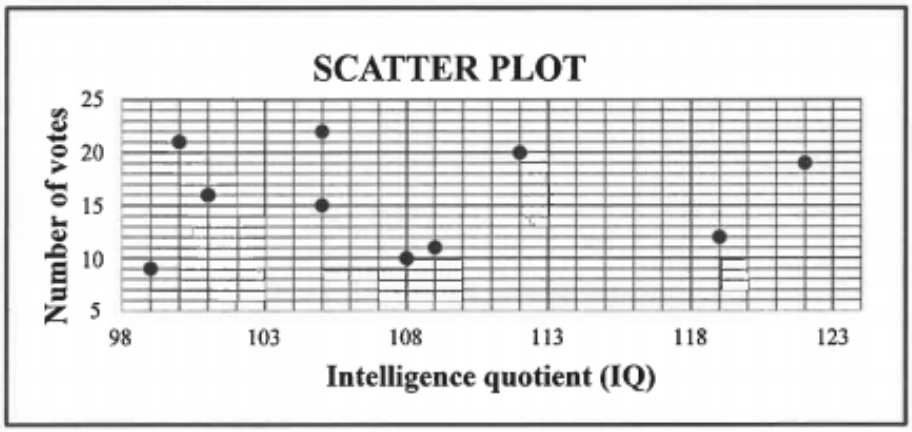
QUESTION 1

The matric class of a certain high school had to vote for the chairperson of the RCL (representative council of learners). The scatter plot below shows the IQ (intelligence quotient) of the 10 learners who received the most votes and the number of votes that they received.

$\bar{y}$ – SD
= 15,5 – 4,59
= 10,91
∴ 10 – 2 = 8 learn



Before the election, the popularity of each of these ten learners was established and a popularity score (out of a 100) was assigned to each. The popularity scores and the number of votes of the same 10 learners who received the most votes are shown in the table below.

Popularity score (x)	32	89	35	82	50	59	81	40	79	65
Number of votes (y)	9	22	10	21	11	15	20	12	19	16

1.1 Calculate the:

1.1.1 Mean number of votes that these 10 learners received (2)

$\bar{y} = \frac{155}{10}$
$= 15,5$

1.1.2 Standard deviation of the number of votes that these 10 learners received (1)

SD = 4,59

1.2 The learners who received fewer votes than one standard deviation below the mean were not invited for an interview. How many learners were invited? (2)

1.3 Determine the equation of the least squares regression line for the data given in the table. (3)

$\hat{y} = 1,77 + 0,22x$

1.4 Predict the number of votes that a learner with a popularity score of 72 will receive. (2)

$\hat{y} = 1,77 + 0,22(72)$
$= 17,61$
≈ 18 votes

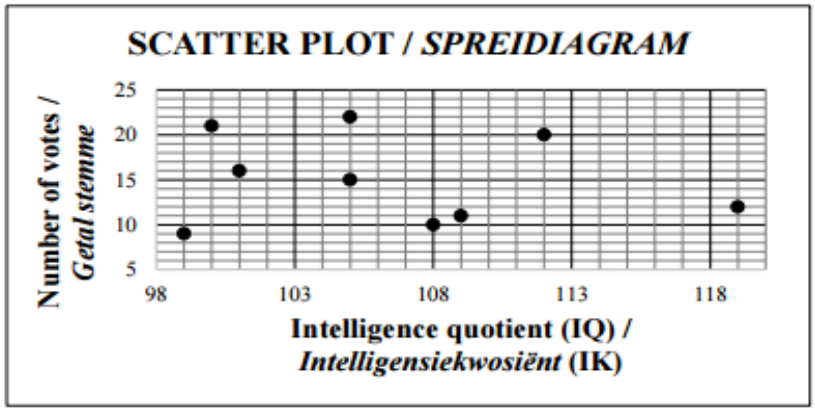
1.5 Using the scatter plot and table above, provide a reason why:

1.5.1 IQ is not a good indicator of the number of votes that a learner could receive (1)

1.5.2 The prediction in QUESTION 1.4 is reliable (1)

[12]

QUESTION/*VRAAG* 1



Popularity score (x) ***Gewildheidspunt* (x)**	32	89	35	82	50	59	81	40	79	65
Number of votes (y) ***Getal stemme* (y)**	9	22	10	21	11	15	20	12	19	16

1.1.1	$\bar{y} = \frac{155}{10}$ $= 15{,}5$ ANSWER ONLY: Full marks	✓155 ✓answer (2)
1.1.2	SD = 4,59	✓ answer (1)
1.2	$\bar{y} - \text{SD}$ $= 15{,}5 - 4{,}59$ $= 10{,}91$ $\therefore\ 10 - 2 = 8$ learners	✓ value of $\bar{y} - \text{SD}$ ✓ answer (2)
1.3	$a = 1{,}7709\ldots$ $b = 0{,}2243\ldots$ $\hat{y} = 1{,}77 + 0{,}22x$	✓ a ✓ b ✓ equation (3)
1.4	$\hat{y} = 1{,}77 + 0{,}22(72)$ $= 17{,}61$ ≈ 18 votes **OR/*OF*** $\hat{y} = 17{,}92 \approx 18$ votes	✓ substitution ✓ answer (2) ✓✓ answer (2)
1.5.1	Points are all scattered therefore low correlation and unrealistic prediction./*Punte is versprei daarom 'n lae korrelasie en onrealistiese voorspelling.*	✓ R (1)
1.5.2	$r = 0{,}98$/correlation very strong/*korrelasie baie sterk* $\therefore$ a reliable prediction/*'n betroubare voorspelling*	✓ S (1)
		[12]

QUESTION 2

A farm stall sells milk in 5-litre containers to the local community. The price varies according to the availability of milk at the farm stall. The price of milk, in rands per 5-litre container, and the number of 5-litre containers of milk sold, are recorded in the table below.

Price of milk in rands per 5-litre container (x)	26	32	36	28	40	33	29	34	27	30
Number of 5-litre containers of milk sold (y)	48	30	26	44	23	32	39	29	42	33

2.1 On the grid provided in the ANSWER BOOK, draw the scatter plot to represent the data. (3)

2.2 Determine the equation of the least squares regression line for the data. $\hat{y} = 90{,}48 - 1{,}77x$ (3)

2.3 If the farmer sells a 5-litre container of milk for R38, predict the number of 5-litre containers of milk he will sell. (2)

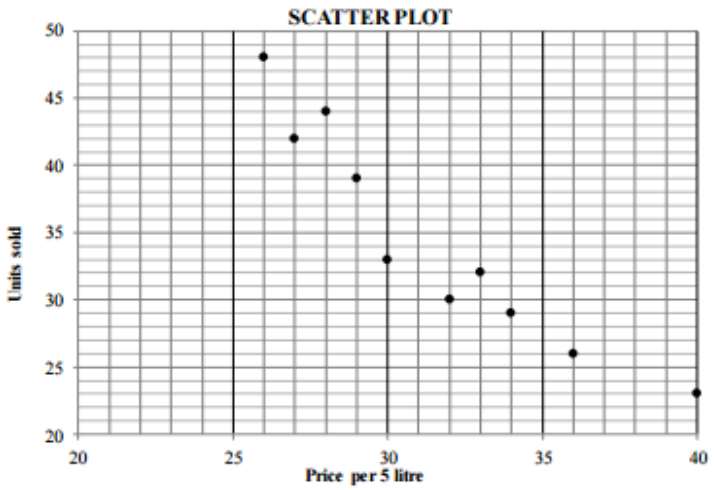
2.4 Refer to the correlation between the price of 5-litre containers of milk and the number of 5-litre containers of milk sold, and comment on the accuracy of your answer to QUESTION 2.3. (2)
[10]

$y = 90{,}48 - 1{,}77(38)$
$y = 23{,}22$ units/*eenhede*

$r = -0{,}94$
The value of r indicates a strong relationship between the cost per 5 litre and the number of units sold ∴ there is a good chance of the prediction being accurate./

QUESTION/*VRAAG* 2

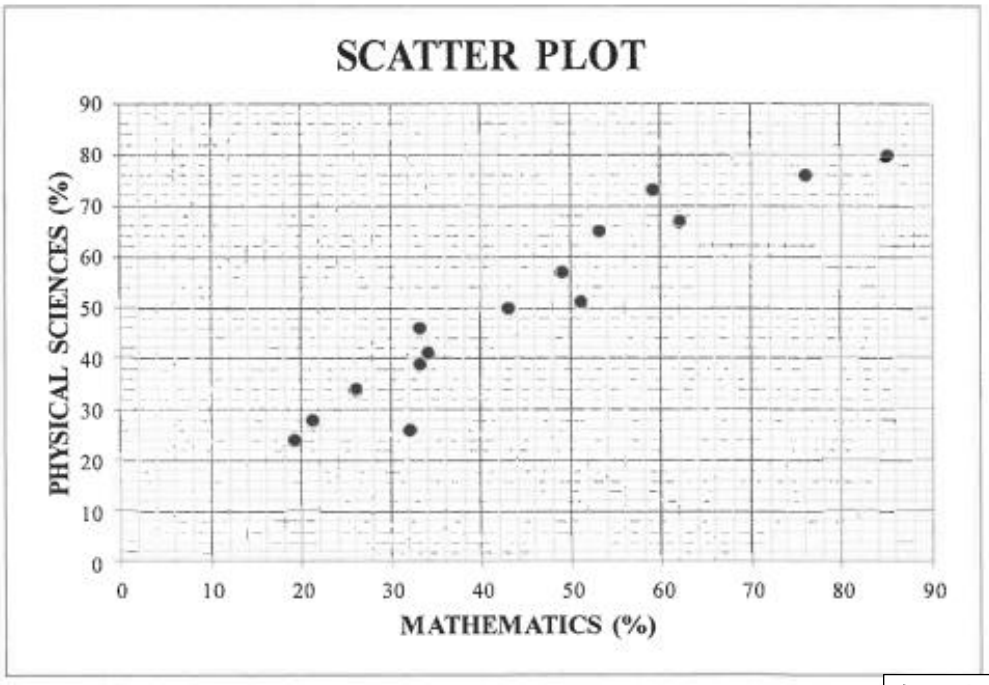
Price of milk in rands per 5-litre container (*x*) ***Prys van melk in rand, per 5 liter-houer (x)***	26	32	36	28	40	33	29	34	27	30
Number of 5-litre containers of milk sold (*y*) ***Aantal 5 liter-houers melk verkoop (y)***	48	30	26	44	23	32	39	29	42	33

2.1		1 mark: 3 to 5 points plotted correctly 2 marks: 6 to 9 points plotted correctly 3 marks: all points plotted correctly (3)
2.2	$a = 90{,}478... \approx 90{,}48$ $b = -1{,}773... \approx -1{,}77$ $\hat{y} = 90{,}48 - 1{,}77x$ Answer only: Full marks *Slegs antw: Volpunte*	✓ *a* ✓ *b* ✓ equation (3)
2.3	$y = 23{,}069... \approx 23{,}07$ units/*eenhede* (calculator/*sakrekenaar*) **OR/*OF*** $y = 90{,}48 - 1{,}77(38)$ $y = 23{,}22$ units/*eenhede*	✓✓ answer (2) ✓ substitution ✓ answer (2)
2.4	$r = -0{,}94$ The value of *r* indicates a strong relationship between the cost per 5 litre and the number of units sold ∴ there is a good chance of the prediction being accurate./ *Die waarde van r dui 'n sterk vewantskap tussen die koste per 5 liter en die aantal eenhede verkoop aan ∴ daar is 'n goeie kans dat die voorspelling akkuraat is*	✓ value of *r* **OR/OF** strong relationship/ *sterk verwantskap* ✓ accurate/*akkuraat* (2)
		[10]

QUESTION 1

A Mathematics teacher was curious to establish if her learners' Mathematics marks influenced their Physical Sciences marks. In the table below, the Mathematics and Physical Sciences marks of 15 learners in her class are given as percentages (%).

MATHEMATICS (AS %)	26	62	21	33	53	76	32	59	43	33	49	51	19	34	85
PHYSICAL SCIENCES (AS %)	34	67	28	46	65	76	26	73	50	39	57	51	24	41	80



1.1 Determine the equation of the least squares regression line for the data. $\hat{y} = 9{,}5 + 0{,}91x$ (3)

1.2 Draw the least squares regression line on the scatter plot provided in the ANSWER BOOK. $\hat{y} = 9{,}5 + 0{,}91(69) \approx 72{,}29\%$ (2)

1.3 Predict the Physical Sciences mark of a learner who achieved 69% for Mathematics. (2)

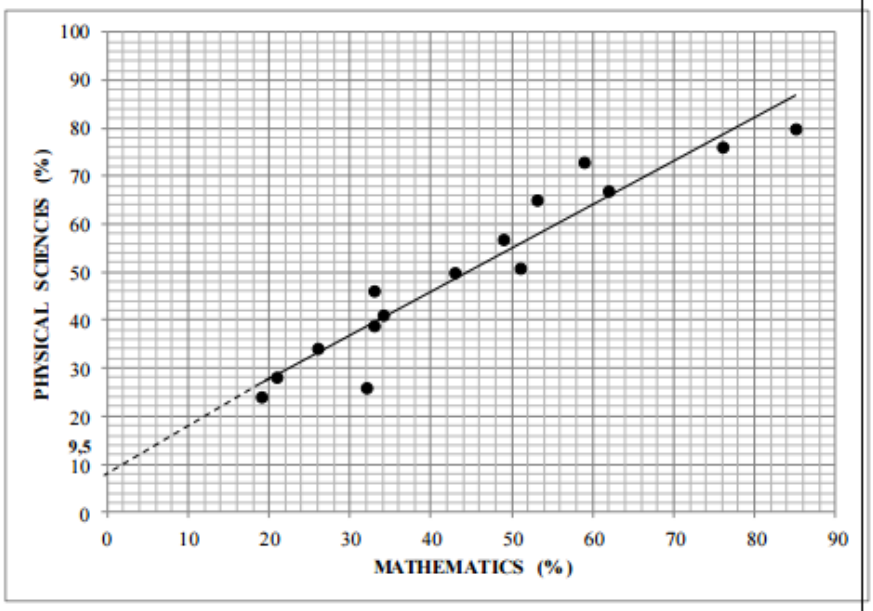
1.4 Write down the correlation coefficient between the Mathematics and Physical Sciences marks for the data. r =0,95 (1)

1.5 Comment on the strength of the correlation between the Mathematics and Physical Sciences marks for the data. (1)

1.6 What trend did the teacher observe between the results of the two subjects? (1)

[10]

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) $(\bar{x}; \bar{y})$ $(45{,}1\,; 50{,}5)$ (2)
1.3	Final exam mark ≈ 72,22% (calculator) **OR** $\hat{y} = 9{,}5 + 0{,}91(69)$ ≈ 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]