq T < 20$	21	10	210
$20 \leq T < 40$	48	30	1440
$40 \leq T < 60$	56	50	2800
$60 \leq T < 80$	32	70	2240
$80 \leq T < 100$	10	90	900
$100 \leq T < 120$	5	110	550
Sum	$\sum f = 172$		$\sum f \cdot x = 8140$

$$\therefore \text{Estimated mean} = \frac{8140}{172} \rightarrow \frac{\sum f \cdot x}{\sum f}$$

$\therefore \bar{x} = 47$  minutes



Do not get confused between the MEAN and the MEDIAN. The mean is the average value of a data set, while the median is the middle value in an ordered set of data.



In order to determine the exact position of the median the formula shown below should be used. However, when working with ogives it is considered accurate enough to divide the cumulative frequency by 2.

$$\text{Position of median} = \frac{n+1}{2}$$

**QUESTION 1**

Mary wants to buy a car and visits a popular website. She finds a number of advertisements for the make of car that she would like to buy. She summarises the selling prices (in thousands of rands) of the cars on sale in the cumulative frequency table below.

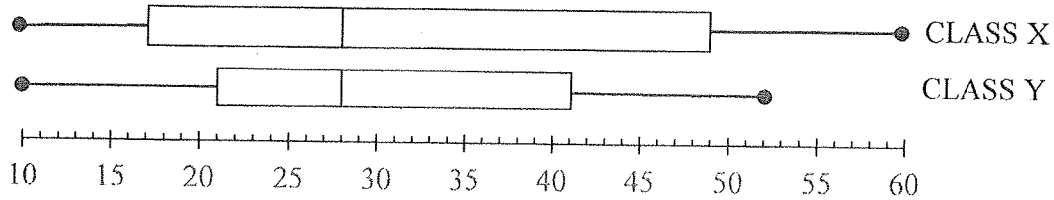
SELLING PRICE (IN THOUSANDS OF RANDS)	FREQUENCY	CUMULATIVE FREQUENCY
$50 \leq x < 60$	3	3
$60 \leq x < 70$	4	7
$70 \leq x < 80$	$a$	14
$80 \leq x < 90$	19	33
$90 \leq x < 100$	12	$b$
$100 \leq x < 110$	5	50

- 1.1 Write down the values of  $a$  and  $b$ . (2)
- 1.2 Draw a cumulative frequency graph (ogive) of the data on the grid provided in the ANSWER BOOK. (3)
- 1.3 Mary wants to spend a maximum of R95 000. Use the cumulative frequency graph to estimate the number of cars that are on sale in the price range that Mary can afford. (1)
- [6]**



**QUESTION 2**

2.1 Two classes wrote a Mathematics test that had a maximum mark of 60. The results of each class are summarised in the box and whisker diagrams below.



2.1.1 Comment on the skewness of the results in class X. (1)

2.1.2 In which class is the standard deviation of the marks bigger? (1)

2.1.3 Comment on the average performance in the test of the two classes. Use relevant statistics to support your argument. (2)

2.2 The time, in minutes, that it took for the first goal to be scored in seven football games was recorded. The times, in ascending order, are represented by  $a, b, c, d, e, f$  and  $g$  in the table below.

$a$	$b$	$c$	$d$	$e$	$f$	$g$
-----	-----	-----	-----	-----	-----	-----

The following observations were made about the data:

- All these goals were scored at different times.
- The minimum time for the first goal was 5 minutes.
- The range of the times was 48 minutes.
- The median time was 22 minutes.
- The difference between the time at the lower quartile and the minimum time was 7 minutes.
- The IQR of the times was 28 minutes.
- The mean time was 27 minutes.
- $e = 2c$

2.2.1 Determine the values of  $a, b, c, d, e, f$  and  $g$ . (8)

2.2.2 If the standard deviation of the data set is 15,87 minutes, how many goals were scored within ONE standard deviation of the mean time? (3)

**[15]**



**QUESTION 1**

The 100<sup>th</sup> Tour de France took place from 29 June 2013 to 21 July 2013. The race was made up of 21 stages of varying distances. The distance, in kilometres, covered in each stage is given in the table below:

Stage	Distance	Stage	Distance	Stage	Distance
1	213	8	195	15	247
2	156	9	168	16	168
3	145	10	197	17	32
4	25	11	33	18	172
5	228	12	218	19	204
6	176	13	173	20	125
7	205	14	191	21	133

[Source: [www.letour.fr/le-tour/2013/us](http://www.letour.fr/le-tour/2013/us)]

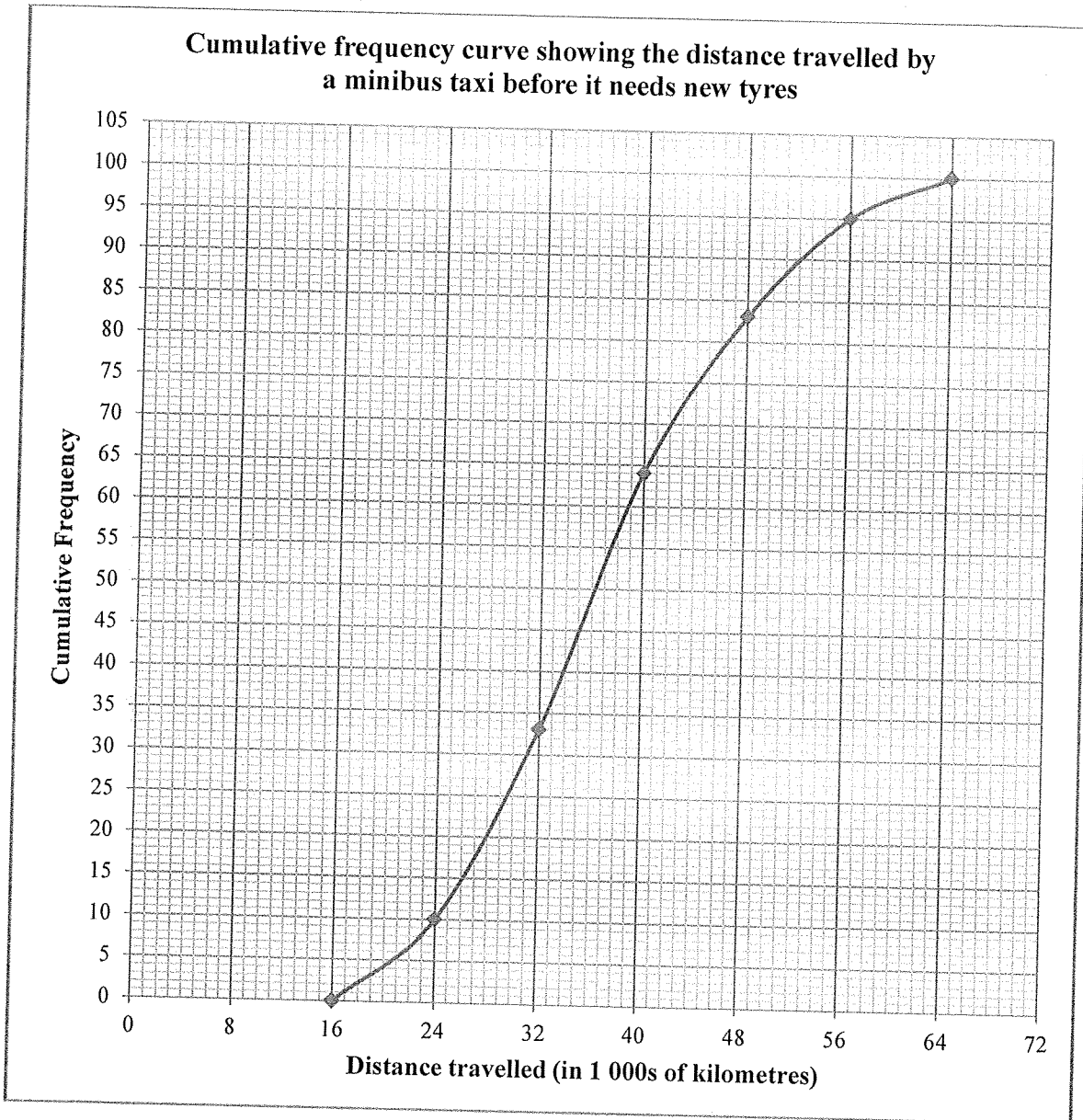
- 1.1 Calculate the mean distance. (3)
- 1.2 Calculate the standard deviation of the distances. (2)
- 1.3 Determine the number of stages that lie beyond ONE standard deviation of the mean. (2)
- 1.4 The distance covered in each stage has been rearranged in ascending order and is shown below. Determine the five-number summary of this data. (4)
- |     |     |     |     |     |     |     |
|-----|-----|-----|-----|-----|-----|-----|
| 25  | 32  | 33  | 125 | 133 | 145 | 156 |
| 168 | 168 | 172 | 173 | 176 | 191 | 195 |
| 197 | 204 | 205 | 213 | 218 | 228 | 247 |
- 1.5 Use the scaled line provided in DIAGRAM SHEET 1 to draw a box and whisker diagram to represent the distance covered in each stage. (2)
- 1.6 Are there any outliers in the data set? Explain. (2)
- [15]**





**QUESTION 2**

A manufacturer recorded how far a minibus taxi travels before it needs new tyres. He recorded the distances, in 1 000s of kilometres, covered by a number of taxis that travelled the same route. This information is shown in the cumulative frequency graph (ogive) below.

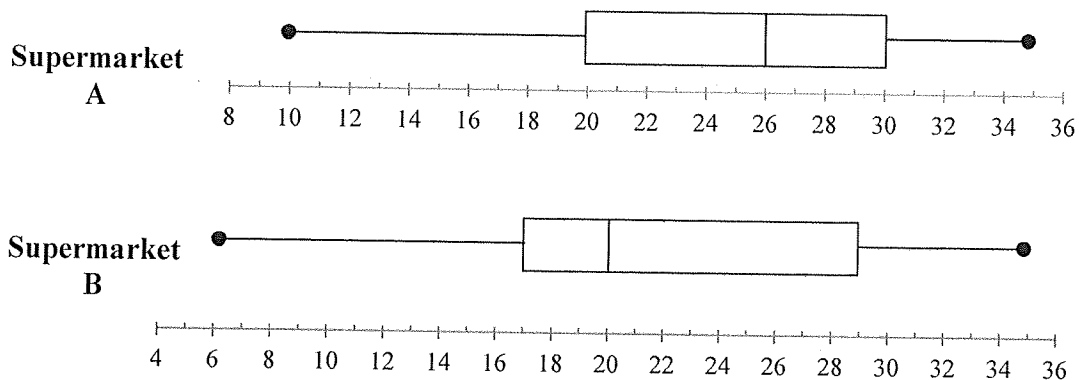


- 2.1 How many times did they record the distance travelled by a minibus taxi before it needed new tyres? (1)
  - 2.2 Write down the modal class of the data. (1)
  - 2.3 Estimate the median distance travelled before new tyres are needed. (1)
  - 2.4 Estimate the inter-quartile range for this data. (3)
- [6]**



**QUESTION 1**

1.1 The number of delivery trucks making daily deliveries to neighbouring supermarkets, Supermarket A and Supermarket B, in a two-week period are represented in the box-and-whisker diagrams below.



- 1.1.1 Calculate the interquartile range of the data for Supermarket A. (2)
- 1.1.2 Describe the skewness in the data of Supermarket A. (1)
- 1.1.3 Calculate the range of the data for Supermarket B. (2)
- 1.1.4 During the two-week period, which supermarket receives 25 or more deliveries per day on more days? Explain your answer. (2)

1.2 The number of delivery trucks that made deliveries to Supermarket A each day during the two-week period was recorded. The data is shown below.

10	15	20	$x$	30	35	15	31	32	21	$x$	27	28	29
----	----	----	-----	----	----	----	----	----	----	-----	----	----	----

If the mean of the number of delivery trucks that made deliveries to supermarket A is 24,5 during these two weeks, calculate the value of  $x$ .

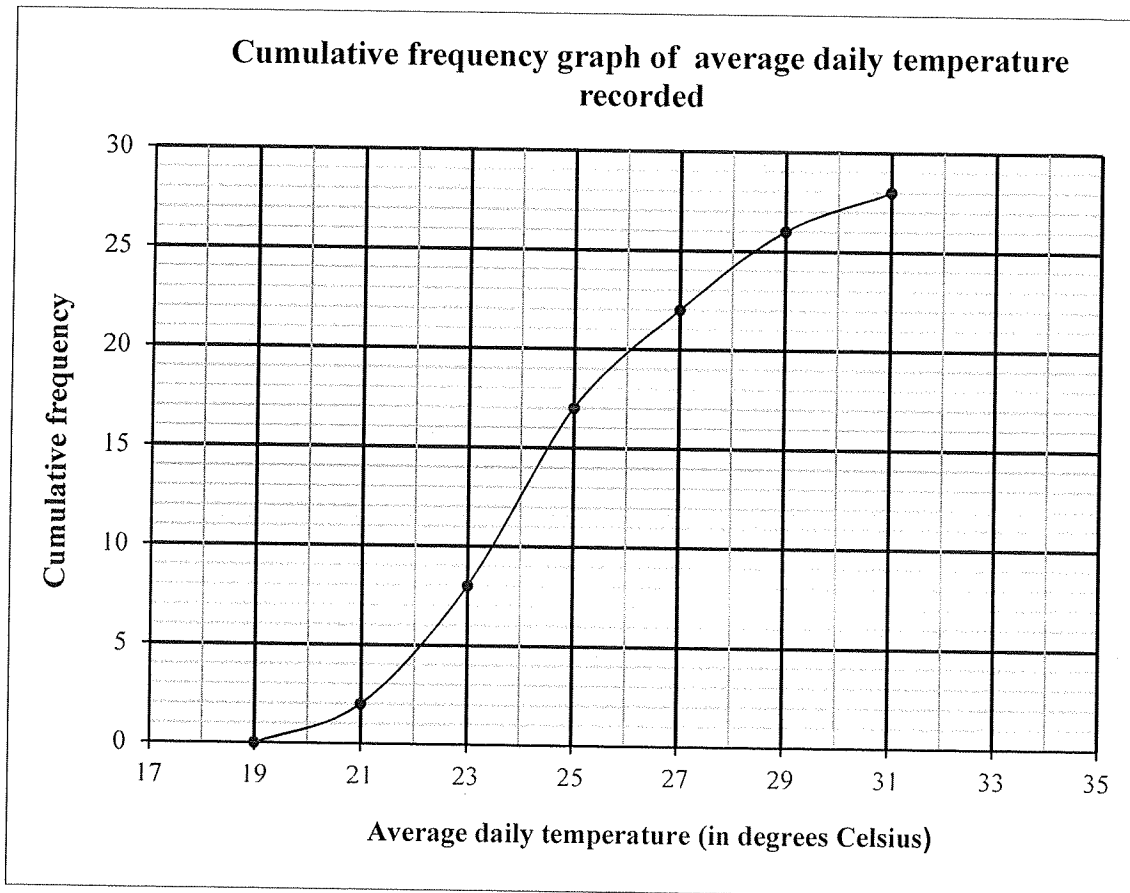
(3)  
[10]





**QUESTION 2**

The 2012 Summer Olympic Games was held in London. The average daily temperature, in degrees Celsius, was recorded for the duration of the Games. A cumulative frequency graph (ogive) of this data is shown below.



- 2.1 Over how many days was the 2012 Summer Olympic Games held? (1)
  - 2.2 Estimate the percentage of days that the average daily temperature was less than 24 °C. (2)
  - 2.3 Complete the frequency table for the data on DIAGRAM SHEET 1. (3)
  - 2.4 Hence, use the grid provided on DIAGRAM SHEET 1 to draw a frequency polygon of the data. (4)
- [10]**



**QUESTION 1**

The following table represents the heights, in centimetres, of 120 boys in a school.

HEIGHT (cm)	FREQUENCY
$150 < x \leq 155$	4
$155 < x \leq 160$	22
$160 < x \leq 165$	56
$165 < x \leq 170$	32
$170 < x \leq 175$	6

- 1.1 Complete the cumulative frequency table in the SPECIAL ANSWER BOOK. (2)
  - 1.2 Draw an ogive, using the diagram in the SPECIAL ANSWER BOOK, to represent the information in the table. (4)
  - 1.3 Determine, using the ogive, the five number summary. (5)
  - 1.4 If the distribution of the data is represented by means of a box whisker diagram, comment on the spread of the data. (1)
- [12]**

**QUESTION 2**

The following is a sample of weekly wages earned by ten people working for a small printing and design company.

R2 250 R2 250 R3 000 R3 300 R3 300  
 R3 600 R3 900 R4 350 R4 350 R5 250

- 2.1 Calculate the mean weekly wage. (2)
  - 2.2 Calculate the standard deviation of the weekly wage. (1)
  - 2.3 Determine the percentage of workers which lie within ONE standard deviation of the mean. (4)
- [7]**



**QUESTION 1**      November 2015

The table below shows the weight (to the nearest kilogram) of each of the 27 participants in a weight-loss programme.

56	68	69	71	71	72	82	84	85
88	89	90	92	93	94	96	97	99
102	103	127	128	134	135	137	144	156

- 1.1 Calculate the range of the data. (2)
- 1.2 Write down the mode of the data. (1)
- 1.3 Determine the median of the data. (1)
- 1.4 Determine the interquartile range of the data. (3)
- 1.5 Use the number line provided in the ANSWER BOOK to draw a box and whisker diagram for the data above. (2)
- 1.6 Determine the standard deviation of the data. (2)
- 1.7 The person weighing 127 kg states that she weighs more than one standard deviation above the mean. Do you agree with this person? Motivate your answer with calculations. (3)

[14]

**QUESTION 2**

The table below shows the weight (in grams) that each of the 27 participants in the weight-loss programme lost in total over the first 4 weeks.

WEIGHT LOSS OVER 4 WEEKS (IN GRAMS)	FREQUENCY
$1\ 000 < x \leq 1\ 500$	2
$1\ 500 < x \leq 2\ 000$	3
$2\ 000 < x \leq 2\ 500$	3
$2\ 500 < x \leq 3\ 000$	4
$3\ 000 < x \leq 3\ 500$	5
$3\ 500 < x \leq 4\ 000$	7
$4\ 000 < x \leq 4\ 500$	2
$4\ 500 < x \leq 5\ 000$	1

- 2.1 Estimate the average weight loss, in grams, of the participants over the first 4 weeks. (2)
- 2.2 Draw an ogive (cumulative frequency graph) of the data on the grid provided. (4)
- 2.3 The weight-loss programme guarantees a loss of 800 g per week if a person follows the programme without cheating. Hence, determine how many of the participants had an average weight loss of 800 g or more per week over the first 4 weeks. (2)

[8]



**QUESTION 1**

The table below shows the number of cans of food collected by 9 classes during a charity drive.

5	8	15	20	25	27	31	36	75
---	---	----	----	----	----	----	----	----

- 1.1 Calculate the range of the data. (1)
- 1.2 Calculate the standard deviation of the data. (2)
- 1.3 Determine the median of the data. (1)
- 1.4 Determine the interquartile range of the data. (3)
- 1.5 Use the number line provided in the ANSWER BOOK to draw a box and whisker diagram for the data above. (3)
- 1.6 Describe the skewness of the data. (1)
- 1.7 Identify outliers, if any exist, for the above data. (1)
- [12]**

**QUESTION 2**

The table below shows the time (in minutes) that 200 learners spent on their cellphones during a school day.

TIME SPENT (IN MINUTES)	FREQUENCY
$95 < x \leq 105$	15
$105 < x \leq 115$	27
$115 < x \leq 125$	43
$125 < x \leq 135$	52
$135 < x \leq 145$	28
$145 < x \leq 155$	21
$155 < x \leq 165$	10
$165 < x \leq 175$	4

- 2.1 Complete the cumulative frequency column in the table provided in the ANSWER BOOK. (2)
- 2.2 Draw a cumulative frequency graph (ogive) of the data on the grid provided. (3)
- 2.3 Use the cumulative frequency graph to determine the value of the lower quartile. (2)
- 2.4 Determine, from the cumulative frequency graph, the number of learners who used their cellphones for more than 140 minutes. (2)
- [9]**



**QUESTION 1** (EC/NOVEMBER 2016)  
 Downloaded from [Stanmorephysics.com](http://Stanmorephysics.com)

Mr Ngwane is the sales manager for a furniture shop. Every month his 15 staff members report on the number of customers who visited during the previous month. The results were given as follows:

12 15 15 19 22 23 26 26 32 33 33 33 33 35 35

1.1 Determine the:

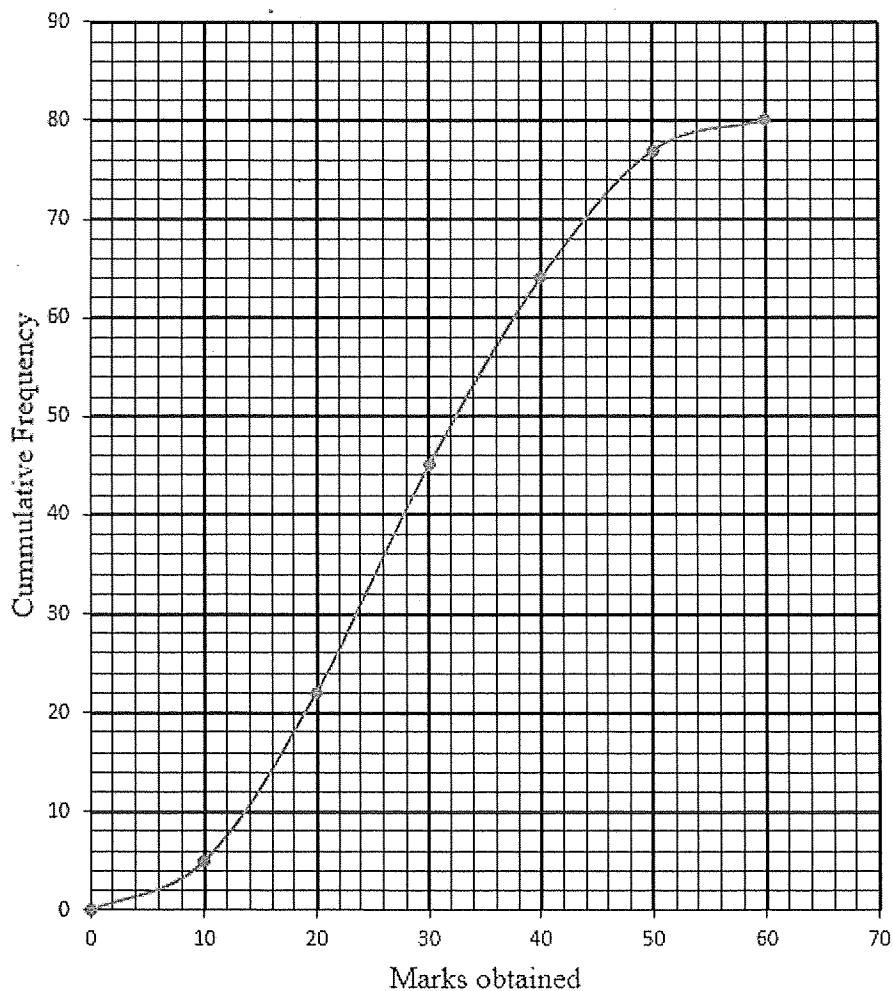
- 1.1.1 median of the data (1)
- 1.1.2 interquartile range (3)
- 1.1.3 mean of the data (2)
- 1.1.4 standard deviation of the data. (2)

1.2 Determine the percentage of customers who visited the furniture shop that are outside one standard deviation of the mean. (3)  
 [11]

**QUESTION 2**

A group of learners wrote a standardised English test that was scored out of 60. The results were represented in a cumulative frequency graph below.

Cummulative frequency for the marks obtained



- 2.1 How many learners wrote the test? (1)
- 2.2 How many learners scored at least 20 out of 60? (2)
- 2.3 Using the graph, estimate the median test score. (2)

- 2.4 Complete the frequency table below using the SPECIAL ANSWER BOOK provided.

Marks obtained	Frequency
$0 < x \leq 10$	
$10 < x \leq 20$	
$20 < x \leq 30$	
$30 < x \leq 40$	
$40 < x \leq 50$	
$50 < x \leq 60$	

(5)

- 2.5 Write down the modal group.

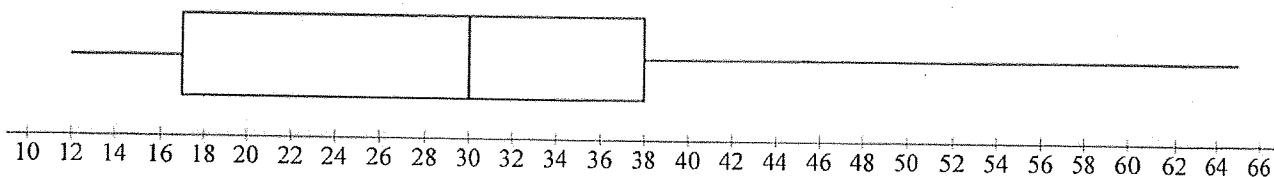
(1)

[11]

## QUESTION 1

(DBE/NOVEMBER 2017)

- 1.1 Mr Brown conducted a survey on the amount of airtime (in rands) EACH student had on his or her cellphone. He summarised the data in the box and whisker diagram below.



- 1.1.1 Write down the five-number summary of the data. (2)
- 1.1.2 Determine the interquartile range. (1)
- 1.1.3 Comment on the skewness of the data. (1)
- 1.2 A group of 13 students indicated how long it took (in hours) before their cellphone batteries required recharging. The information is given in the table below.

5	8	10	17	20	29	32	48	50	50	63	$y$	107
---	---	----	----	----	----	----	----	----	----	----	-----	-----

- 1.2.1 Calculate the value of  $y$  if the mean for this data set is 41. (2)
- 1.2.2 If  $y = 94$ , calculate the standard deviation of the data. (1)
- 1.2.3 The mean time before another group of 6 students needed to recharge the batteries of their cellphones was 18 hours. Combine these groups and calculate the overall mean time needed for these two groups to recharge the batteries of their cellphones. (3)

[10]



**QUESTION 1**

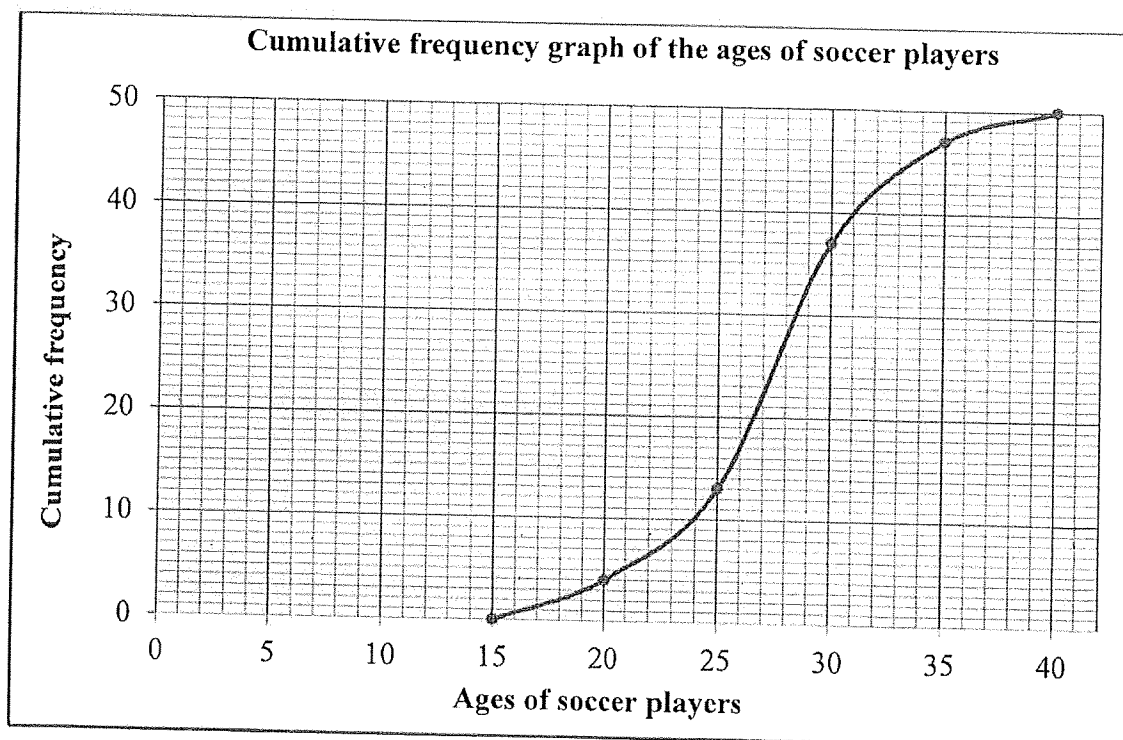
A school held a sports day. One of the items on the programme was an obstacle race. Teams of 10 parents and learners participated in this race. The table below shows the time taken, in minutes, by each member of a particular team to complete the race.

4	12	13	16	17	18	20	22	22	25
---	----	----	----	----	----	----	----	----	----

- 1.1 How long, in minutes, did it take for the fastest member of this team to complete the race? (1)
  - 1.2 Determine the mean time taken by this team. (2)
  - 1.3 Calculate the standard deviation for the data. (1)
  - 1.4 How many members of the team completed the obstacle race outside of two standard deviations of the mean? (3)
  - 1.5 It took another team a total time of  $x+5$  minutes to complete the race. Calculate the value of  $x$  if the overall mean of the two teams combined was 18 minutes. (3)
- [10]**

**QUESTION 2**

- 2.1 A survey was conducted of the ages of players at a soccer tournament. The results are shown in the cumulative frequency graph (ogive) below.



- 2.1.1 How many players took part in the soccer tournament? (1)
- 2.1.2 Determine the number of players between the ages of 24 and 31 years old. (2)
- 2.1.3 Complete the frequency column of the table below in the ANSWER BOOK.

CLASS INTERVAL	FREQUENCY	CUMULATIVE FREQUENCY
$15 \leq x < 20$		4
$20 \leq x < 25$		13
$25 \leq x < 30$		37
$30 \leq x < 35$		47
$35 \leq x < 40$		50

- 2.1.4 Use the grid provided in the ANSWER BOOK to draw a frequency polygon for the data. (4)

- 2.2 Two Grade 11 Mathematics classes have the same number of learners. The five-number summaries of the marks obtained by these classes for a test are shown below.

**CLASS A** (30 ; 48 ; 65 ; 82 ; 90)

**CLASS B** (50 ; 58 ; 65 ; 75 ; 90)

The parents of learners in CLASS A and CLASS B observe that both classes have the same median and the same maximum mark and therefore claim that there is no difference in the performance between these classes.

Do you agree with this claim? Use at least TWO different arguments to justify your answer.

(3)  
[13]

**NOTE:**

- If a candidate answers a question TWICE, only mark the FIRST attempt.
- If a candidate has crossed out an attempt of a question and not redone the question, mark the crossed out version.
- Consistent accuracy applies in ALL aspects of the marking memorandum.
- Assuming answers/values in order to solve a problem is NOT acceptable.

**QUESTION 1**

1.1	$\text{Mean} = \frac{\sum_{i=1}^n x_i}{n} = \frac{408}{19} = 21,47$	✓ 408 ✓ 19 ✓ answer (2)																				
1.2	Standard deviation = 7,81	✓✓ answer (2)																				
1.3	The one standard deviation limits are $(\bar{x} - 1\sigma; \bar{x} + 1\sigma)$ $= (21,47 - 7,81; 21,47 + 7,81) = (13,66; 29,28)$ $\therefore$ 13 people lie within 1 standard deviation of the mean.	✓ interval ✓ 13 people (2)																				
1.4	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">5</td><td style="padding: 2px 5px;">12</td><td style="padding: 2px 5px;">13</td><td style="padding: 2px 5px;">15</td><td style="padding: 2px 5px; background-color: #cccccc;">18</td><td style="padding: 2px 5px;">18</td><td style="padding: 2px 5px;">18</td><td style="padding: 2px 5px;">19</td><td style="padding: 2px 5px;">20</td><td style="padding: 2px 5px; background-color: #cccccc;">21</td></tr> <tr> <td style="padding: 2px 5px;">21</td><td style="padding: 2px 5px;">22</td><td style="padding: 2px 5px;">23</td><td style="padding: 2px 5px;">23</td><td style="padding: 2px 5px; background-color: #cccccc;">26</td><td style="padding: 2px 5px;">29</td><td style="padding: 2px 5px;">33</td><td style="padding: 2px 5px;">35</td><td style="padding: 2px 5px;">37</td><td></td></tr> </table> <p>IQR = 26 - 18 = 8</p>	5	12	13	15	18	18	18	19	20	21	21	22	23	23	26	29	33	35	37		✓ $Q_1 = 18$ ✓ $Q_3 = 26$ ✓ IQR = 8 (3)
5	12	13	15	18	18	18	19	20	21													
21	22	23	23	26	29	33	35	37														
1.5		✓✓ box ✓ whiskers (3)																				
1.6	There is a marked difference between the lowest value (5) and the next lowest value (12) whilst the differences between all other data points are within at most 3 values. $\therefore$ 5 is an outlier	✓ reason ✓ 5 is an outlier (2) [14]																				

**QUESTION 2**

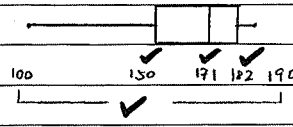
2.1	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Class</th><th>Frequency</th><th>Cumulative frequency</th></tr> </thead> <tbody> <tr><td><math>0 \leq m &lt; 2</math></td><td>7</td><td>7</td></tr> <tr><td><math>2 \leq m &lt; 4</math></td><td>15</td><td>22</td></tr> <tr><td><math>4 \leq m &lt; 6</math></td><td>26</td><td>48</td></tr> <tr><td><math>6 \leq m &lt; 8</math></td><td>29</td><td>77</td></tr> <tr><td><math>8 \leq m &lt; 10</math></td><td>36</td><td>113</td></tr> <tr><td><math>10 \leq m &lt; 12</math></td><td>31</td><td>144</td></tr> <tr><td><math>12 \leq m &lt; 14</math></td><td>14</td><td>158</td></tr> <tr><td><math>14 \leq m &lt; 16</math></td><td>2</td><td>160</td></tr> </tbody> </table>	Class	Frequency	Cumulative frequency	$0 \leq m < 2$	7	7	$2 \leq m < 4$	15	22	$4 \leq m < 6$	26	48	$6 \leq m < 8$	29	77	$8 \leq m < 10$	36	113	$10 \leq m < 12$	31	144	$12 \leq m < 14$	14	158	$14 \leq m < 16$	2	160	✓ first three cumulative frequencies correct ✓ remainder correct (total = 160) (2)
Class	Frequency	Cumulative frequency																											
$0 \leq m < 2$	7	7																											
$2 \leq m < 4$	15	22																											
$4 \leq m < 6$	26	48																											
$6 \leq m < 8$	29	77																											
$8 \leq m < 10$	36	113																											
$10 \leq m < 12$	31	144																											
$12 \leq m < 14$	14	158																											
$14 \leq m < 16$	2	160																											
2.2		✓ grounding at 0 ✓ plotting cumulative frequencies at upper limits ✓ smooth shape of curve (3)																											

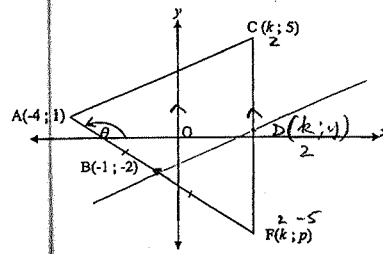
2.3	The median for the data is approximately 8 messages.	✓Median (1)
2.4	Approximately 130 learners sent 11 or fewer messages. Therefore 30 learners sent more than 11 messages. $\frac{30}{160} \times 100\% = 18,75\%$	✓30 learners ✓answer (2)
2.5	Skewed to the left or negatively skewed	✓answer (1)

[9]

GRADE : 11  
 SUBJECT : Mathematics  
 TITLE : Nov P 2  
 EXAMINER : Mr A. Slaughter DOE  
 TOTAL MARKS : 150

DATE : \_\_\_ / \_\_\_ / 20\_\_\_  
**SOLUTIONS**  
 TIME : 3 hour(s)

1.1.	100 143 150 155 164 (171) 171 180 182 188 190 $Q_1$ $M$ $Q_3$	1.3.	IQR = 182 - 150 = 32 • LF                      • UF = $Q_1 - 1.5 \cdot IQR$ = $Q_3 + 1.5 \cdot IQR$ = 150 - 1.5 \cdot 32 = 182 + 1.5 \cdot 32 = 102                      = 230 100 < LF                      nothing > 230 $\therefore$ outlier = 100 ✓		
	I min = 100                      50 II $Q_1$ = 150                      75 III $M$ = 171                      85.5 IV $Q_3$ = 182                      91 V max = 190                      95 scale = mm $\div$ 2 		2.1.	$\bar{x} = \frac{25+47+\dots+1x+\dots+30}{10}$ $= \frac{324+x}{10}$	1
1.2.	$\bar{x} = 163.09$ $M = 171$ $\bar{x} - M = 163.09 - 171 = -8 < 0$ $\therefore$ skewed to left ✓ (OR) $M - Q_1 = 171 - 150 = 21$ $Q_3 - M = 182 - 171 = 11$ $M - Q_1 > Q_3 - M$ $\therefore$ skewed to left.		2.2.	$36 = \frac{324+x}{10}$ ✓ LCD = 10 x thru $360 = 324 + x$ $36 = x$ ✓	2
			2.3.	$\sigma = 8.88$ ✓✓	2
			2.4.	$\bar{x} = 36$ $\sigma = 8.88$	

	$\bar{x} = 0$ $x + \sigma$ = 36 - 8.88                      = 36 + 8.88 = 27.12 ✓                      = 44.88 < 27.12                      > 44.88 = 25                      = 47.55 $\therefore$ 3 people ✓	4.			
3.1.	} D/sheet 1	4.1.	1. $A(-4;1)$ $B(-1;-2)$ $F(k;p)$ $-1 = \frac{-4+k}{2}$ $-2 = \frac{1+p}{2}$ $2 = k$ $-5 = p$	3	
3.2.			2. $A(-4;1)$ $F(2;-5)$ $m_{AF} = \frac{-5-1}{2-(-4)} = -1$ ✓ $\checkmark$ sub $\checkmark$ ans	3	
3.3.	$30\% = \frac{15}{50}$ (strictly speaking cum freq $\leq$ so, $\leq \frac{14}{50}$ failed)		3. $B(-1;-2)$ $m_1 = 1$ ✓ $\therefore y = x + c$ ✓ sub $B(-1;-2)$ $-2 = -1 + c$ ✓ $-1 = c$ $\therefore y = x - 1$ ✓	4	
	Loosely: $< 15 = 4$ $\therefore \geq 15 = 40 - 4 = 36$ passed ✓✓ 34 35 36		4.2.	$C(2;5)$ $A(-4;1)$ $F(2;-5)$ $AC = \sqrt{(1-5)^2 + (-4-2)^2} = \sqrt{52}$ CF = 10 ✓ $FA = \sqrt{(-5-1)^2 + (2-(-4))^2} = \sqrt{72}$	

NOVEMBER 2013

NAME: SLT

DIAGRAM SHEET 1

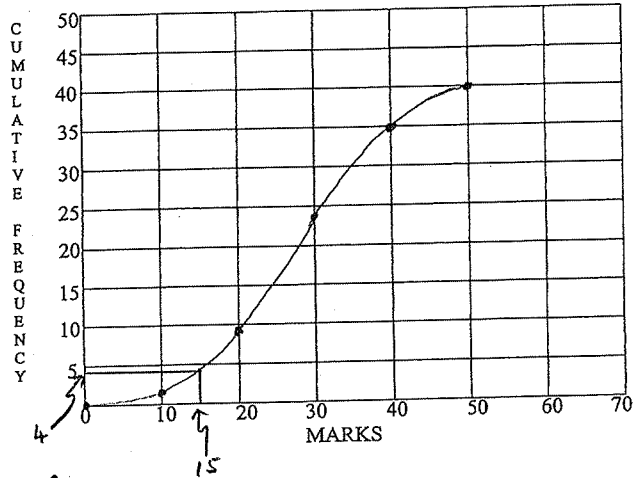
QUESTION 3.1

Grounding pt  
(0;0)

Interval	Frequency	Cumulative frequency
$0 \leq x < 10$	2	2
$10 \leq x < 20$	7	9
$20 \leq x < 30$	14	23
$30 \leq x < 40$	12	35
$40 \leq x < 50$	5	40

2

QUESTION 3.2:



- ✓ grounding pt (0;0)
- ✓ plotting
- ✓ smooth shape

3



**NOTE:**

- If a candidate answers a question TWICE, only mark the FIRST attempt.
- If a candidate has crossed out an attempt of a question and not redone the question, mark the crossed out version.
- Consistent accuracy applies in ALL aspects of the marking memorandum.
- Assuming answers/values in order to solve a problem is NOT acceptable.

**LET WEL:**

- Indien 'n kandidaat 'n vraag twee keer beantwoord, merk slegs die eerste poging.
- Indien 'n kandidaat 'n antwoord doodgetrek het, maar nie oorgedoen het nie, merk die doodgetrekte antwoord.
- Volgehoue akkuraatheid geld in ALLE aspekte van die memorandum.
- Aanname van antwoorde/waardes om 'n probleem op te los, is ONaanvaarbaar.

**QUESTION/VRAAG 1**

1.1.1	IQR (A) = 30 – 20 = 10	✓ 30 – 20 ✓ 10	(2)
1.1.2	Data of Supermarket A is skewed to the left/Data van Supermark A is skeef na links. <b>OR</b> Negatively skewed/negatief skeef	✓ comment/kommentaar	(1)
1.1.3	Range/Omvang (B) = 35 – 6 = 29	✓ 35 – 6 ✓ 29	(2)
1.1.4	Supermarket A • Supermarket A received 25 or more deliveries on more than 7 days whilst Supermarket B received 25 or more deliveries on less than 7 days/ Supermark A het op meer as 7 dae 25 of meer afleverings ontvang terwyl Supermark B op minder as 7 dae soveel afleverings ontvang het.	✓ correct choice/ regte keuse ✓ reason/rede	(2)
1.2	$\bar{x} = 24,5$ $\frac{2x + 293}{14} = 24,5$ $2x + 293 = 343$ $2x = 50$ $x = 25$	✓ $\frac{2x + 293}{14}$ ✓ $2x + 293 = 343$  ✓ 25	(3) <b>[10]</b>

**QUESTION/VRAAG 2**

2.1	28 days/dae	✓ answ/antw (1)															
2.2	12 days $\therefore \frac{12}{28} \times 100$ = 42,86%  Accept/Aanvaar 12,5 days which is/dae, wat gelyk is aan 44,64% OR Accept/Aanvaar 13 days which is/dae, wat gelyk is aan 46,43%	✓ No. of days/ getal dae  ✓ percentage/ persentasie	(2)														
2.3	<table border="1"> <thead> <tr> <th>Temperature, T, in degrees Celsius</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>19 ≤ T &lt; 21</td> <td>2</td> </tr> <tr> <td>21 ≤ T &lt; 23</td> <td>6</td> </tr> <tr> <td>23 ≤ T &lt; 25</td> <td>9</td> </tr> <tr> <td>25 ≤ T &lt; 27</td> <td>5</td> </tr> <tr> <td>27 ≤ T &lt; 29</td> <td>4</td> </tr> <tr> <td>29 ≤ T &lt; 31</td> <td>2</td> </tr> </tbody> </table>	Temperature, T, in degrees Celsius	Frequency	19 ≤ T < 21	2	21 ≤ T < 23	6	23 ≤ T < 25	9	25 ≤ T < 27	5	27 ≤ T < 29	4	29 ≤ T < 31	2	✓ 2 and/en 6  ✓ 9 and/en 5  ✓ 4 and/en 2	(3)
Temperature, T, in degrees Celsius	Frequency																
19 ≤ T < 21	2																
21 ≤ T < 23	6																
23 ≤ T < 25	9																
25 ≤ T < 27	5																
27 ≤ T < 29	4																
29 ≤ T < 31	2																
2.4	<p style="text-align: center;"><b>FREQUENCY POLYGON</b></p>	✓ anchored at / geanker by (18 ; 0) and/en (32 ; 0) ✓ points at midpoints/ punte by middelpunte ✓ straight lines joining pts/ reguitlyne verbind punte ✓ all points plotted/ alle punte geplot	(4) <b>[10]</b>														

**NOTE:**

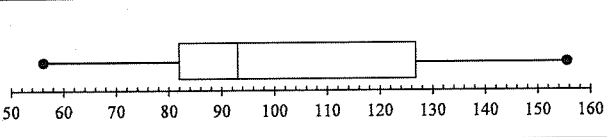
- If a candidate answered a question TWICE, mark only the FIRST attempt.
- If a candidate crossed out an answer and did not redo it, mark the crossed-out answer.
- Consistent accuracy applies to ALL aspects of the marking memorandum.
- Assuming values/answers in order to solve a problem is unacceptable.

**LET WEL:**

- As 'n kandidaat 'n vraag TWEE keer beantwoord het, sien slegs die EERSTE poging na.
- As 'n kandidaat 'n antwoord deurgehaal en nie oorgedoen het nie, sien die deurgehaalde antwoord na.
- Volgehoue akkuraatheid is op ALLE aspekte van die memorandum van toepassing.
- Dit is onaanvaarbaar om waardes/antwoorde aan te neem om 'n probleem op te los.

**QUESTION/VRAAG 1**

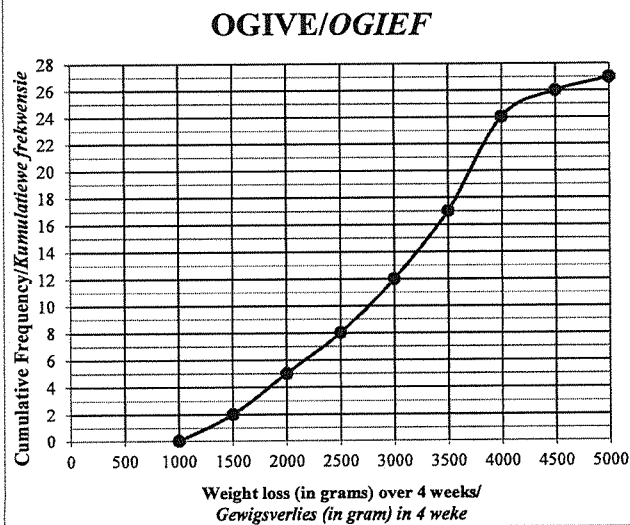
56	68	69	71	71	72	82	84	85
88	89	90	92	93	94	96	97	99
102	103	127	128	134	135	137	144	156

1.1	Range/Omvang = 156 – 56 = 100 kg	✓ max – min ✓ answer/antw (2)
1.2	Mode/Modus = 71 kg	✓ answer/antw (1)
1.3	Median/Mediaan = T <sub>14</sub> = 93 kg	✓ answer/antw (1)
1.4	Q <sub>1</sub> = T <sub>7</sub> = 82 Q <sub>3</sub> = T <sub>21</sub> = 127 IQR = Q <sub>3</sub> – Q <sub>1</sub> = 127 – 82 = 45 kg	✓ Q <sub>1</sub> = 82 ✓ Q <sub>3</sub> = 127  ✓ answer/antw (3)
1.5		✓ box/mond ✓ whiskers/snor (2)
1.6	SD = 25,838 ≈ 25,84 kg	✓ answer/antw (2)
1.7	$\bar{x}$ = 98,59 $\bar{x} + 1\sigma$ = 98,59 + 25,84 = 124,43 kg 127 > 124,43 ∴ I agree with this person/Ek stem met die persoon saam.	✓ $\bar{x}$ = 98,59 ✓ 124,43  ✓ conclusion/ gevolgtrekking (3) <b>[14]</b>



**QUESTION/VRAAG 2**

WEIGHT LOSS OVER 4 WEEKS GEWIGSVERLIES IN 4 WEKE (IN GRAMS/GRAM)	FREQUENCY FREKWENSIE f	CUMULATIVE KUMULATIEWE f
1 000 < x ≤ 1 500	2	2
1 500 < x ≤ 2 000	3	5
2 000 < x ≤ 2 500	3	8
2 500 < x ≤ 3 000	4	12
3 000 < x ≤ 3 500	5	17
3 500 < x ≤ 4 000	7	24
4 000 < x ≤ 4 500	2	26
4 500 < x ≤ 5 000	1	27

2.1	Average/Gemiddelde = $\frac{1250 \times 2 + 1750 \times 3 + \dots + 4750 \times 1}{27}$  = $\frac{81250}{27}$ = 3009,259 ≈ 3009,26 g	✓ 81 250 ✓ answer/antw (2)
2.2	<b>OGIVE/OGIEF</b> 	✓ grounded ✓ upper limits ✓ cumulative frequency ✓ smooth curve  ✓ geanker ✓ boonste limiete ✓ kumulatiewe frekwensie ✓ gladde karwe (4)
2.3	(3200 ; 14) 27 – 14 = 13 participants/deelnemers (accept/aanvaar: 12 – 14)	✓ 14 ✓ 13 (2) <b>[8]</b>

**NOTE:**

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**LET WEL:**

- As 'n kandidaat 'n vraag TWEE keer beantwoord het, sien slegs die EERSTE poging na.
- As 'n kandidaat 'n antwoord deurgehaal en nie oorgedoen het nie, sien die deurgehaalde antwoord na.
- Volgehoue akkuraatheid is op ALLE aspekte van die memorandum van toepassing.
- Dit is onaanvaarbaar om waardes/antwoorde te veronderstel om 'n probleem op te los.

**QUESTION/VRAAG 1**

5	8	15	20	25	27	31	36	75
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1.1	Range/Omvang = $75 - 5 = 70$	✓ answer/antw (1)
1.2	Std dev/Std afwyking = 19,56	✓ ✓ answer/antw (2)
1.3	Median/Mediaan = 25	✓ answer/antw (1)
1.4	$Q_1 = \frac{8+15}{2} = 11,5$ $Q_2 = \frac{31+36}{2} = 33,5$ IQR = $Q_3 - Q_1 = 33,5 - 11,5 = 22$	✓ $Q_1 = 11,5$ ✓ $Q_3 = 33,5$ ✓ answer/antw (3)
1.5		✓ box/mond ✓ whiskers/snor ✓ min and max (maks) (3)
1.6	Skewed to the right/skeef na regs Positively skewed/positief skeef	✓ answer/antw (1)
1.7	Outlier/uitskieter = 75  OR/OF $33.5 + 1.5(22) = 66.5$ Outlier/uitskieter = 75	✓ answer/antw ✓ answer/antw (1) [12]

**QUESTION/VRAAG 2**

2.1	<table border="1"> <thead> <tr> <th>TIME SPENT/ TYD SPANDEER (IN MINUTES/ MINUTE)</th> <th>FREQUENCY FREKWENSIE <math>f</math></th> <th>CUMULATIVE FREQUENCY/ KUMULATIEWE FREKWENSIE <math>f</math></th> </tr> </thead> <tbody> <tr><td><math>95 &lt; x \leq 105</math></td><td>15</td><td>15</td></tr> <tr><td><math>105 &lt; x \leq 115</math></td><td>27</td><td>42</td></tr> <tr><td><math>115 &lt; x \leq 125</math></td><td>43</td><td>85</td></tr> <tr><td><math>125 &lt; x \leq 135</math></td><td>52</td><td>137</td></tr> <tr><td><math>135 &lt; x \leq 145</math></td><td>28</td><td>165</td></tr> <tr><td><math>145 &lt; x \leq 155</math></td><td>21</td><td>186</td></tr> <tr><td><math>155 &lt; x \leq 165</math></td><td>10</td><td>196</td></tr> <tr><td><math>165 &lt; x \leq 175</math></td><td>4</td><td>200</td></tr> </tbody> </table>	TIME SPENT/ TYD SPANDEER (IN MINUTES/ MINUTE)	FREQUENCY FREKWENSIE $f$	CUMULATIVE FREQUENCY/ KUMULATIEWE FREKWENSIE $f$	$95 < x \leq 105$	15	15	$105 < x \leq 115$	27	42	$115 < x \leq 125$	43	85	$125 < x \leq 135$	52	137	$135 < x \leq 145$	28	165	$145 < x \leq 155$	21	186	$155 < x \leq 165$	10	196	$165 < x \leq 175$	4	200	✓ ✓ correct CF values/ korrekte KF-waardes  (2)
TIME SPENT/ TYD SPANDEER (IN MINUTES/ MINUTE)	FREQUENCY FREKWENSIE $f$	CUMULATIVE FREQUENCY/ KUMULATIEWE FREKWENSIE $f$																											
$95 < x \leq 105$	15	15																											
$105 < x \leq 115$	27	42																											
$115 < x \leq 125$	43	85																											
$125 < x \leq 135$	52	137																											
$135 < x \leq 145$	28	165																											
$145 < x \leq 155$	21	186																											
$155 < x \leq 165$	10	196																											
$165 < x \leq 175$	4	200																											

2.2	<p style="text-align: center;"><b>OGIVE/OGIEF</b></p>	✓ ✓ ✓ 8 points correct OR/OF ✓ ✓ 4-7 points correct OR/OF ✓ 1-3 points correct  (3)
2.3	$Q_1 = 118$ Accept any answer between (115 and 120)	✓ ✓ answer/antw (2)
2.4	Number of learners / Getal leerders = $200 - 150 = 50$ Accept 150 or any other reading between (145 and 155)	✓ 150 ✓ 50 (2) [9]

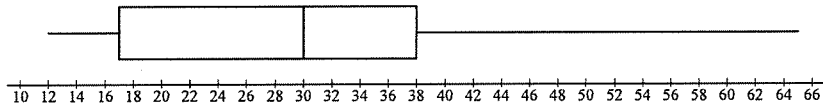
**NOTE:**

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- Volgehoue akkuraatheid is op ALLE aspekte van die nasienriglyne van toepassing.
- Dit is onaanvaarbaar om waardes/antwoorde te veronderstel om 'n probleem op te los.

**QUESTION/VRAAG 1**



1.1.1	min = 12 $Q_1 = 17$ median / mediaan = 30 $Q_3 = 38$ max = 65	✓ min + max ✓ median, $Q_1$ and/en $Q_3$ (2)
1.1.2	$IQR = Q_3 - Q_1$ $= 38 - 17$ $= 21$	✓ answer/antw (1)
1.1.3	Skewed to the right OR positively skewed <i>Skeef na regs OF positief skeef</i>	✓ answer/antw (1)

5	8	10	17	20	29	32	48	50	50	63	y	107
---	---	----	----	----	----	----	----	----	----	----	---	-----

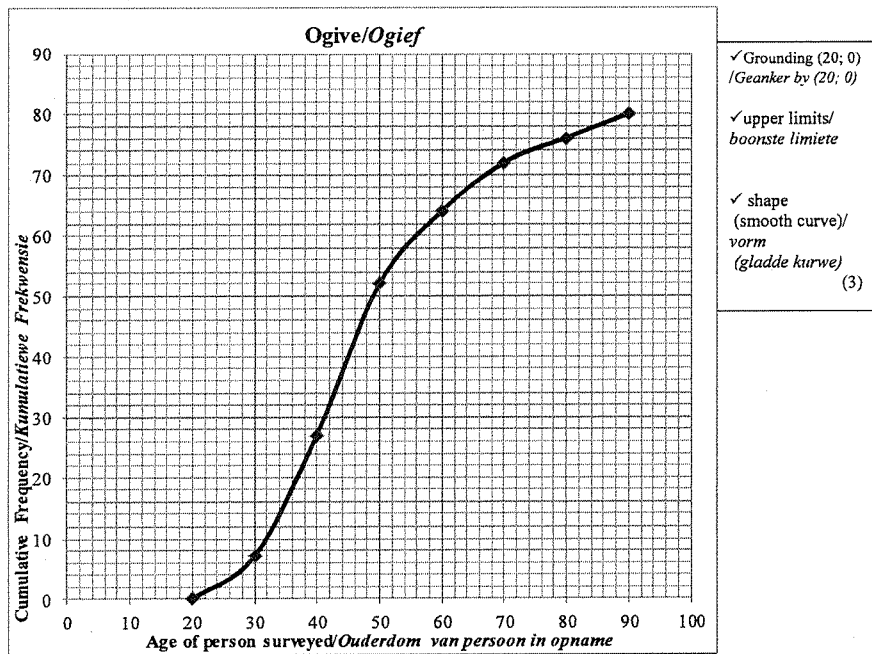
1.2.1	Mean/Gemiddeld = $\frac{439 + y}{13}$ $41 = \frac{439 + y}{13}$ $439 + y = 533$ $y = 94$	✓ $41 = \frac{439 + y}{13}$ ✓ answer/antw (2)
1.2.2	$\sigma = 30,94$	✓ answer/antw (1)

1.2.3	$41 \times 13 = 533$ $6 \times 18 = 108$ $\frac{533 + 108}{19} = \frac{641}{19} = 33,74$	✓ 108 ✓ $533 + 108 = 641$ ✓ answer/antw (3) [10]
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**QUESTION/VRAAG 2**

2.1	AGE OF PERSON SURVEYED/OUDERDOM VAN PERSOON IN OPNAME	FREQUENCY/FREKWENSIE	CUMULATIVE FREQUENCY/KUMULATIEWE FREKWENSIE	✓ 20, 12 ✓ 8, 4 ✓ 52 ✓ 76 (4)
	$20 < x \leq 30$	7	7	
	$30 < x \leq 40$	20	27	
	$40 < x \leq 50$	25	52	
	$50 < x \leq 60$	12	64	
	$60 < x \leq 70$	8	72	
	$70 < x \leq 80$	4	76	
	$80 < x \leq 90$	4	80	
2.2	$n = 80$			✓ answer/antw (1)
2.3	$40 < x \leq 50$			✓ answer/antw (1)

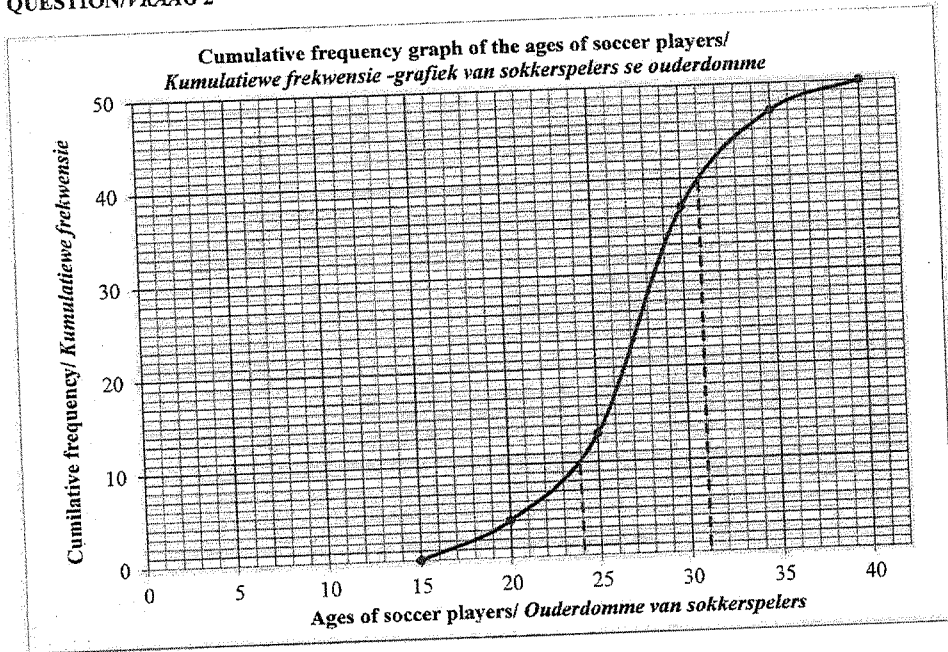
2.4



2.5	$80 - 58 = 22$ $\frac{22}{80} \times 100 = 27,5\%$	<b>Accept/aanvaar:</b> 56 – 59 calls/oproepe	✓ 58 calls/oproepe ✓ 22 ✓ 27,5% (3)
			[12]

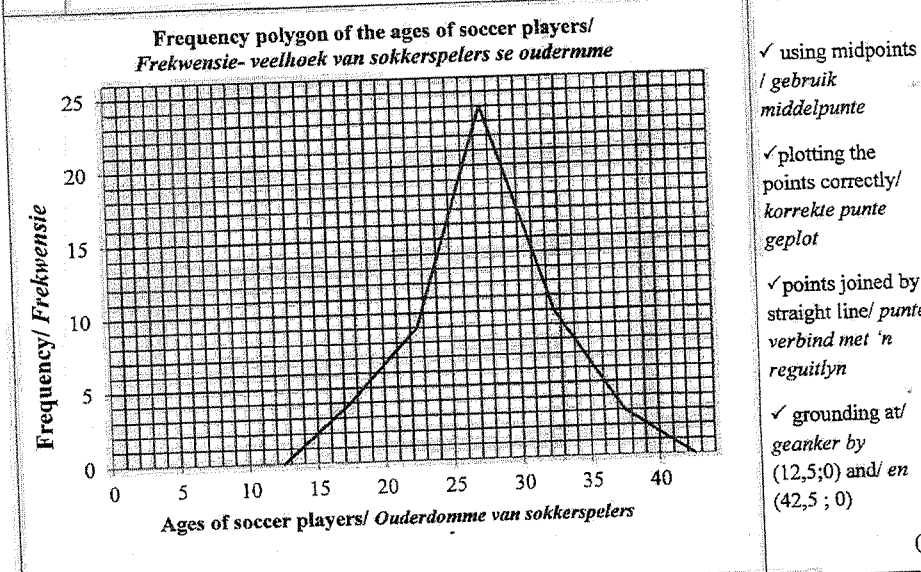


QUESTION/VRAAG 2



2.1.4

Class interval/ Klas- interval	Class midpoint/ Klas- middelpunt	Frequency/ Frekwensie
$15 \leq x < 20$	17,5	4
$20 \leq x < 25$	22,5	9
$25 \leq x < 30$	27,5	24
$30 \leq x < 35$	32,5	10
$35 \leq x < 40$	37,5	3



- ✓ using midpoints / gebruik middelpunte
  - ✓ plotting the points correctly/ korrekte punte geplot
  - ✓ points joined by straight line/ punte verbind met 'n reguitlyn
  - ✓ grounding at/ geanker by (12,5;0) and/ en (42,5 ; 0)
- (4)

2.1.1	50 players/ spelers	✓ answer/ antwoord (1)																		
2.1.2	$40 - 10 = 30$ players/ spelers	✓ 40 and/ en 10 ✓ answer/ antwoord (2)																		
2.1.3	<table border="1"> <thead> <tr> <th>Class interval/ Klas interval</th> <th>Frequency/ Frekwensie</th> <th>Cumulative frequency Kumulatiewe frekwensie</th> </tr> </thead> <tbody> <tr> <td><math>15 \leq x &lt; 20</math></td> <td>4</td> <td>4</td> </tr> <tr> <td><math>20 \leq x &lt; 25</math></td> <td>9</td> <td>13</td> </tr> <tr> <td><math>25 \leq x &lt; 30</math></td> <td>24</td> <td>37</td> </tr> <tr> <td><math>30 \leq x &lt; 35</math></td> <td>10</td> <td>47</td> </tr> <tr> <td><math>35 \leq x &lt; 40</math></td> <td>3</td> <td>50</td> </tr> </tbody> </table>	Class interval/ Klas interval	Frequency/ Frekwensie	Cumulative frequency Kumulatiewe frekwensie	$15 \leq x < 20$	4	4	$20 \leq x < 25$	9	13	$25 \leq x < 30$	24	37	$30 \leq x < 35$	10	47	$35 \leq x < 40$	3	50	✓ two correct values/ twee korrekte waardes ✓ three correct values/ drie korrekte waardes ✓ all correct values/ al die waardes korrek (3)
Class interval/ Klas interval	Frequency/ Frekwensie	Cumulative frequency Kumulatiewe frekwensie																		
$15 \leq x < 20$	4	4																		
$20 \leq x < 25$	9	13																		
$25 \leq x < 30$	24	37																		
$30 \leq x < 35$	10	47																		
$35 \leq x < 40$	3	50																		

2.2

The claim is not valid. / Die bewering is nie geldig nie

Range of class/ Omvang van klas A = 60  
 Range of class/ Omvang van klas B = 40

The range of class A is bigger than the range of class B. Therefore the marks of class A are more spread out than the class B.  
 Die omvang van klas A is groter as die omvang van klas B. Dus is die punte in klas A meer verspreid as klas B

At least 25% of class A have lower marks than any learner in class B.  
 Ten minste 25% van klas A het laer punte as enige leerder in klas B.

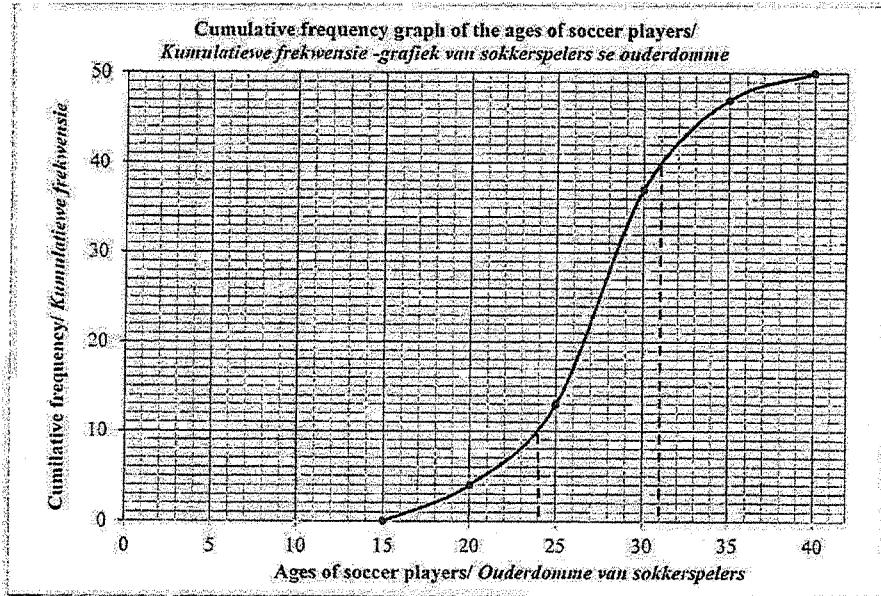
Class A performed worse at the bottom end. /  
 Klas A het slegter gevorder aan die onderste groep

✓ claim not valid/ bewering nie geldig nie  
 ✓ comment on the overall spread/ kommentaar oor die algehele verspreiding  
 ✓ comparison of the lower marks/ vergelyk laer punte

(3) [13]



QUESTION/VRAAG 2

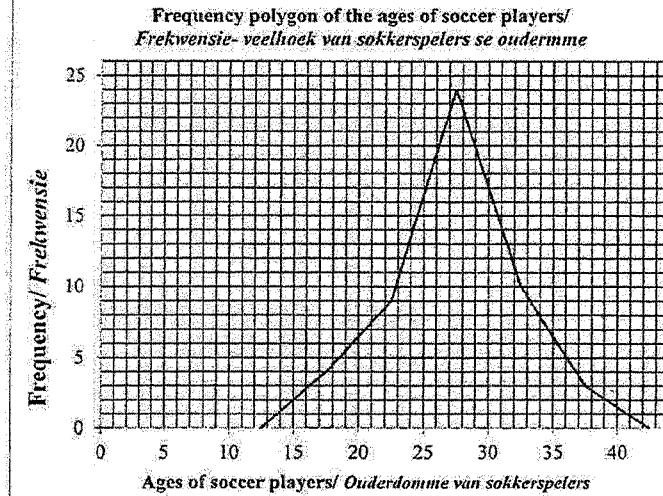


2.1.1	50 players / spelers	DEPARTMENT OF BASIC EDUCATION PRIVATE BAG 9353, PRETORIA 0001 2018 -11- 21 APPROVED MARKING GUIDELINE PUBLIC EXAMINATION	✓ answer / antwoord (1)																	
2.1.2	40 - 10 = 30 players / spelers		✓ 40 and / en 10 ✓ answer / antwoord (2)																	
2.1.3	<table border="1"> <thead> <tr> <th>Class interval / Klas interval</th> <th>Frequency / Frekwensie</th> <th>Cumulative frequency Kumulatiewe frekwensie</th> </tr> </thead> <tbody> <tr><td>15 ≤ x &lt; 20</td><td>4</td><td>4</td></tr> <tr><td>20 ≤ x &lt; 25</td><td>9</td><td>13</td></tr> <tr><td>25 ≤ x &lt; 30</td><td>24</td><td>37</td></tr> <tr><td>30 ≤ x &lt; 35</td><td>10</td><td>47</td></tr> <tr><td>35 ≤ x &lt; 40</td><td>3</td><td>50</td></tr> </tbody> </table>		Class interval / Klas interval	Frequency / Frekwensie	Cumulative frequency Kumulatiewe frekwensie	15 ≤ x < 20	4	4	20 ≤ x < 25	9	13	25 ≤ x < 30	24	37	30 ≤ x < 35	10	47	35 ≤ x < 40	3	50
Class interval / Klas interval	Frequency / Frekwensie	Cumulative frequency Kumulatiewe frekwensie																		
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35 ≤ x < 40	3	50																		

2.1.4

Class interval / Klas-interval	Class midpoint / Klas-middelpunt	Frequency / Frekwensie
15 ≤ x < 20	17,5	4
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DEPARTMENT OF BASIC EDUCATION  
PRIVATE BAG 9353, PRETORIA 0001  
2018 -11- 21  
APPROVED MARKING GUIDELINE  
PUBLIC EXAMINATION



- ✓ using midpoints / gebruik middelpunte
  - ✓ plotting the points correctly / korrekte punte geplot
  - ✓ points joined by straight line / punte verbind met 'n reguitlyn
  - ✓ grounding at / geanker by (12,5;0) and / en (42,5; 0)
- (4)

2.2	The claim is not valid. / Die bewering is nie geldig nie a Range of class / Omvang van klas A = 60 Range of class / Omvang van klas B = 40 b The range of class A is bigger than the range of class B. Therefore the marks of class A are more spread out than the class B. / Die omvang van klas A is groter as die omvang van klas B. Dus is die punte in klas A meer verspreid as klas B c At least 25% of class A have lower marks than any learner in class B. / ten minste 25% van klas A het laer punte as enige leerder in klas B. d Class A performed worse at the bottom end. / Klas A het slegter gevorder aan die onderste groep	✓ claim not valid / bewering nie geldig nie ✓ comment on the overall spread / kommentaar oor die algehele verspreiding ✓ comparison of the lower marks / vergelyk laer punte (3)
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