KWV EDUCATION

KWV MATHS 11 & 12

STATISTICS SOLUTIONS

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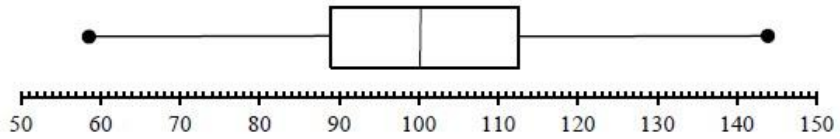
WHERE TO START IN MATHS AND SCIENCE

KWV 01 MEMO

QUESTION/*VRAAG* 1

1.1	Mean/*Gemiddelde* = $\frac{\sum x}{n} = \frac{1522}{15} = 101{,}47$	✓ 1522 ✓ 101,47 (2)
1.2	Standard deviation/*standaardafwyking* = 19,07	✓19,07 ✓2 decimal places (2)
1.3	lower quartile/*onderste (eerste) kwartiel* = 89 upper quartile/*boonste (derde) kwartiel* = 113	✓ 89 ✓ 113 (2)
1.4		✓ M at 100 ✓ min = 58 and max = 145 ✓ Q_1 = 89 and Q_2 = 113 (3)
1.5	$(\bar{x} - 1\sigma\ ;\ \bar{x} + 1\sigma) = (82{,}4\ ;\ 120{,}54)$ $\therefore$ 2 days/*dae* Answer only: full marks	✓✓ interval ✓ answer (3) **[12]**

QUESTION/*VRAAG* 2

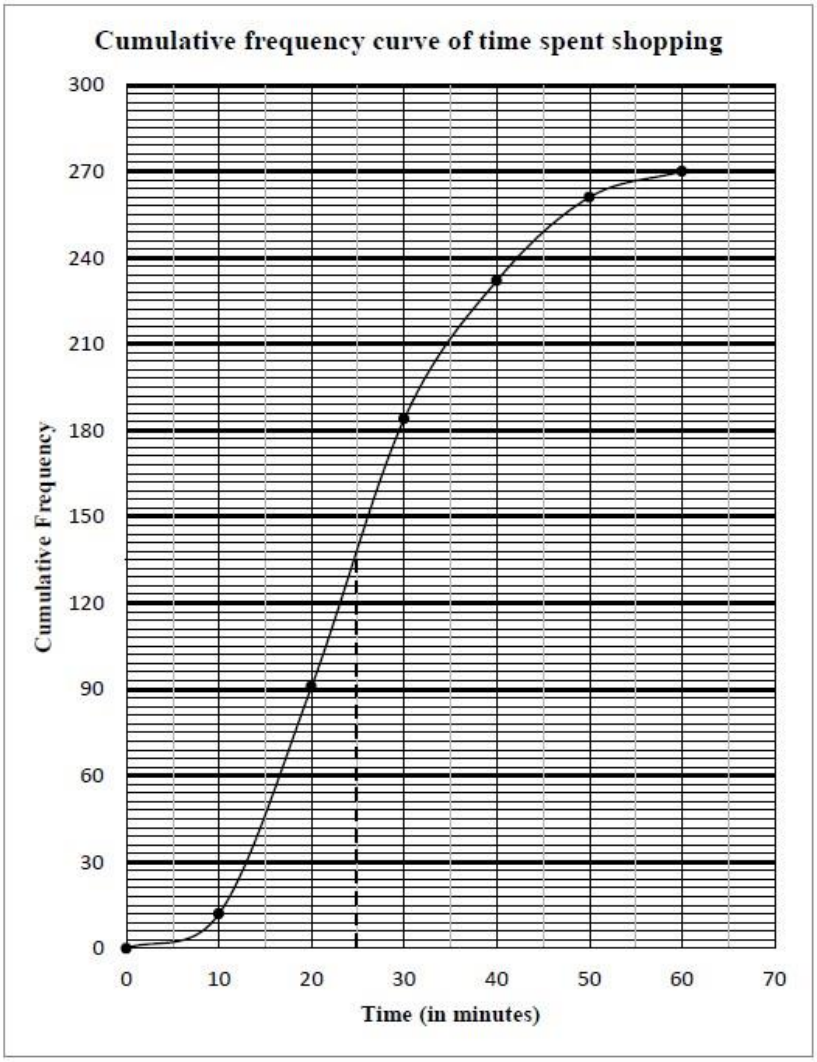
2.1

TIME IN MINUTES	NUMBER OF CUSTOMERS (frequency)	CUMULATIVE FREQUENCY
$0 < x \leq 10$	12	12
$10 < x \leq 20$	79	91
$20 < x \leq 30$	93	184
$30 < x \leq 40$	48	232
$40 < x \leq 50$	29	261
$50 < x \leq 60$	9	270

✓ completing frequency column
✓ ✓ cumulative frequency

(3)

2.2



✓ plot against upper limit
✓ cumulative frequency
✓ anchored
✓ smooth curve

(4)

2.3

Median time spent shopping is approximately 25 minutes.
(Allow 24–25 minutes)

✓ ✓ answer

(2)

2.4

The data is skewed to the right or positively skewed/
Die data is skeef na regs of positief skeef.

✓ correct skewness

(1)
[10]

QUESTION/*VRAAG* 3

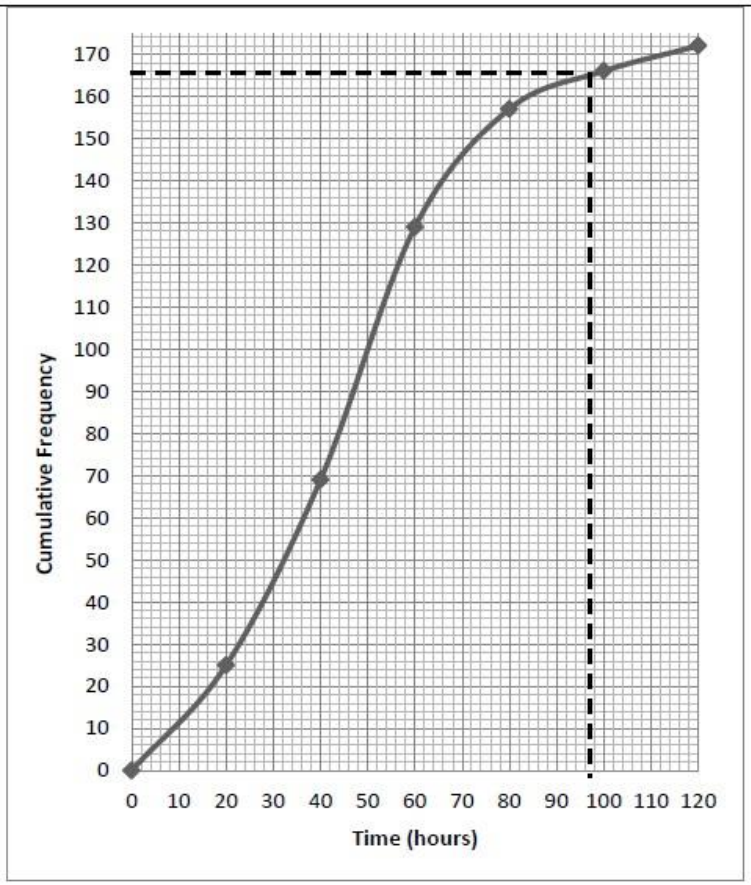
3.1	(41 ; 26)	✓ correct outlier (1)
3.2	quadratic/*kwadraties*	✓ correct answer (1)
3.3	The younger or older the participants are, the longer they will take to complete the item. They do not have the required strength, fitness and stamina. *Hoe jonger of ouer die deelnemers is, hoe langer sal hulle neem om die item te voltooi. Hulle het nie die vereiste krag, fiksheid en stamina (energie) nie.* **OR** It would appear that swimmers close to 19 years completed the item in the shortest time. Swimmers of that age are normally in good physical condition and have lots of stamina. *Dit wil voorkom of swemmers rondom 19 jaar die item in die kortste tyd voltooi het. Swemmers van daardie ouderdom is normaalweg in goeie fisiese kondisie en het baie energie en stamina.*	✓ younger/older *jonger/ouer* ✓ lack of strength/ *tekort aan krag* (2) ✓ 19 years/*jaar* ✓ peak fitness/ *top fiks* (2)
3.4.1	The standard deviation will become smaller/decrease./ *Die standaardafwyking sal kleiner word/verminder.*	✓ decrease/ *verminder* (1)
3.4.2	The mean will become smaller/decrease./ *Die gemiddelde sal kleiner word/verminder.*	✓ decrease/ *verminder* (1) **[6]**

KWV 02 MEMO

QUESTION 1

1.1	As the number of days that an athlete trained increased, the time taken to run the 100m event decreased. **OR** The fewer number of days an athlete trained, the longer the time he took to complete the 100m sprint. **OR** The greater number of days an athlete trained, the shorter the time he ran the 100m sprint.	✓ explanation (1)
1.2	(60 ; 18,1)	✓ (1)
1.3	$a = 17{,}81931464\ldots$ $b = -0{,}070685358\ldots$ $\therefore \hat{y} = -0{,}07x + 17{,}82$	✓✓ a ✓ b ✓ equation (4)
1.4	$\therefore \hat{y} \approx -0{,}07(45) + 17{,}82$ $\approx 14{,}67$ seconds	✓ substitution ✓ answer (2)
1.5	$r = -0{,}74$ (–0,740772594...)	✓✓ r (2)
1.6	There is a moderately strong relationship between the variables.	✓ moderately strong (1) **[11]**

QUESTION 2

2.1		✓grounding at 0 ✓plotting at upper limits ✓ smooth shape of curve (3)
2.2	$40 \leq t < 60$	✓ class (1)
2.3	(96 ; 164) $\therefore$ 172 – 164 = 8 learners	✓164 ✓ 8 (2)
2.4	Frequency: 25; 44; 60; 28; 9; 6 Mean = $\frac{25\times10+44\times30+60\times50+28\times70+9\times90+6\times110}{172}$ $= \frac{8000}{172}$ = 46,51 hours	✓frequency ✓ midpoints ✓ $\frac{8000}{172}$ ✓ answer (4) **[10]**

KWV 03 MEMO

QUESTION/*VRAAG* 1

1.1	$\bar{x} = \frac{816}{12} = 68$	✓ $\frac{816}{12}$ ✓ 68 (2)
1.2	$\sigma = 18{,}42$	✓ answer/*antw* (1)
1.3	$(68 - 18{,}42 ; 68 + 18{,}42) = (49{,}58 ; 86{,}42)$ $\therefore$ 6 candidates had a mark within one standard deviation of the mean/*6 kandidate het 'n punt binne een standaardafwyking vanaf die gemiddelde.*	✓✓ interval ✓ answer/*antw* (3)
1.4	$a = 22{,}828... = 22{,}83$ $b = 0{,}66429... = 0{,}66$ $\therefore \hat{y} = 0{,}66x + 22{,}83$ **OR/*OF*** $\hat{y} = 22{,}83 + 0{,}66x$	✓ value of *a/ waarde van a* ✓ value of *b/ waarde van b* ✓ equation/*vgl* (3)
1.5	$\hat{y} = 0{,}66x + 22{,}83$ $y = 0{,}66(60) + 22{,}83$ $62{,}43...\% \approx 62\%$ **OR/*OF*** $62{,}69\% \approx 63\%$	✓ subs of 60 into equation ✓ answer/*antw* (2) ✓✓ answer/*antw* (2)
1.6	(82 ; 62)	✓ answer/*antw* (1) **[12]**

QUESTION/*VRAAG* 2

2.1

$50 < x \leq 60$ **OR/*OF*** $50 \leq x < 60$ **OR/*OF***
between 50 and 60/*tussen 50 en 60*

✓ answer/*antw*

(1)

2.2.1

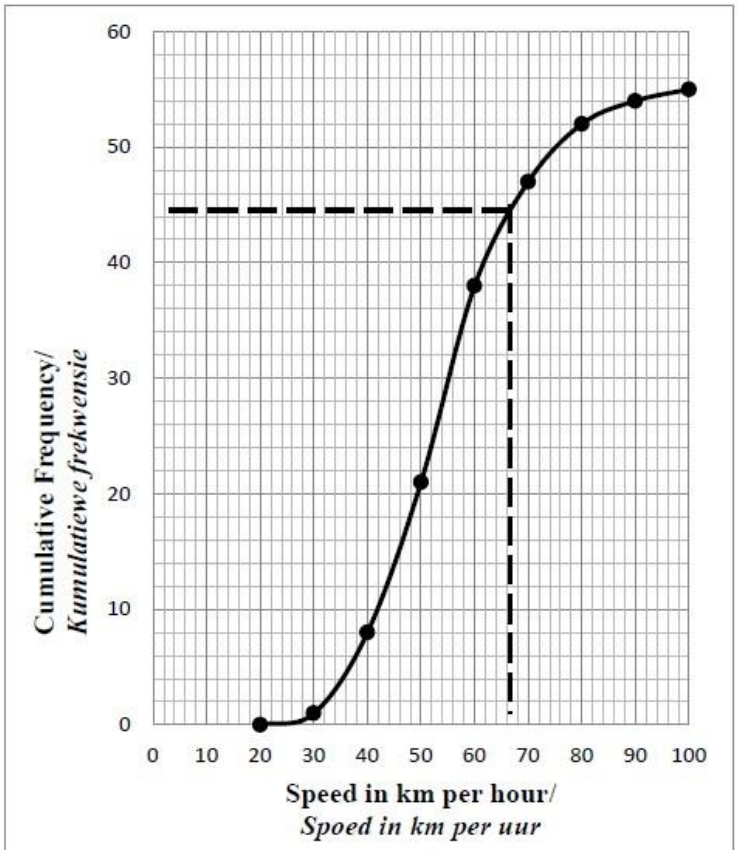
Class *Klas*	Frequency *Frekwensie*	Cumulative frequency *Kumulatiewe frekwensie*
$20 < x \leq 30$	1	1
$30 < x \leq 40$	7	8
$40 < x \leq 50$	13	21
$50 < x \leq 60$	17	38
$60 < x \leq 70$	9	47
$70 < x \leq 80$	5	52
$80 < x \leq 90$	2	54
$90 < x \leq 100$	1	55

✓ 8

✓ 55

(2)

2.2.2



✓ grounding at (20 ; 0)/ *anker by* (20 ; 0)
✓ plotting at upper limits/ *plot by boonste limiete*
✓ smooth shape of curve/*gladde kurwe*

(3)

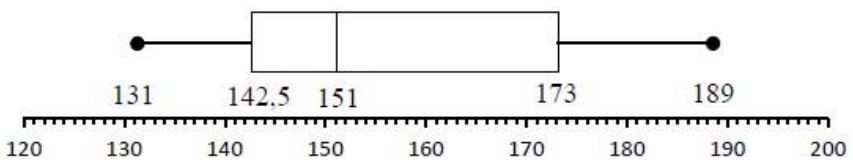
2.3

55 – 44 (accept/*aanvaar* 43 – 45)
≈ 11 motorists/*motoriste*
(accept/*aanvaar* 10 – 12 motorists/*motoriste*)

✓ 44
✓ 11

(2)
[8]

QUESTION/*VRAAG* 1

1.1	$\bar{x} = \frac{3310}{21}$ $= 157{,}62$ Answer only: Full marks *slegs antw: volpunte*	✓$\frac{3310}{21}$ ✓157,62 (2)
1.2	(131 ; 142,5 ; 151 ; 173 ; 189)	✓ 131 and/ *en* 189 ✓ 142,5 ✓ 173 ✓ 151 (4)
1.3		✓box/*mond* ✓ whiskers/ *snor* (2)
1.4	positively skewed/*positief skeef* **OR/*OF*** skewed to the right/*skeef na regs*	✓ answer/ *antwoord* (1)
1.5	$\sigma = 17{,}27$	✓✓answer/ *antwoord* (2)
1.6.1	$\bar{x} = 157{,}62 + p$	✓ answer (1)
1.6.2	$\sigma = 17{,}27$	✓ answer/ *antwoord* (1) **[13]**

QUESTION/*VRAAG* 2

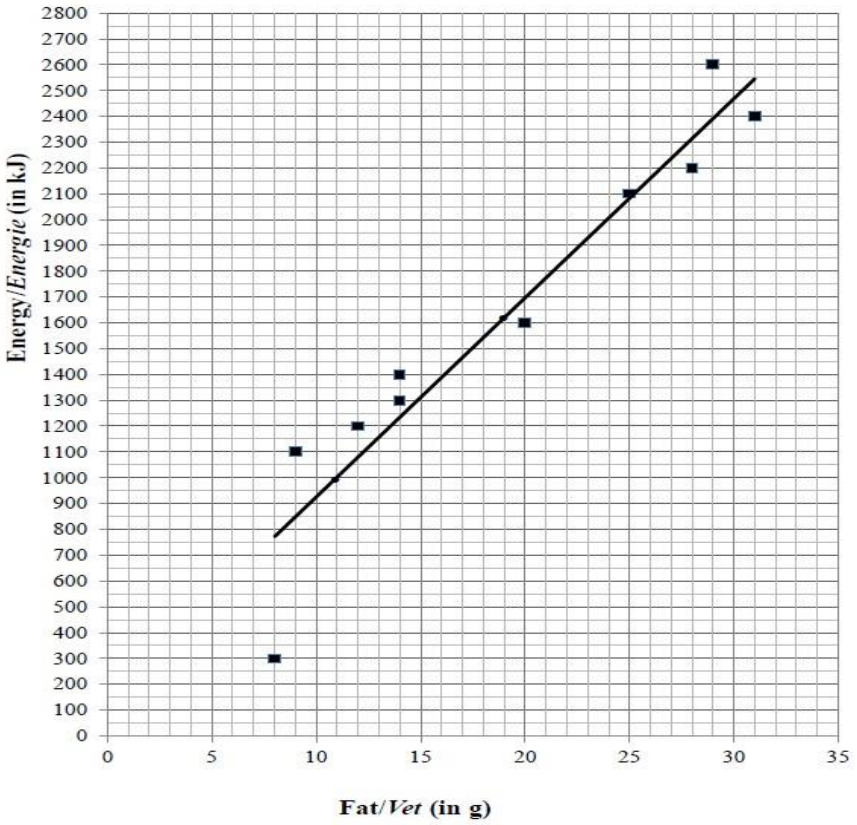
2.1	As the temperature increases, the sales of ice-creams increase/*Soos die temperatuur styg, neem die verkope toe.* **OR/*OF*** As the temperature decreases, the sales of ice-creams decrease/*Soos die temperatuur daal, neem die verkope af.*	✓ reason/*rede* (1) ✓ reason/*rede* (1)
2.2	The liveable temperature cannot keep on increasing/*Die leefbare temperatuur kan nie aanhou styg nie.*	✓ reason/*rede* (1)
2.3	$a = -460{,}35$ $b = 30{,}09$ $\hat{y} = 30{,}09x - 460{,}35$ **OR/*OF*** $\hat{y} = -460{,}35 + 30{,}09x$ Answer only: Full marks *slegs antw: volpunte*	✓✓ –460,35 ✓ 30,09 ✓ equation/*vgl* (4)
2.4	$r = 0{,}96$	✓ 0,96 (1)
2.5	There is a <u>very strong</u> positive relationship (correlation)/*Daar is 'n <u>baie sterk</u> positiewe verband (korrelasie).*	✓ very strong/*baie sterk* (1) **[8]**

KWV 05 MEMO

QUESTION/*VRAAG* 1

Fat/*Vet* (in g)	9	14	25	8	12	31	28	14	29	20
Energy/*Energie* (in kJ)	1 100	1 300	2 100	300	1 200	2 400	2 200	1 400	2 600	1 600

1.1



1.2.2

1.1
no marks: 0 – 2 points correctly

✓plotting 3 – 5 points correctly

✓✓plotting 6 – 9points correctly

✓✓✓plotting all 10 points correctly

geen punte: 0 – 2 punte korrek

✓ *stip 3 – 5 pte korrek*

✓✓*stip 6 –9 pte korrek*

✓✓✓ *stip al 10 pte korrek*

(3)

1.2.2
✓ y – int close to (0 ; 150)
✓ one pt close to (25 ; 2100) or (20 ; 1700)
(2)

1.2.1	$\hat{y} = 154{,}60 + 77{,}13(18)$ $= 1\,542{,}94 \approx 1\,500$ kJ	✓ subst ✓ answ rounded off correctly/ *antw korrek afgerond* (2)
1.3	(8 ; 300)	✓ answ/*antw* (1)
1.4	$r = 0{,}9520... \approx 0{,}95$	✓✓ answ/*antw* (2)
1.5	very strong positive relationship/ *baie sterk positiewe verband*	✓ strong/ *sterk* (1) **[11]**

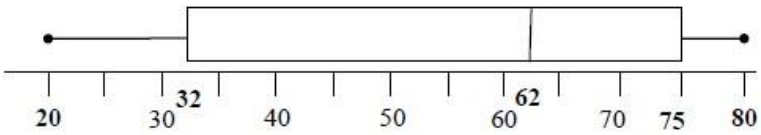
QUESTION/*VRAAG* 2

Sum of the values on uppermost faces/ ***Som van die waardes op boonste vlakke***	**Frequency/** ***Frekwensie***
2	0
3	3
4	2
5	4
6	4
7	8
8	3
9	2
10	2
11	1
12	1

2.1	mean/*gemiddelde* $= \frac{2(0)+3(3)+4(2)+...12(1)}{30} = \frac{202}{30}$ $= 6{,}73$	✓202 ✓ answ/*antw* (2)
2.2	median/*mediaan* $= \frac{T_{15}+T_{16}}{2} = \frac{7+7}{2} = 7$	✓✓ answ/*antw* (2)
2.3	SD/*SA* $= 2{,}264... \approx 2{,}26$	✓✓ answ/*antw* (2)
2.4	$(6{,}73 - 2{,}26 ; 6{,}73 + 2{,}26)$ $= (4{,}47 ; 8{,}99)$ $\therefore 4 + 4 + 8 + 3 = 19$ times/*keer*	✓lower boundary ✓upper boundary ✓ answ/*antw* (3) **[9]**

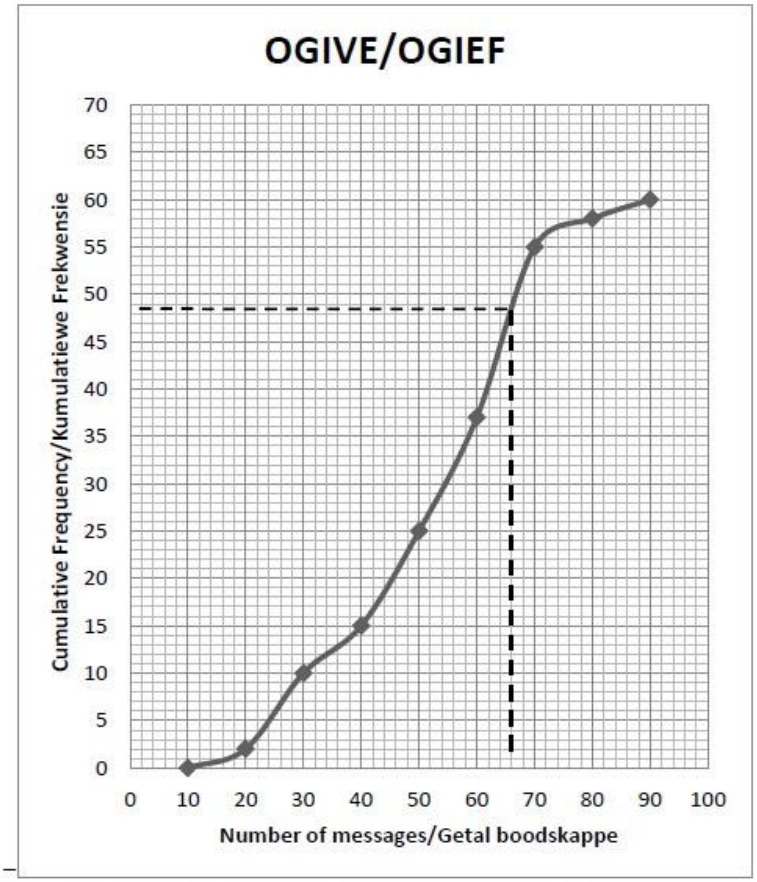
KWV 06 MEMO

QUESTION/*VRAAG* 1



1.1	The data is skewed to the left/*Die data is skeef na links.* **OR/*OF*** The data is negatively skewed/*Die data is negatief skeef.*	✓answ/*antw* ✓answ/*antw* (1)
1.2	Range/*Omvang* = 80 – 20 = 60	✓ max. – min. ✓answ/*antw* (2)
1.3	25% of the learners failed/*van die leerders het gedruip*	✓ ✓answ/*antw* (2)
1.4	$54 = \frac{445 + T_4}{9}$ $T_4 = 41$ **20** | 28 | 36 | **41** | **62** | 69 | **75** | **75** | **80**	✓ 20 ✓✓ 41 ✓ 62 ✓ 75 ✓ 80 (6) **[11]**

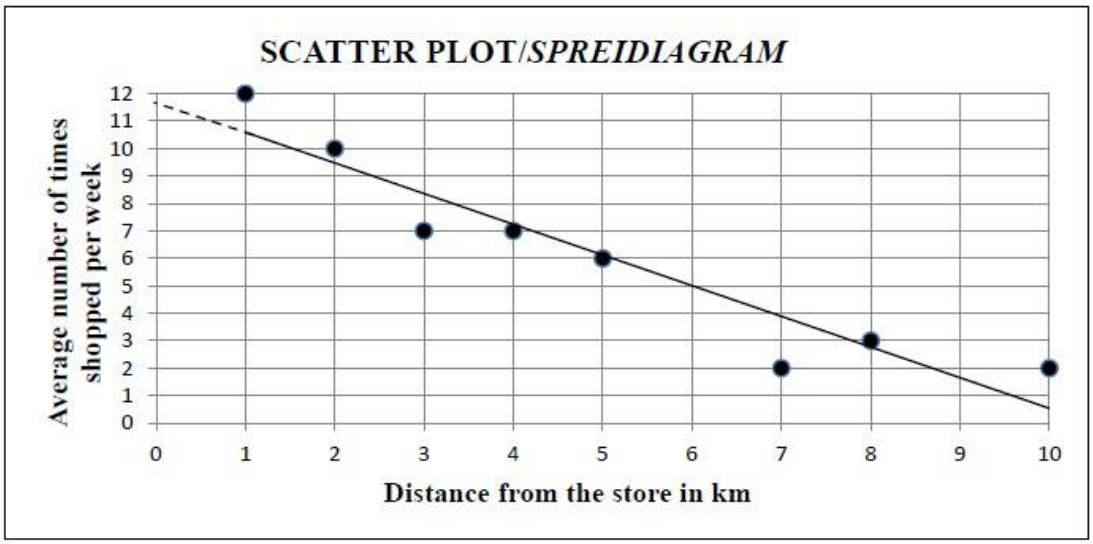
QUESTION/*VRAAG* 2

2.1	Mean/*Gemiddelde* $= \frac{2(15)+8(25)+...2(85)}{60} = \frac{3080}{60}$ = 51,33 messages per day/*boodskappe per dag*	✓ 3 080 ✓ $\frac{3080}{60}$ ✓ answ/*antw* (3)
2.2		✓ grounding at (10 ; 0) ✓ plotting at upper limits ✓ plotting. cumulative *f* ✓ smooth shape of curve ✓ *geanker by* (10 ; 0) ✓ *stip by boonste limiete* ✓ *plot kumulatiewe f* ✓ *gladde vorm van kurwe* (4)
2.3	Number of days/*Getal dae* = 60 – 46 (see on graph above/*sien op grafiek hierbo*) = 14 days/*dae* **OR/*OF*** Number of days/*Getal dae* = $2 + 3 + \frac{1}{2} \times 18 = 14$ days/*dae*	✓ 46 (accept 45 – 49) ✓ answ/*antw* (accept 11 – 15) (2) ✓ add correct values/*tel korrekte waardes by* ✓ answ/*antw* (2) **[9]**

KWV 07 MEMO

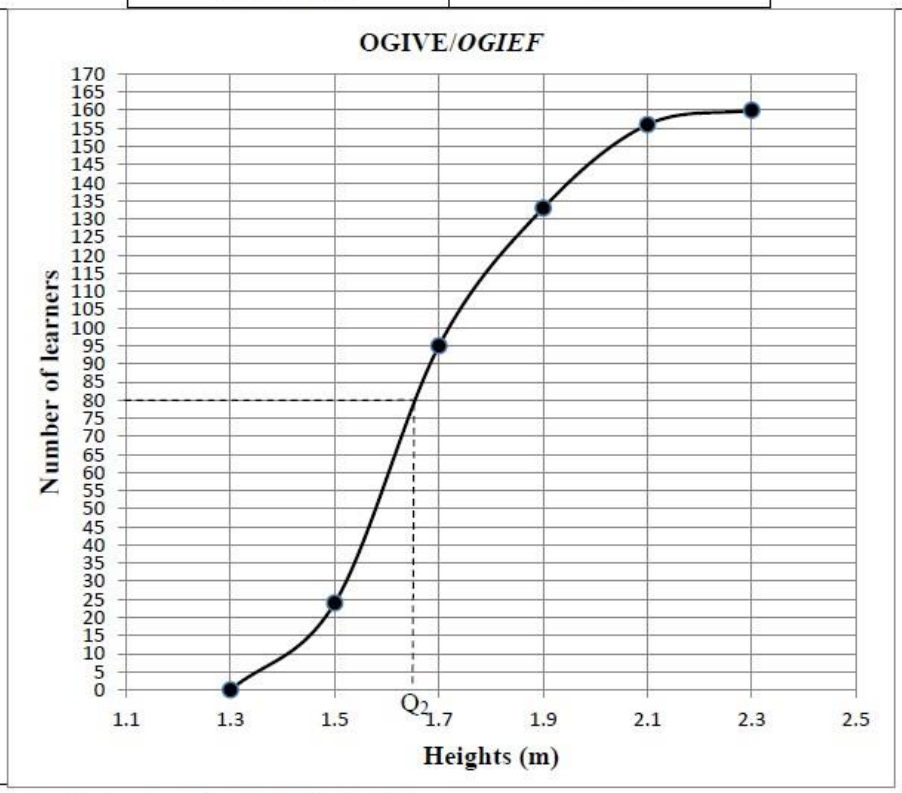
QUESTION/*VRAAG* 1

Distance from the store in km *Afstand vanaf die winkel in* **km**	1	2	3	4	5	7	8	10
Average number of times shopped per week *Gemiddelde aantal keer wat kopers die winkel per week besoek*	12	10	7	7	6	2	3	2



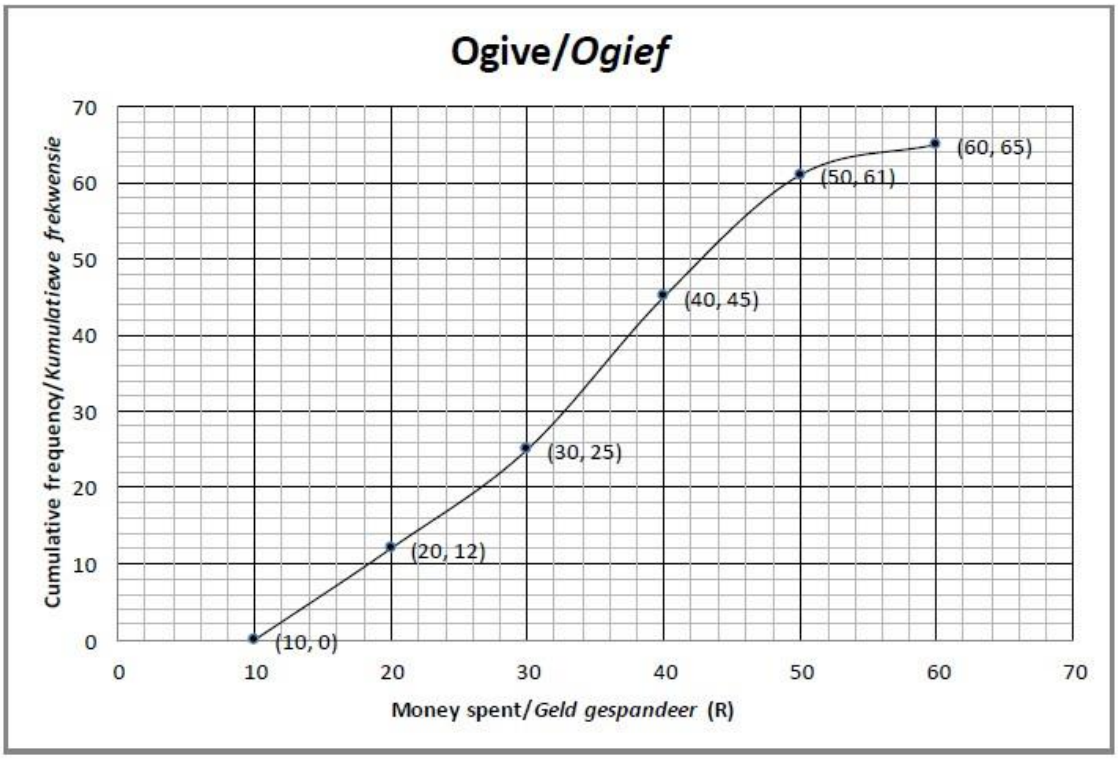
1.1	Strong/*Sterk*	✓ (1)
1.2	–0,95 (–0,9462..)	✓ (1)
1.3	$a = 11{,}71$ (11,7132…) $b = -1{,}12$ (–1,1176…) $\hat{y} = -1{,}12x + 11{,}71$	✓ value of a ✓ value of b ✓ equation/*vgl* (3)
1.4	$\hat{y} = -1{,}12(6) + 11{,}71$ = 5 times	✓ substitition ✓ answer (2)
1.5	On scatter plot/*Op spreidiagram*	✓✓ A line close to any 2 of the following points: (5 ; 6) or (10 ; $\frac{1}{2}$) or (6 ; 5) or (0 ; 11,7) (2) **[9]**

QUESTION/*VRAAG* 2

2.1	Positively skewed **OR** skewed to the right/*positief skeef **OF** skeef na regs*	✓ answer (1)
2.2	Range/*Omvang* = 2,21 – 1,39 = 0,82 m	✓ subtract values ✓answer (2)
2.3		✓95 , 133, 156 ✓160 (2)
2.4		✓ upper limits / *boonste limiete* ✓ cum *fl kum f* ✓ shape/ *vorm* ✓ grounded *geanker* (4)
2.5	method (using 80 to determine the height) 1,65 (accept any value between 1,6 and 1,69)	✓ method ✓ answer (2)
2.6.1	The mean would change by 0,1 *m* *Die gemiddelde sal met 0,1 m verander*	✓ answer (1)
2.6.2	No influence/change as there is no difference in variation of data./*Geen invloed /verandering aangesien daar geen verskil in die variasie van die data is nie.*	✓ answer (1) **[13]**

Intervals *Klasse*	Cumulative frequency *Kumulatiewe frekwensie*
$1,3 \leq x < 1,5$	24
$1,5 \leq x < 1,7$	95
$1,7 \leq x < 1,9$	133
$1,9 \leq x < 2,1$	156
$2,1 \leq x < 2,3$	160

QUESTION/*VRAAG* 1

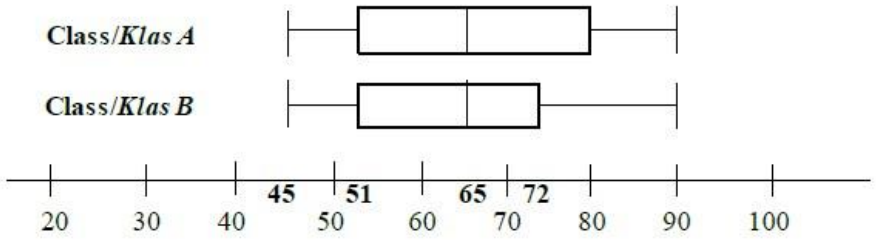


Amount of money/ *Bedrag geld* (in R)	$10 \le x < 20$	$20 \le x < 30$	$30 \le x < 40$	$40 \le x < 50$	$50 \le x < 60$
Frequency *Frekwensie*	*a*	13	20	*b*	4

1.1	65 learners/*leerders*	✓ answer (1)
1.2	Modal class/*Modale klas*: $30 \le x < 40$	✓ answer (1)
1.3	$a = 12$ $b = 61 - 45$ $= 16$	✓ answer ✓ answer (2)
1.4	No. of learners/*Aantal leerders* = 65 – 54 **OR/*OF*** 65 – 55 = 11 = 10 Answer only: full marks	✓ 54 or 55 ✓ 11 or 10 (2) **[6]**

QUESTION/*VRAAG* 2

2.1



2.1.1	IQR of Class B/*IKV van Klas B* = $Q_3 - Q_1$ = 72 – 51 = 21 marks/*punte*	✓72 and 51 ✓ 21 only (2)
2.1.2	Although the boxes contain the same number of data points, the marks for Class A are more widely spread./*Alhoewel die monde dieselfde aantal datapunte bevat, is die punte van Klas A meer verspreid.* **OR/OF** Although the boxes contain the same number of data points, the marks for Class B are more clustered./*Alhoewel die monde dieselfde aantal datapunte bevat, is die punte van Klas B nader aan mekaar.*	✓ ✓ Class A is more widely spread (2) ✓ ✓ Class B is more clustered (2)
2.1.3	Medians are the same/*Mediane is dieselfde* Ranges are the same **OR** Maximum and minimum values are the same/*Variasiewydtes is dieselfde **OF** die maksimum en minimum waarde is dieselfde* 75% of both classes obtained 51 and above/*75% van albei klasse behaal 51 en meer.*	✓ ✓ any TWO of the 3 reasons mentioned (2)

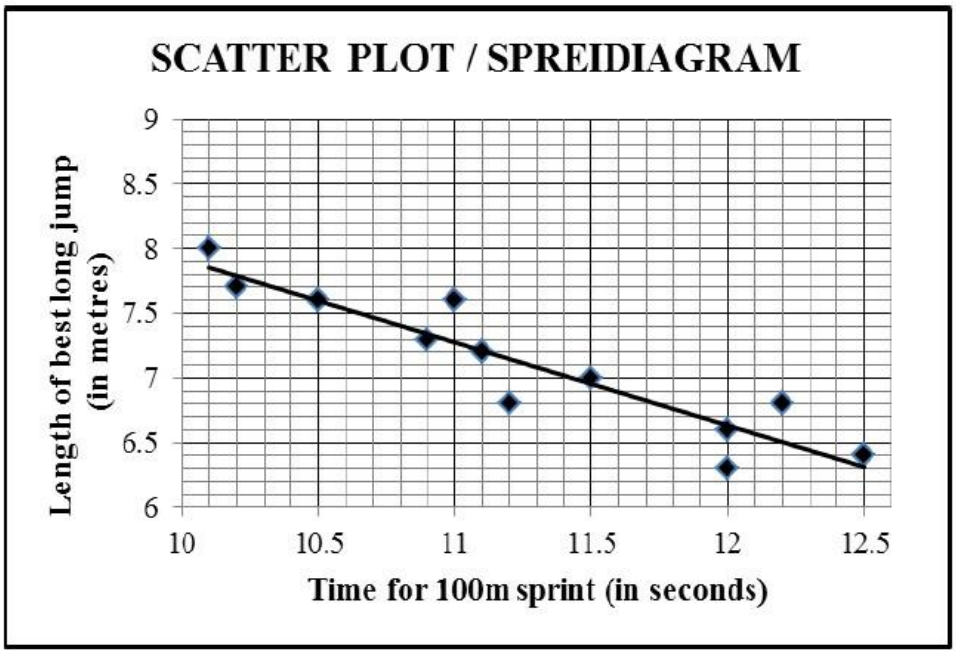
2.2

COUPLE/*PAAR*	1	2	3	4	5	6	7	8
JUDGE 1/ *BEOORDELAAR 1*	18	4	6	8	5	12	10	14
JUDGE 2/ *BEOORDELAAR 2*	15	6	3	5	5	14	8	15

2.2.1	$a = -0,03$ $b = 0,93$ $\hat{y} = -0,03 + 0,93x$	✓ value a ✓ value b ✓ equation (3)
2.2.2	$\hat{y} = -0,03 + 0,93(15)$ = 13,92 **OR/*OF*** 13,85 ≈ 14	✓ substitution ✓ answer (2)
2.2.3	Yes **OR** they are consistent, because $r = 0,9$. ($r = 0,89567\ldots$)/*Ja OF hulle is konsekwent, want $r = 0,9$. ($r = 0,89567\ldots$)*	✓ statement ✓ $r = 0,9$ (2) **[13]**

QUESTION/*VRAAG* 1

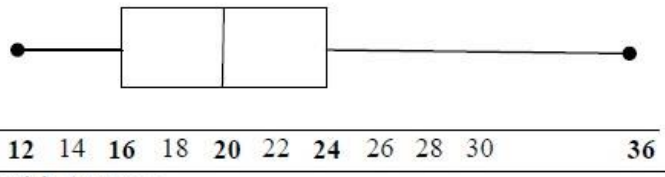
Time for 100 m sprint (in seconds) *Tyd vir 100 m-naelloop (in sekondes)*	10,1	10,2	10,5	10,9	11	11,1	11,2	11,5	12	12	12,2	12,5
Distance of best long jump (in metres) *Afstand van beste sprong in verspring (in meter)*	8	7,7	7,6	7,3	7,6	7,2	6,8	7	6,6	6,3	6,8	6,4



1.1	$a = 14{,}343\ldots = 14{,}34$ $b = -0{,}642\ldots = -0{,}64$	✓✓ value of a ✓ value of b (3)
1.2	$y = 14{,}34 - 0{,}64(11{,}7)$ $= 6{,}85$ **OR/OF** $y = 6{,}83$ (calculator / *sakrekenaar*)	✓ substitution correctly ✓ answer (2) ✓✓answer (2)
1.3	The gradient increases / *Die gradient neem toe* The point (12,3 ; 7,6) lies some distance above the current data. /*Die punt (12,3 ; 7,6) lê bokant die huidige data.*	✓ increases/*neem toe* ✓ reasoning in words/ *redenasie in woorde* (2) [7]

QUESTION/*VRAAG* 2

12	13	13	14	14	16	17	18	18	18	19	20
21	21	22	22	23	24	25	27	29	30	36	

2.1.1	$\bar{x} = \frac{472}{23}$ $\bar{x}$ = 20,52 seconds / *sekonde*	✓ $\frac{472}{23}$ ✓ answer (2)
2.1.2	$Q_1 = 16$ $Q_3 = 24$ IQR/*IKO* = $Q_3 - Q_1$ = 24 – 16 = 8	✓ Q_1 ✓ Q_3 ✓ answer (3)
2.2	20,52 + 5,94 = 26,46 ∴ > 26,46 ∴ 4 girls/*dogters*	✓ 26,46 ✓ answer (2)
2.3	 **12** 14 **16** 18 **20** 22 **24** 26 28 30 **36**	✓ whiskers ending at 12 & 36 ✓ Q_1 = 16 & Q_3 = 24 (box) ✓ Q_2 = 20 (3)
2.4.1	Girls / *Meisies*	✓ answer (1)
2.4.2	Five-number summary of boys: (15 ; 21 ; 23,5 ; 26 ; 38) **None** of the boys / ***Nie een** van die seuns **nie*** 5 girls completed in less than 15 seconds which was the minimum time taken by the boys. *5 meisies voltooi in minder as 15 sekondes, wat die minimumtyd is wat die seuns geneem het.*	✓ answer ✓ reason/*rede* (2) **[13]**

KWV 10 MEMO

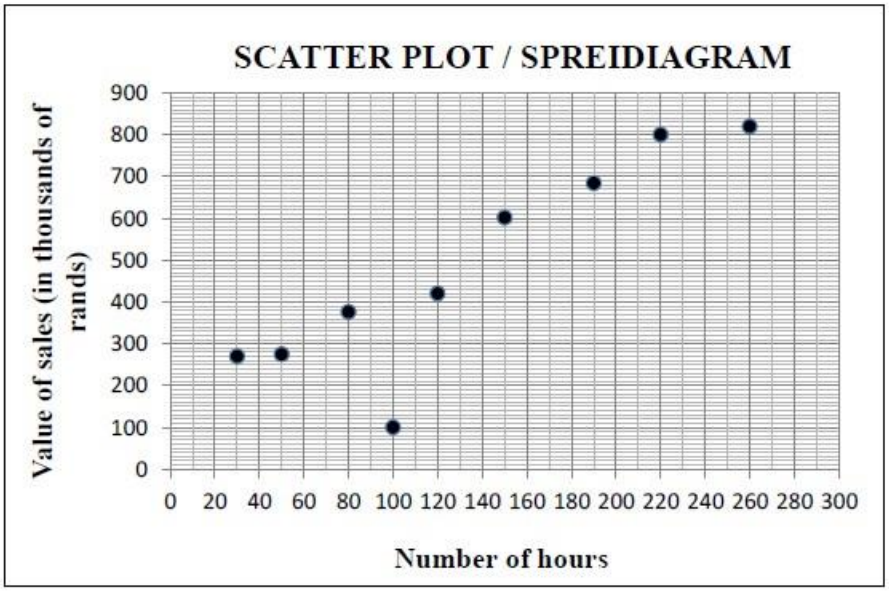
QUESTION/*VRAAG* 1

Days/*Dae*	1	2	3	4	5	6	7	8	9	10
Units of blood/ *Eenhede bloed*	45	59	65	73	79	82	91	99	101	106

1.1.1	$\bar{x} = \frac{800}{10}$ $= 80$ Answer only: full marks	✓ 800 (addition of units) ✓ answer (CA if ÷ 10) (2)
1.1.2	$\sigma = 18{,}83$ No penalty for rounding	✓✓ answer (A) (2)
1.1.3	(61,17 ; 98,83) Days 1, 2, 8, 9 and 10 lie outside 1 standard deviation from the mean ∴ 5 days Correct answer only: full marks provided that 1.1.1. & 1.1.2 both correct	✓ mean – 1 SD ✓ mean + 1 SD ✓ answer (3)
1.2.1	Skewed to the left or negatively skewed/ *Skeef na links of negatief skeef*	✓ answer (1)
1.2.2	A = 65 B = 99 Answers without labelling: 1/2	✓ answer ✓ answer (2)
1.3	New total = 95 × 10 = 950 ∴ Units not counted = 950 – 800 = 150	✓ answer (CA from 1.1.1) (1) **[11]**

QUESTION/*VRAAG* 2

Number of hours Aantal uur	30	50	80	100	120	150	190	220	260
Value of sales (in thousands of rands) Waarde van verkope (in duisend rand)	270	275	376	100	420	602	684	800	820



2.1	Outlier/*Uitskieter*: (100 ; 100)	accept: 100 as answer	✓ answer (1)
2.2	$a = 94{,}50273\ldots$ $b = 2{,}913729\ldots$ $\hat{y} = 94{,}50 + 2{,}91x$	Integral values: max 2/3 Swopped a and b: 2/3	✓ value of a ✓ value of b ✓ equation (3)
2.3	$\hat{y} = 2{,}91(240) + 94{,}50$ (CA from 2.1) $= 792{,}90$ Value = R793 000 **OR/*OF*** $\hat{y} = 793{,}7978142$ (calculator) Value = R794 000	Penalise 1 mark if answer not in thousands of Rands	✓ substitution ✓ answer in thousands of Rands (2) ✓✓ answer in thousands of Rands (2)
2.4	$b = 2{,}913729\ldots$ ∴ R2 914 **OR/*OF*** R2 910 (calculator)	Answer only: full marks	✓ value of b ✓ answer (2) **[8]**

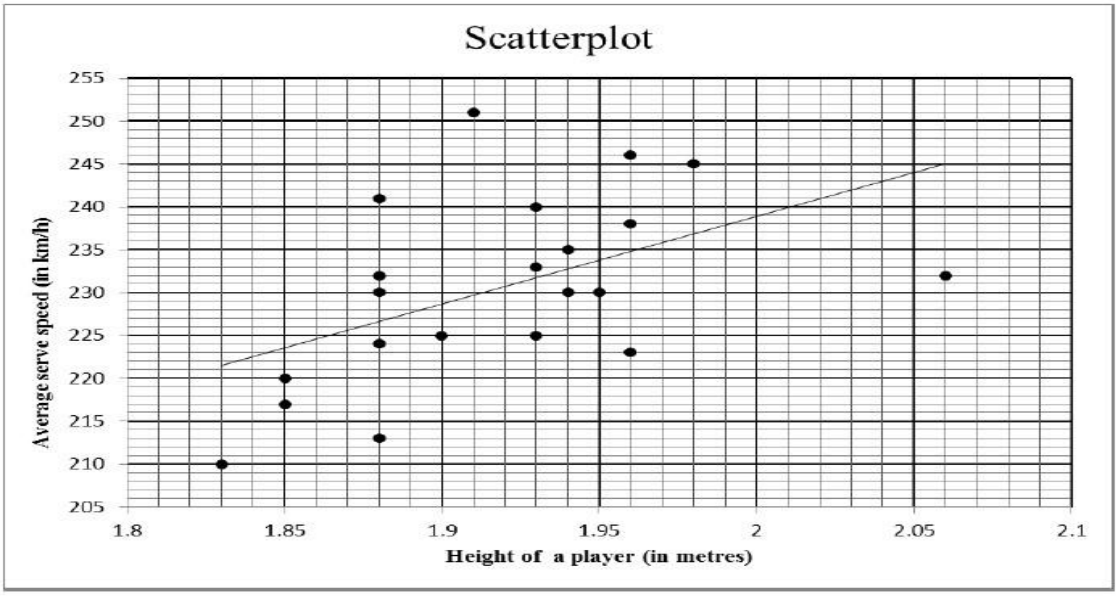
QUESTION/*VRAAG* 1

1.1.1	140 items	answer (1)
1.1.2	Modal class/*modale klas:* $20 < x \leq 30$ minutes **OR/*OF*** $20 \leq x < 30$ minutes	answer (1) answer (1)
1.1.3	Number of minutes taken = 20 minutes	answer (1)
1.1.4	140 – 126 [Accept: 124 to 128] 14 orders (12 to 16) Answer only: Full marks	126 answer (2)
1.1.5	75^{th} percentile is at 105 items =37 minutes [accept 36 – 38 minutes] Answer only: Full marks	105 answer (2)
1.1.6	Lower quartile is at 35 items =21,5 min [accept 21 – 23 min] IQR = 37 – 21,5 = 15,5 min [accept 13 – 17 min] Answer only: Full marks	lower quartile (Q_1) answer (2)

35	70	75	80	80
90	100	100	105	105
110	110	115	120	125

1.2.1(a)	$\bar{x} = \frac{1420}{15}$ Answer only: Full marks = R94,666.. = *R*94,67	1420 answer (2)
1.2.1(b)	σ = *R*22,691... = R22,69	answer (2)
1.2.2(a)	They both collected the **same (equal) amount** in tips, i.e. R1 420 over the 15-day period. *Hulle albei het **dieselfde bedrag** met fooitjies ontvang, nl. R1 420 oor die 15 dae-tydperk*	answer (1)
1.2.2(b)	Mary's standard deviation is smaller than Reggie's which suggests that there was **greater variation in the amount of tips that Reggie collected** each day compared to the number of tips that Mary collected each day. *Marie se standaardafwyking is kleiner as Reggie s'n wat beteken dat daar **groter variasie/verspreiding in die fooitjies was wat Reggie** elke dag **ontvang** het in vergelyking met die getal fooitjies wat Marie elke dag ontvang het.*	explanation (1)
		[15]

QUESTION/*VRAAG* 2



2.1	251 km/h	answer (1)
2.2.1	$r = 0,52$ **OR** C	answer (1)
2.2.2	The points are **fairly scattered** and the least squares regression line is increasing. *Die punte is **redelik verspreid** en die kleinstekwadrate-regressielyn neem toe.*	reason (1)
2.3	There is a weak positive relation hence the height could have an influence *Daar is 'n swak positiewe verband, tog kan die lengte 'n invloed hê.* **OR/*OF*** There is no conclusive evidence that the height of a player will influence his/her tennis serve speed. *Daar is geen duidelike bewys dat die lengte van die speler sy/haar afslaanspoed kan beïnvloed nie.* **OR/*OF*** There is no conclusive evidence that a taller person will serve faster than a shorter person. *Daar is geen duidelike bewys dat 'n langer speler vinniger sal afslaan as 'n korter een nie.*	answer (1) answer (1) answer (1)

2.4	For (0 ; 27,07), it means that the player has a height of 0 m but can serve at a speed of 27,07 km/h. **It is impossible for a person to have a height of 0 m.** *(0 ; 27,07) beteken dat 'n speler 'n lengte van 0* m *kan hê en teen 'n spoed van 27,07* km/h *kan afslaan.* ***Dit is onmoontlik om 'n lengte van 0* m *te hê.*** **OR/OF** This means that the **player does not exist and therefore cannot serve and have a serve speed.** *Dit beteken dat die speler nie bestaan nie en daarom nie kan afslaan en 'n afslaanspoed hê nie.*	explanation (1) explanation (1)
		[5]

KWV 12 MEMO

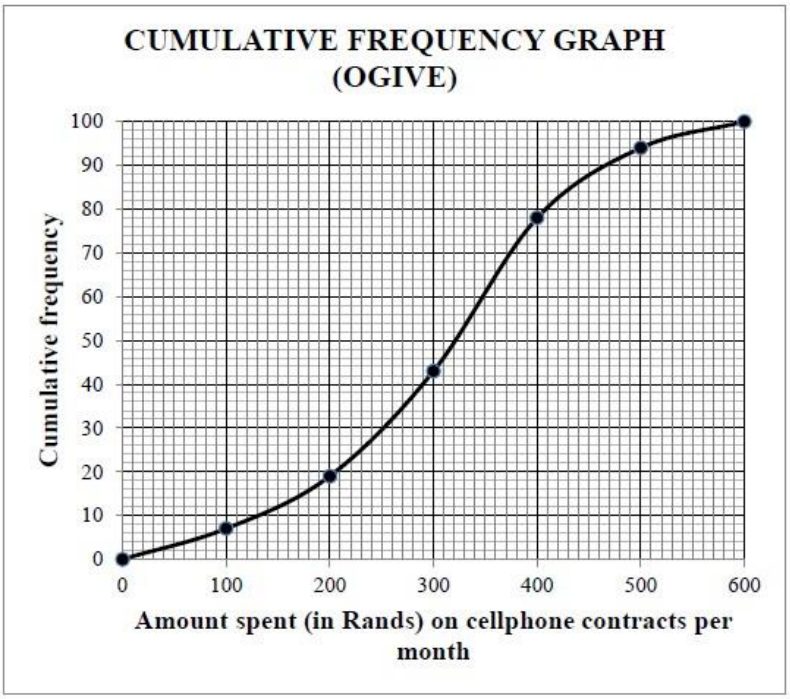
QUESTION/*VRAAG* 1

Monthly income (in rands) **Maandelikse inkomste (in rand)**	9 000	13 500	15 000	16 500	17 000	20 000
Monthly repayment (in rands) **Maandelikse paaiement (in rand)**	2 000	3 000	3 500	5 200	5 500	6 000

1.1	$a = -1946,875... = -1946,88$ $b = 0,41$ $\hat{y} = -1946,88 + 0,41x$ Answer only: Full marks	✓ $a = -1946,88$ ✓ $b = 0,41$ ✓ equation (3)
1.2	Monthly repayment ≈ R3 727,16 (calculator) *Maandelikse paaiement* ≈ R3 727,16 **OR** $\hat{y} = -1946,88 + 0,41(14000)$ ≈ R3 793,12	✓✓ answer (2) ✓ substitution ✓ answer (2)
1.3	$r = 0,946 \ldots. \approx 0,95$	✓ answer (1)
1.4	Not to spend R9 000 per month because the point (18 000 ; 9 000) lies very far from the least squares regression line. **OR** D *Spandeer nie R9 000 per maand nie, want die punt (18 000 ;9 000) lê baie ver van die kleinste-kwadrate regressielyn. **OF** D*	✓✓ answer (2)
		[8]

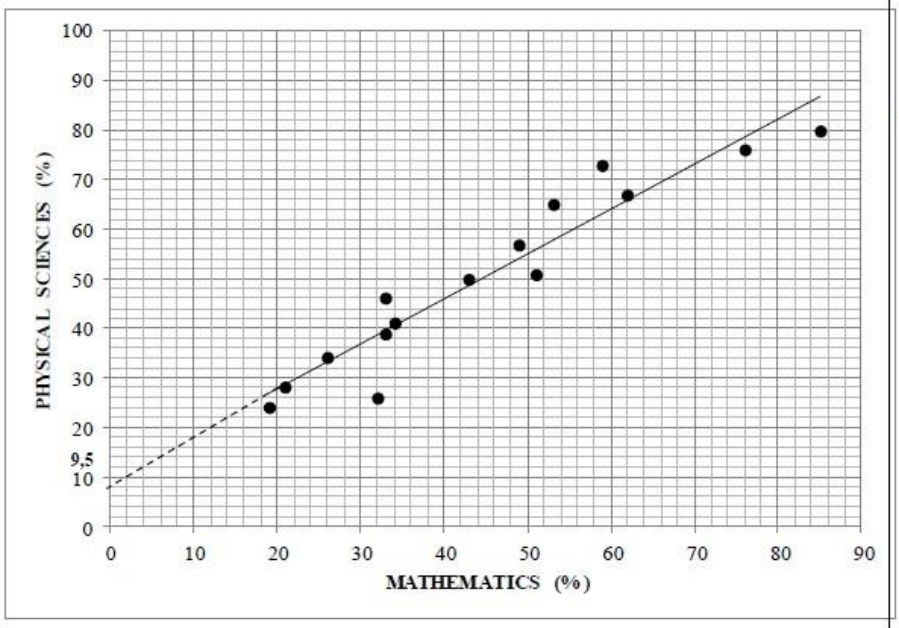
QUESTION/*VRAAG* 2

2.1	Number people paid R200 or less = 19 *Aantal mense wat R200 of minder betaal het = 19*	✓ answer (1)
2.2	$7+12+a+35+b+6=100$ $a=40-b$ $309=\frac{(50\times 7)+(150\times 12)+(250\times a)+(350\times 35)+(450\times b)+(550\times 6)}{100}$ $309=\frac{(50\times 7)+(150\times 12)+(250\times (40-b))+(350\times 35)+(450\times b)+(550\times 6)}{100}$ $350+1800+10000-250b+12250+450b+3300=30900$ $200b=3200$ $b=16$ $a=24$ **OR/*OF*** $7+12+a+35+b+6=100$ $b=40-a$ $309=\frac{(50\times 7)+(150\times 12)+(250\times a)+(350\times 35)+(450\times b)+(550\times 6)}{100}$ $309=\frac{(50\times 7)+(150\times 12)+(250\times a)+(350\times 35)+(450\times (40-a))+(550\times 6)}{100}$ $350+1800+250a+12250+1800-450a=30900$ $200a=4\,800$ $a=24$ $b=16$	✓ $\sum x=100$ ✓ $a=40-b$ ✓ $\sum fX$ ✓ $\sum\frac{fX}{n}=309$ ✓ $200b=3200$ (5) ✓ $\sum x=100$ ✓ $b=40-a$ ✓ $\sum fX$ ✓ $\sum\frac{fX}{n}=309$ ✓ $200a=4\,800$ (5)
2.3	Modal class/*modale klas:* $300<x\leq 400$	✓ answer (1)

2.4		✓ grounded at (0 ; 0) ✓ (600 ; 100) ✓ cumulative frequencies for *y*-coordinates ✓ smooth shape (4)
2.5	Number of people/*Aantal mense* = 100 – 82 [accept 80 – 84 people] 18 people paid more than R420 per month/. [accept 16 – 20 people] *18 mense betaal meer as R420 per maand* Answer only: Full marks	✓ 82 ✓ answer (2)
		[13]

KWV 13 MEMO

QUESTION/*VRAAG* 1

1.1	$a = 9{,}5$ $b = 0{,}909.. = 0{,}91$ $\hat{y} = 9{,}5 + 0{,}91x$	✓ $a = 9{,}5$ ✓ $b = 0{,}91$ ✓ equation (3)
1.2		✓✓ correct slope going through 2 points: (50 ; 55) or (40 ; 46) or (60 ; 64) or (0 ; 9,5) or (45 ; 50) (2)
1.3	Final exam mark ≈ 72,22% (calculator) **OR** $\hat{y} = 9{,}5 + 0{,}91(69)$ $\approx 72{,}29\%$	✓✓ answer (2) ✓ substitution ✓ answer (2)
1.4	$r = 0{,}95$	✓ answer(A) (1)
1.5	There is a **very strong positive** correlation between the Mathematics and Physical Sciences mark. *Daar is 'n baie sterk positiewe korrelasie tussen die Wiskunde en Fisiese Wetenskappunte.*	✓ **strong**/ ***sterk*** (1)
1.6	The teacher concludes that the higher the learners' Mathematics marks, the higher the learners' Physical Sciences marks. *Die onderwyser het waargeneem dat hoe hoër die wiskunde punte is, hoe hoër is die Fisiese Wetenskappunte.*	✓ answer (1)
		[10]

QUESTION/*VRAAG* 2

2 018	**2 175**	**2 182**	**2 215**	**2 254**	**2 263**	**2 267**	**2 271**	**2 293**	**2 323**	**2 334**	**2 346**

2.1	July / *Julie*	✓ answer (1)
2.2	$\overline{x} = \frac{26941}{12}$ Answer only: Full marks $= 2\,245{,}083.. \approx 2\,245{,}08$ aircraft landings	✓ 26 941 ✓ answer (2)
2.3	Standard deviation for landings at the King Shaka International airport: $\sigma = 86{,}30$	✓✓ answer (2)
2.4	$(\overline{x} - \sigma\,; \overline{x} + \sigma) = (2\,245{,}08 - 86{,}30\,;\, 2\,245{,}08 + 86{,}30)$ limit = (2 158,78 ; 2 331,38) There were **9** months when the aircraft arrivals at the King Shaka International airport were within one standard deviation of the mean.	✓ $\overline{x} - \sigma$ ✓ $\overline{x} + \sigma$ ✓ answer (3)
2.5	The standard deviation of the number of landings at the Port Elizabeth Airport will be higher than the standard deviation of the number of arrivals at the King Shaka International Airport **OR C.**	✓ answer (1)
		[9]

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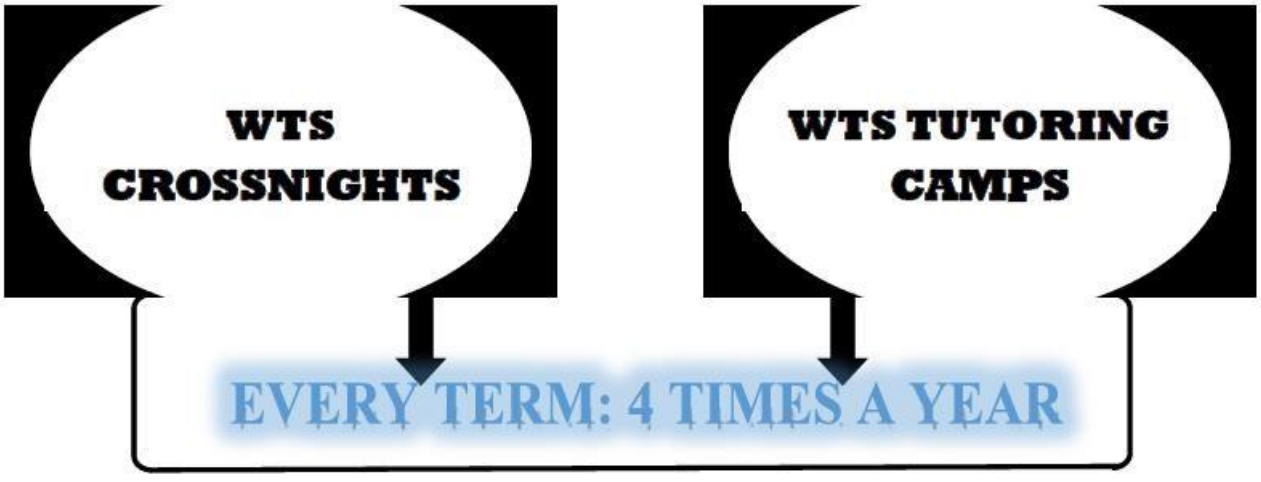

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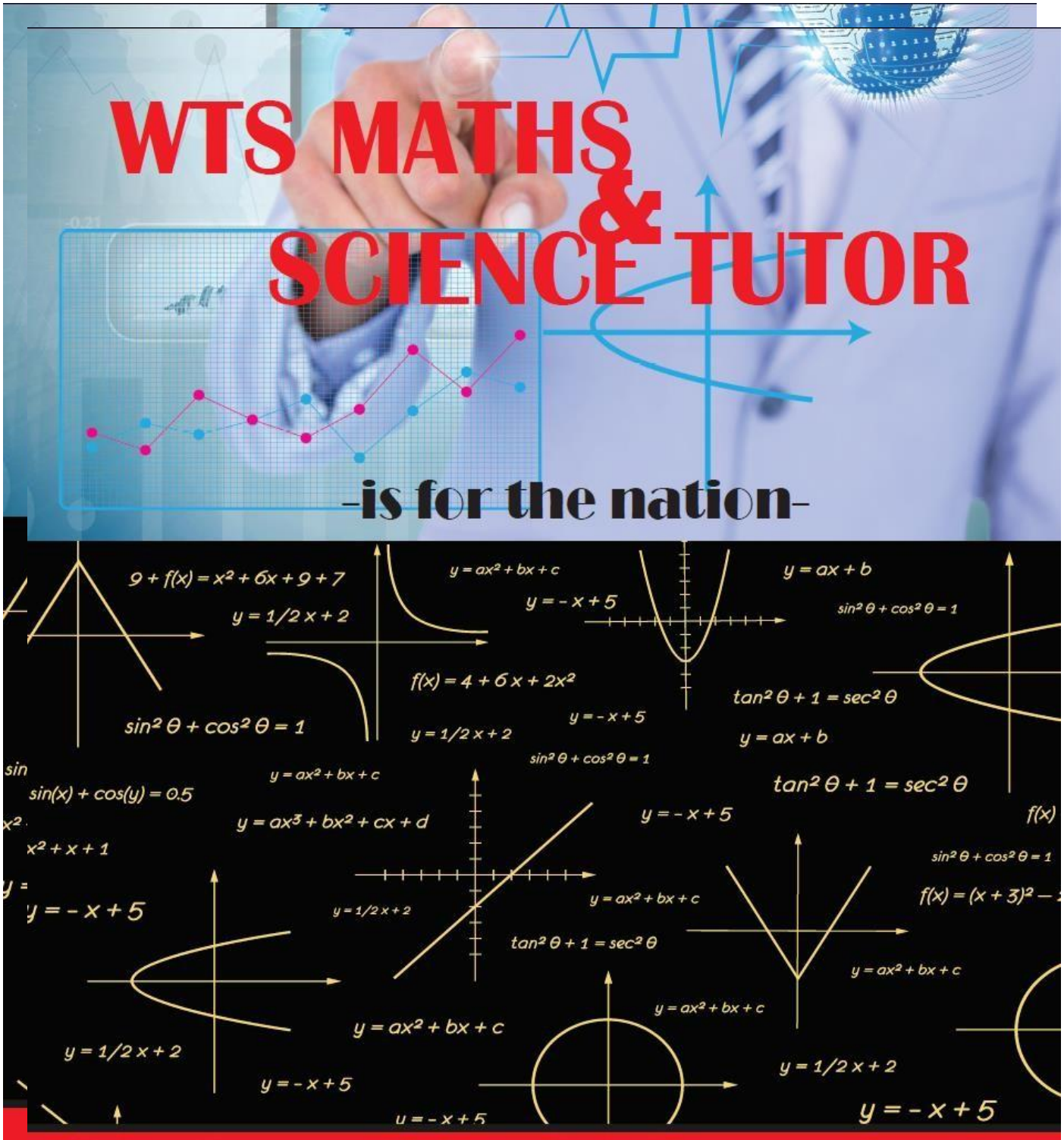
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