education

Department:
Education
PROVINCE OF KWAZULU-NATAL

PINETOWN DISTRICT
GRADE 11
NOVEMBER EXAMINATION – 2019

MATHEMATICAL LITERACY
PAPER 2
2019

MARKS: 100 DURATION: 2 HOURS

This question paper consists of 8 pages, an ANNEXURE and a graph sheet.

Name:	Grade: 11

INSTRUCTIONS AND INFORMATION TO CANDIDATES
READ THESE INSTRUCTIONS CAREFULLY BEFORE ANSWERING THE QUESTIOINS

- Answer all questions.
- Answers and all working steps must have the appropriate units.
- Answers only will not necessarily be awarded full marks.
- Not all the diagrams, maps and plans are drawn to scale.
- Show all necessary working.
- Round off answers according to the given context or unless otherwise stated.
- Write neatly and legibly.
- An approved calculator (non programmable and non graphical) may be used.

QUESTION 1

Mr. Jomo lives with his wife and two children in Durban. Mr. Jomo got a job offer in Johannesburg that pays him a higher salary. To accept the job offer, he has to relocate with his wife and 2 children to Johannesburg. He and his wife decide to sell their house in Durban and buy a house in Johannesburg close to his place of work.

1.1.1 Mr Jomo's annual salary has increased from R366 000 to R504 000. One of the deductions from his gross salary is 1% for his UIF contribution. Determine the increase in his monthly deduction for UIF. (5)

1.1.2 The deductions from Jomo's old salary was 30% of his gross salary, The deductions from his new salary will be 35% of his gross. Jomo's financial advisor told him that the increase in his net salary (after deductions) will be below 30%.
Verify if his financial advisor's prediction was correct.
You may use the following formula:

$$\text{Percentage increase} = \frac{New\ Net - Old\ Net}{Old\ Net} \times 100$$ (8)

1.2 A buyer has offered R1.8 million for the Jomo family home in Durban, and the house that the Jomo family has chosen in Johannesburg cost R2.2 million.

1.2.1 Write the price of the home in Johannesburg as a number. (2)

1.2.2 Mr. and Mrs. Jomo owed the bank R200 000 for their previous loan. They used part of the money from the sale of their old house to settle this outstanding loan. Determine how much more they need to borrow from the bank to pay for their new home. (4)

1.2.3 When the Jomo's applied for a home loan on their new house, they were given the following table to show the monthly loan repayments. They have a choice of paying off the home loan in 15, 20 or 25 years.

Repayment period	Monthly payment per R100 000
25 years	R1 050
20 years	R1 180
15 years	R1 300

Note: The actual monthly repayment will depend on the value of the home loan.

Mr. Jomo decides to repay the loan over 25 years because his monthly repayments would be lower. His financial advisor said that he would save more than half a million rands if he took the loan over 15 years instead of 25 years.
Determine the monthly repayment for 15 and 25 years. Then calculate the total repayment for 15 years and for 25 years to verify whether his financial advisor was correct. (7)

1.3 Mr. and Mrs. Jomo took the advice of their financial advisor and decided to repay the loan in 15 years. They further decided that once they paid back their home loan after 15 years, they will save an amount equal to the monthly repayments for the next 15 years. Bestinvest, an investment company, offered them an investment that would pay them 4% simple interest per annum based on the total amount invested over 15 years.

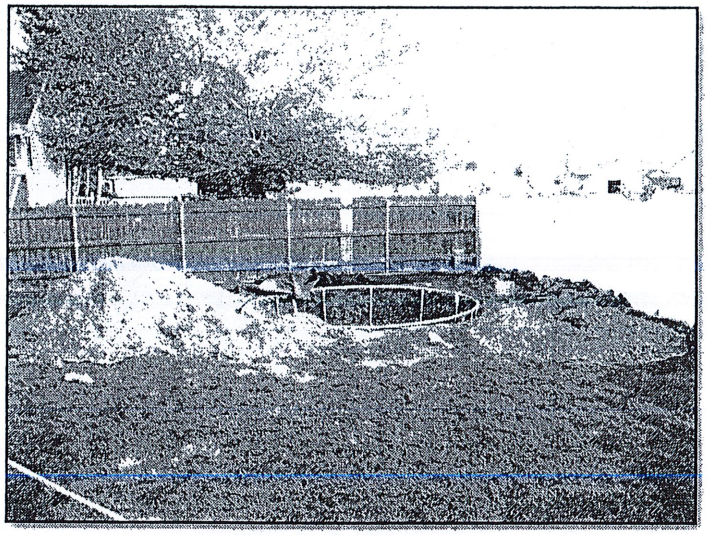
1.3.1 Using the monthly repayment for 15 years from 1.2.3 above, determine the total value of their investment after 15 years. (4)

1.3.2 Mr. Jomo bought a new car. His monthly repayment of the new car is R3 500 per month. Mr. Jomo receives a car allowance of R8 000 per month. His car allowance is taxed at 20% per month. Calculate the value of his car allowance after tax, and then determine how much of his car allowance will be left over for fuel and maintenance, after paying his car instalment. (5)

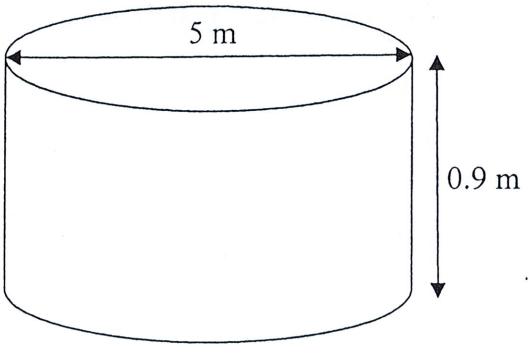
[35]

QUESTION 2

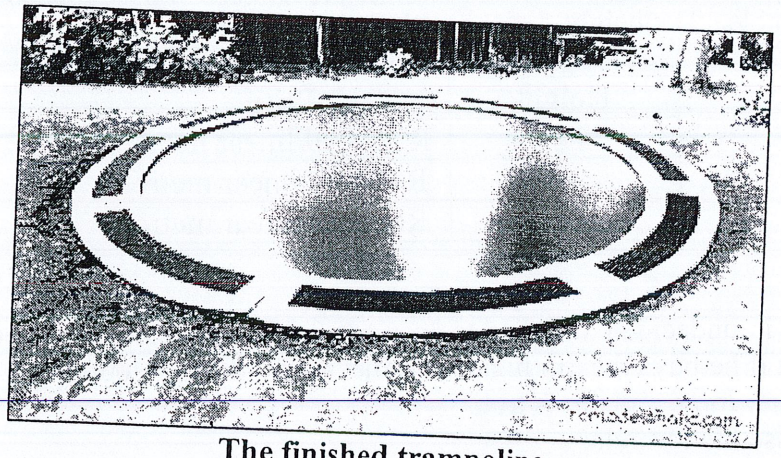
Mr. Jomo wants to build a trampoline for his children in the backyard of his new house in Johannesburg. He dug a hole with a diameter of 5m and a depth of 0.9m.



The hole Jomo dug



The dimensions of the hole Jomo dug



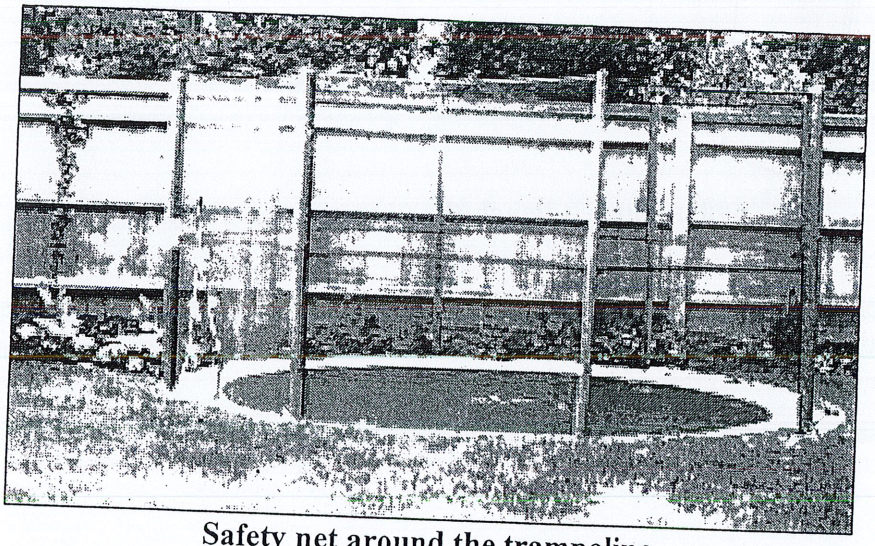
The finished trampoline

Mr. Jomo used some of the sand he dug up but he still had $\frac{2}{3}$ (two-third) of the sand left over. A company is prepared to collect the sand free of charge provided it is more than $10m^3$.

2.1 Calculate the total space the trampoline took up in Jomo's backyard. Round your answer to 2 decimal places.
You may use the formula: $Area = \pi \times r^2$, $where\ r = radius\ and\ \pi = 3.142$ (4)

2.2 Determine whether there is enough sand for the company to collect free of charge.
You may use the formula: $Volume = area\ of\ base \times height$ (4)

Mr. Jomo is concerned about the safety of his children while they jump on the trampoline. He decides to put a safety net around the trampoline like the one shown below:



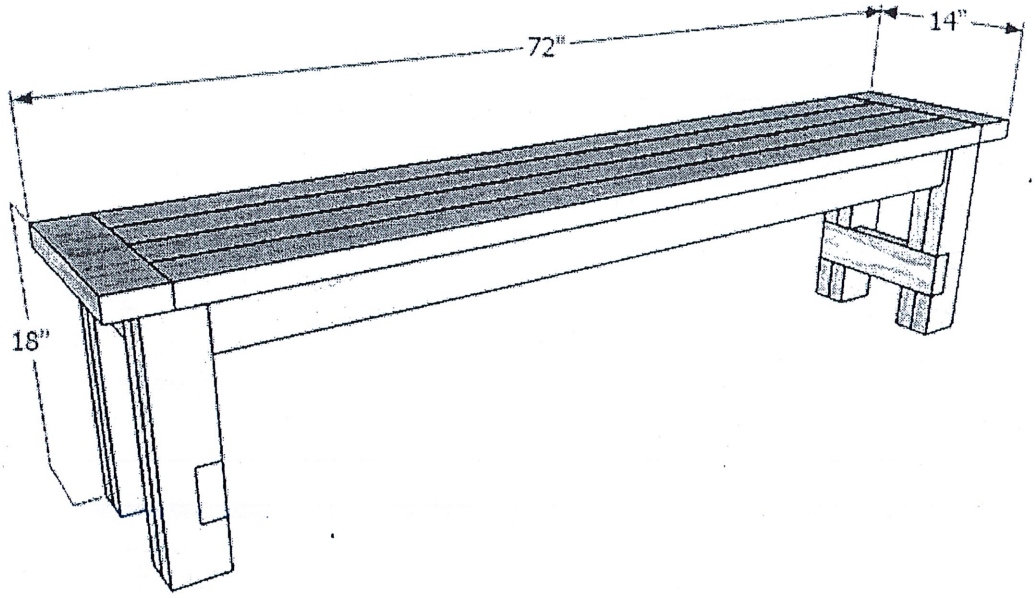
Safety net around the trampoline

The safety net is sold in one linear metre lengths (and not part of a metre). Three height options are available. The height options with their prices is shown below:

Height	Price
2m	R 260.90/linear metre
3m	R472.70/linear metre
4m	R650.50/linear metre

2.3 Mr. Jomo is undecided whether to buy the 3m or the 4m safety net. Jomo's wife claims that if he buys the 3m high safety net he would save more than R2 700. Verify whether Mrs. Jomo's claim is true.
You may use the formula:
$Perimeter = \pi \times d$, *where* $d = diameter$ and $\pi = 3.142$ (8)

Mr. Jomo plans to make a bench on which to sit and watch his children while they played on the trampoline. He searched the Internet and found a simple bench that he could make. The dimensions however, where given in inches.



Wooden garden bench that Jomo wants to make

2.4 In order for his children to sit on the bench as well, Jomo does not want the bench to be higher than 0.5 metre. Does the height on the diagram meet his requirement?
You may use the conversion: 1 inch = 2.54 cm. (4)

[20]

QUESTION 3 . . .

QUESTION 3

3.1 Mr Jomo needs to take a decision regarding the choice of schools for his children. He researched the cost of both Private and Public schools in the area of his new neighbourhood. The table below reflects costs for the year 2020 for the following high schools.

Private Schools	Fees	Public Schools	Fees
Hapari Curro	R35 520	Parktown	R3 870
Deutsche Schule	R42 770	Roosevelt	R6 500
Orban	R58 980	Northcliff	R18 980
Holy Cross	R98 995	Queens	R41 310
Crawford	R125 590	King David	R28 670
St. Andrews	R183 150	Jeppe	R26 770
		Sandown	R12 780
		Highlands	R20 780
		Sandringham	R4 590

3.1.1 Determine the median cost for the Private Schools in Johannesburg in the year 2020. (2)

3.1.2 Determine the mean (average) cost for Public Schools in Johannesburg in the year 2020. (3)

3.1.3 If the range in cost for the Public Schools is R37 440, calculate the range in cost for Private schools and explain what the range tells us about the cost of both Private and Public schools. (4)

3.1.4 With reference to the cost for Public Schools, state with reasons, which measure (median, mean or range) is the best indicator of central tendency for this data. (2)

3.1.5 A new Public School will be opening in the year 2021. If the mean cost of Public schools increases to R20 000, calculate the fee of the new school. (4)

3.1.6 Mr. & Mrs. Jomo budgeted R40 000 for school fees for each of their two children. Of all the schools listed in the table, what is the probability of them selecting a school that is within their budget? Give your answer as a percentage. (2)

3.2 Due to the high relocation cost, the Jomo family will no longer be able to afford a fitness trainer. The trainer used the following data to reassure the Jomo family of their health status. Part of the programme involved doing as many push-ups as possible in 30 seconds. The data collected is organized in a frequency table.

Number of push-ups	Frequency
10 – 12	1
13 – 15	6
16 – 18	3
19 – 21	7
22 – 24	3
25 – 27	2
28 – 30	1
Total	**23**

3.2.1 Represent the data in a bar graph. Use the answer sheet provided. (5)

3.2.2 Is it possible to calculate the mean, median or mode?
Substantiate your answer. (3)

3.2.3 Determine the probability (as a common fraction) of choosing a person with more than 21 push-ups in 30 seconds. (2)

3.2.4 Determine the probability as a percentage of choosing a person from the modal class. (3)

[30]

QUESTION 4

Refer to ANNEXURE A and answer the questions that follow

4.1 Use the given bar scale on the map and determine the straight line distance, in kilometres, travelled by the Jomo family from Durban to Gauteng. (4)

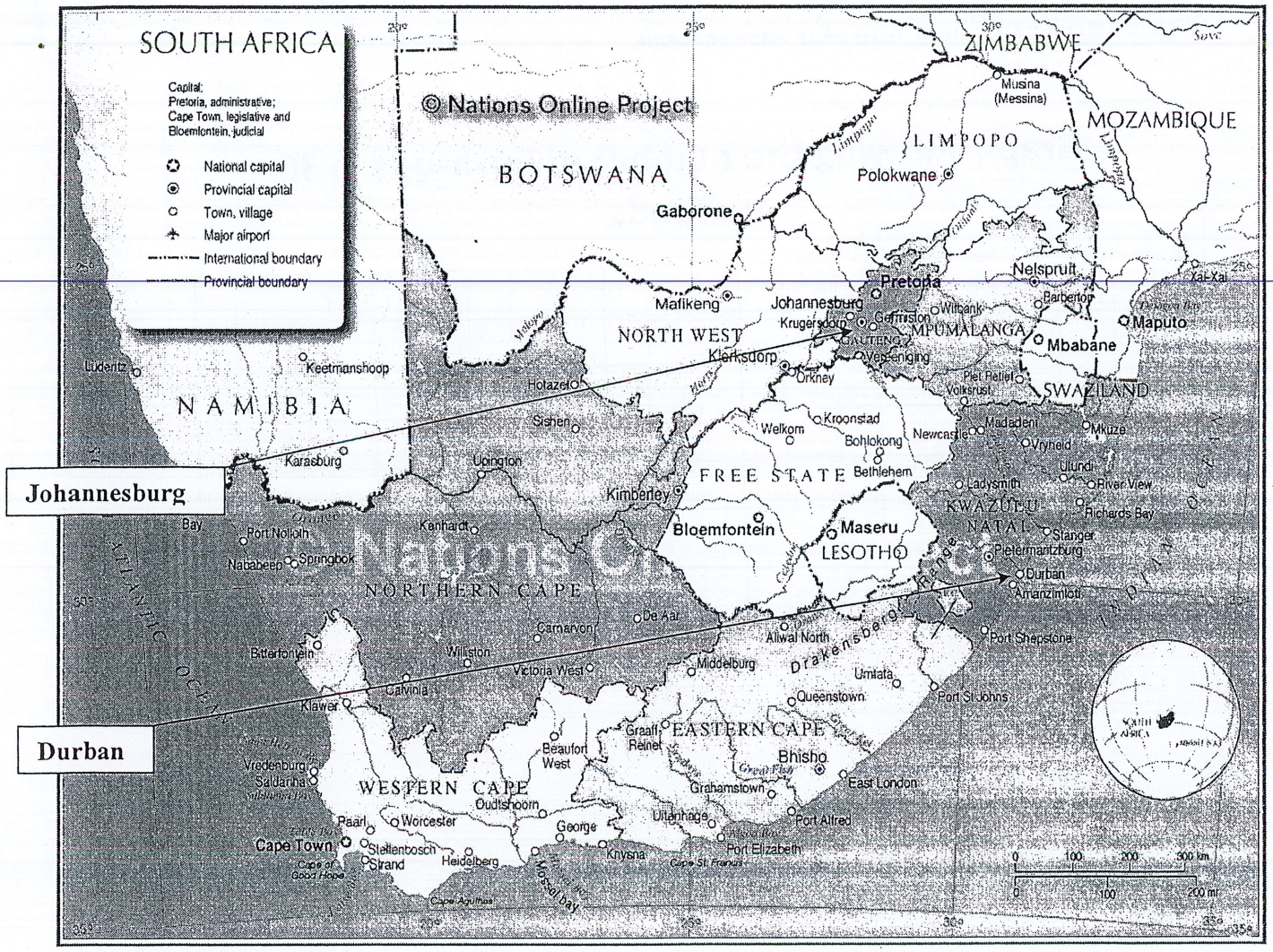
4.2 Convert the bar scale of this map to a number scale. Show your workings.
NB. Your number scale must be rounded off to the nearest 100 000. (3)

4.3 The actual distance from Durban to Pietermaritzburg is 77.8*km*.
Mr. Jomo's VW Caddy has a fuel tank capacity of 60 litres.
His van consumes 8.2 litres per 100km. Determine the cost of petrol from Durban to Pietermaritzburg if petrol costs R15.28/*l*. (4)

4.4 Mr. Jomo was flagged down by a metro cop in Pietermaritzburg for speeding.
He claimed that he was travelling within the average speed limit of 100*km/h*. He said that it took him 4 minutes and 30 seconds to cover a distance of 6 *km*.
Verify, with calculations, whether his claim was correct. (4)

[15]

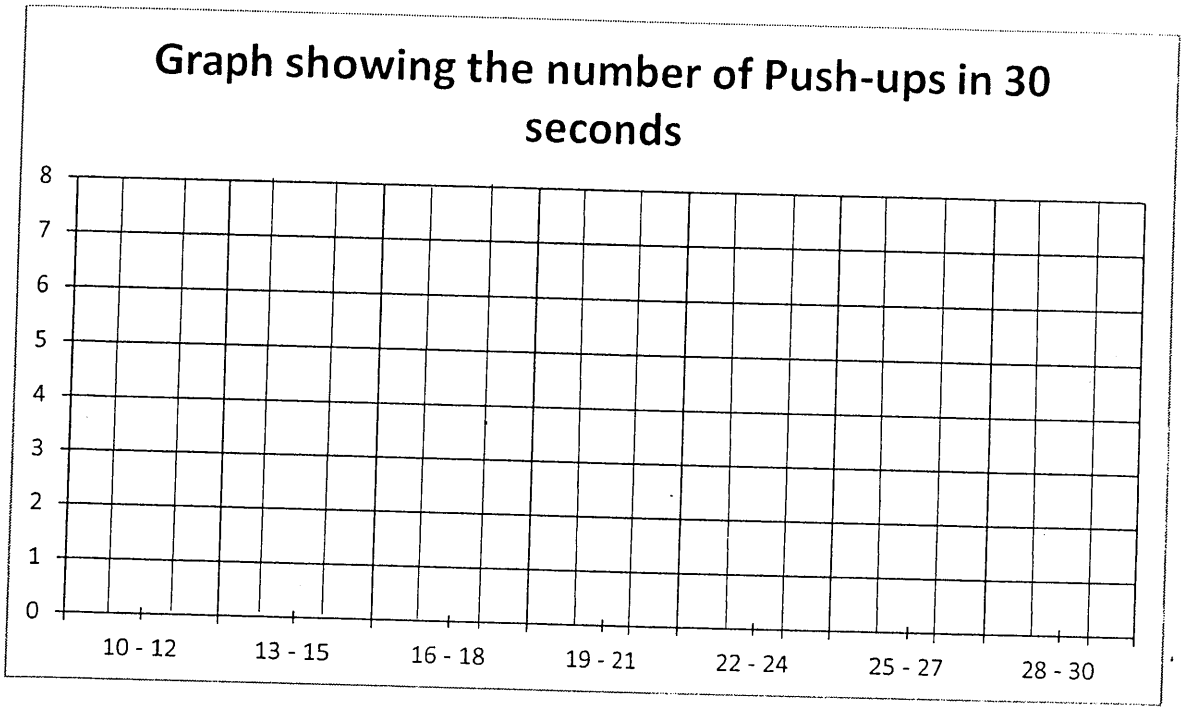
ANNEXURE A


SOUTH AFRICA
Capital:
Pretoria, administrative;
Cape Town, legislative and
Bloemfontein, judicial
National capital
Provincial capital
Town, village
Major airport
International boundary
Provincial boundary
© Nations Online Project
ZIMBABWE
MOZAMBIQUE
BOTSWANA
LIMPOPO
Polokwane
Gaborone
Pretoria
Nelspruit
Johannesburg
Mafikeng
NORTH WEST
MPUMALANGA
Mbabane
Maputo
Klerksdorp
SWAZILAND
NAMIBIA
Keetmanshoop
Lüderitz
Hotazel
Sishen
Karasburg
Upington
FREE STATE
Kimberley
Bloemfontein
Maseru
LESOTHO
KWAZULU
NATAL
Durban
Richards Bay
Port Nolloth
Springbok
Kenhardt
NORTHERN CAPE
Calvinia
Williston
Carnarvon
De Aar
Middelburg
Victoria West
Aliwal North
Port Shepstone
Umtata
Queenstown
Port St Johns
Bitterfontein
Klawer
Vredenburg
Saldanha
WESTERN CAPE
Cape Town
Stellenbosch
Strand
Paarl
Worcester
Oudtshoorn
George
Heidelberg
Knysna
Beaufort West
Graaff Reinet
EASTERN CAPE
Bhisho
East London
Grahamstown
Port Alfred
Port Elizabeth
Uitenhage
Cape Agulhas
Cape St. Francis
Johannesburg
Durban
0 100 200 300 km
0 100 200 mi

Name of Learner: _____ Grade 11 _____

Question 3.2.1

Please detach and submit with your answer script.



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MEMORANDUM

MARKS: 100 DURATION: 2 HOUR

This Memo consists of 7 pages.

Name:	Grade: 11

QUESTION 1			**Mark**	**Level**
1.1.1	Old monthly salary	= R366 000 ÷ 12 = R30 500 ✓MA		
	Old monthly UIF	= 1% x R30 500 = R305 ✓A		
	New monthly salary	= R504 000 ÷ 12 = R42 000 ✓MA		
	New monthly UIF	= 1% x R42 000 = R420 ✓A		
	Increase in UIF	= R420 – R305 = R115 ✓CA		
		OR		
	Difference in salaries	= R504 000 – R366 000 ✓MA		
		= R138 000 ✓A		
	Monthly difference	= R138 000 ÷12 ✓MA = R11 500		
	Monthly diff in UIF	= 1% x R11 500 ✓M		
		= R115 ✓CA		
		OR		
	Difference in salaries	= R504 000 – R366 000 ✓MA		
		= R138 000 ✓A		
	Difference in UIF	= 1% x R138 000 ✓M		
		= R1 380 ✓CA		
	Monthly difference	= R1 380 ÷12		
		= R115 ✓CA	(5)	L3

1.1.2	Old net	= R366 000 – (R366 000 x 30%) ✓MA		
		= R366 000 – R109 800 ✓S		
		= R256 200 ✓A		
	New net	= R504 000 – (R504 000 x 35%) ✓MA		
		= R504 000 – R176 400		
		= R327 600 ✓A		
	% increase	$= \frac{R327\,600 - R256\,200}{256\,200} \times 100$ ✓SF		
		= 27.87% ✓CA NPR		
		CORRECT ✓J		
		OR		
	Old net	= R366 000 x 70% ✓✓MA		
		= R256 200 ✓A		

	New net = R504 000 x 65% ✓MA = R327 600 ✓A % increase = $\frac{R327\,600-R256\,200}{256\,200} \times 100$ ✓SF = 27.87% ✓CA NPR CORRECT ✓J	(8)	L4

1.2.1	R2 200 000 ✓✓A	(2)	L2

1.2.2	Amt left after loan settlement = R1 800 000 – R200 000 ✓MA = R1 600 000 ✓A Loan amount = R2 200 000 – R1 600 000 ✓MCA = R600 000 ✓CA OR Loan amount = R2 200 000 – R1 800 000✓MA + R200 000 ✓M = R400 000 + R200 000 ✓S = R600 000 ✓CA	(4)	L2

1.2.3	Monthly repayment for 25 yrs = $\frac{R600\,000}{100\,000} \times R1\,050 = R6\,300$ ✓MA Monthly repayment for 15 yrs = $\frac{R600\,000}{100\,000} \times R1\,300 = R7\,800$ ✓MA Total repayment for 25 yrs = R6 300 x 12 x 25 = R1 890 000✓MCA Total repayment for 15 yrs = R7 800 x 12 x 15 = R1 404 000 ✓MCA Difference = R1 890 000 – R1 404 000 ✓M = R486 000 ✓CA INCORRECT. It's less than half a million ✓J	(7)	L4

1.3.1	Annual savings = R1 300 x 12 = R15 600 ✓C Total amount after 15 yrs = R15 600 + (4% x R15 600 x 15) ✓MCA = R15 600 + R9 360 ✓S = R24 960 ✓CA OR		

	Monthly savings = R1 300 + (4% x R1 300 x 15) ✓MCA = R1 300 + R780 ✓S = R2 080 ✓CA Total savings = R2 080 x 12 = R24 960 ✓CA	(4)	L2

1.3.2	Car allowance after tax = R8 000 – 20% x R8 000 ✓M = R8 000 – R1 600 ✓S = R6 400 ✓CA Amt left for fuel etc = R6 400 – R3 500 ✓M = R2 900 ✓CA OR Car allowance after tax = R8 000 x 80% ✓✓M = R6 400 ✓CA Amt left for fuel etc = R6 400 – R3 500 ✓M = R2 900 ✓CA	(5)	L3

[35]

QUESTION 2

2.1

Radius = 2.5 m ✓A

Area = 3.142 x $(2.5)^2$ ✓SF

= 19.6375 m^2 ✓CA

= 19.64 m^2 ✓R

(4) L2

2.2

Volume = *area pf base* × *height*

= 19.64 × 0.9 ✓ correct SF with conversion

= 17.676 m^3 ✓CA

Volume of sand remaining $= \frac{2}{3} \times 17.676\ m^3$

= 11.784 m^3 ✓CA

Since 11.784 m^3 is greater than 10 m^3, collection would be free. ✓CA

(4) L3

2.3

Perimeter = 3.142 x 5 ✓SF (correct values)

= 15.71 m ✓A

Cost for 3m high safety net = 15.71 x R472.70✓MA (multiply by price)

= R7 426.12 ✓CA

Cost for 4m high safety net = 15.71 x R650.50

= R10 219.36 ✓CA

Savings = R10 219.36 – R7 426.12 ✓M

= R2 793.24 ✓CA

Her claim is VALID. ✓J

(8) L4

2.4

Height = 18" x 2.54 cm ✓MA

= 45.72 cm ✓A

= 45.72 ÷ 100

= 0.4572 m✓C

Yes. The specified height meets his requirements. ✓J

(4) L3

[20]

QUESTION 3

3.1.1 Median $= \frac{58\,980 + 98\,995}{2}$ ✓MA (adding correct values)

$= \frac{157\,975}{2}$

= R78 987.50 ✓A

(2) L2

3.1.2 Mean = R3 870 + R6 500 + R18 980 + R41 310 + R28 670 +

R26 770 + R12 780 + R20 780 + R4 590) ✓MA÷ 9

$= \frac{164\,250}{9✓M}$ adding correct values

= R18 250✓CA

(3) L2

3.1.3 Range for Private schools = R180 150 – R35 520 ✓MA subtracting correct values

= R147 630 ✓A

A large range for private schools means that there is a large difference in the cost among private schools. The small range for the public✓✓J schools means that the costs among public schools differ only slightly.

(4) L4

3.1.4 Median. ✓A The outliers R3 870 and R41 310 distort the mean. ✓J

(2) L4

3.1.5 Old mean = R18 250 (from 3.1.2)

New mean = R20 000

Old mean total = R18 250 x 9 = R164 250 ✓MCA 9 x old mean from 3.1.2

New mean total = R20 000 x 10 = R200 000 ✓MA 10 x 20 000

Difference = R200 000 – R164 250 ✓MCA subtracting correct values

= R35 750 ✓CA award CA only if mean from 3.1.2 used

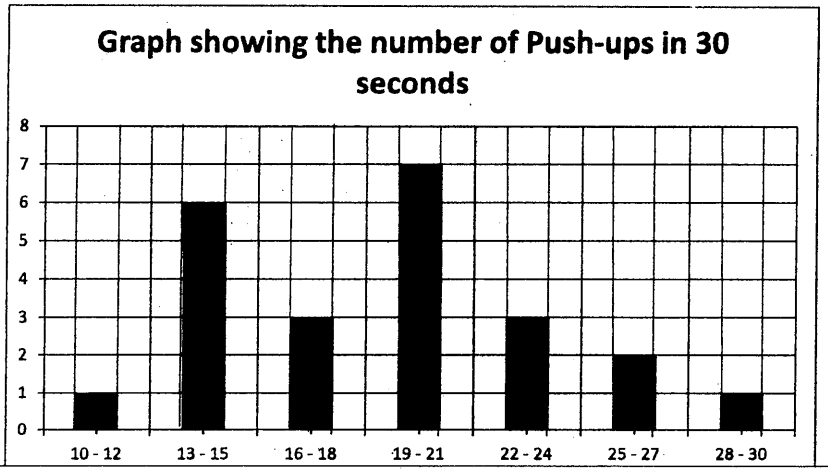
The cost of the new school is R35 750

(4) L4

3.1.6 $P(\leq R40\,000) = \frac{9}{15}$ ✓A × 100

= 60%✓A

(2) L3

3.2.1	**Bar graph – 1 mark; 7 correct bars – 4 marks; 5/6 correct bars – 3 marks; 3/4 bars correct – 2 marks; 1/2 bars correct – 1 mark; 0 bars correct – 0 marks.**  	(5)	L3
3.2.2	No. ✓O The exact mean, median and mode cannot be found. Only an estimated mean, median and mode can be calculated. The frequency indicates class intervals and not actual values. ✓✓J	(3)	L4
32.3	$P(>21) = \frac{6\ \checkmark A}{23\ \checkmark A}$	(2)	L2
3.2.4	$P(\text{modal class}) = \frac{7\ \checkmark A}{23\ \checkmark A} \times 100$ $= 30.4347$ $= 30.43\%$ ✓A NPR	(3)	L3
		[30]	

QUESTION 4

4.1	26mm = 300km ✓A correct scale used (accept 25mm = 300 km) 45mm ✓ A = x accept 42mm – 46 mm $x = \frac{300 \times 45}{26}$ ✓ MA $= 519{,}23\ km$ ✓ CA (484.62 ; 496.15 ; 507.69 ; 530.77 ;504 ; 516 ; 528 ; 540 ; 552)	(4)	L3
4.2	26 mm = 300 km or 25 mm = 300 km 26 : 300 000 000 ✓ C 25 : 300 000 000 ✓ C 1 : 11 538 461.5 ✓A 1 : 12 000 000 ✓✓A 1 : 11 500 000 ✓ R	(3)	L3
4.3	8.2 ℓ = 100 km xℓ = 77.8 $x\ell = \frac{8.2 \times 77.8\ \checkmark MA}{100\ \checkmark MA}$ 1MA multi by 8.2 ; 1MA divide by 100 $= 6.3769 \times R15.28$ ✓ M 1M multiply fuel by R15.28 = R97.48 ✓ CA	(4)	L2
4.4	Speed $= \frac{6\ km}{0.075\ h\ \checkmark C}$ ✓ SF $= 80$ km/h✓ A His claim is CORRECT because he was within the speed limit. ✓ J	(4)	L4
		[15]	