education

Department:
Education
PROVINCE OF KWAZULU-NATAL

NATIONAL
SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P2

MARKING GUIDELINE

PREPARATORY EXAMINATION
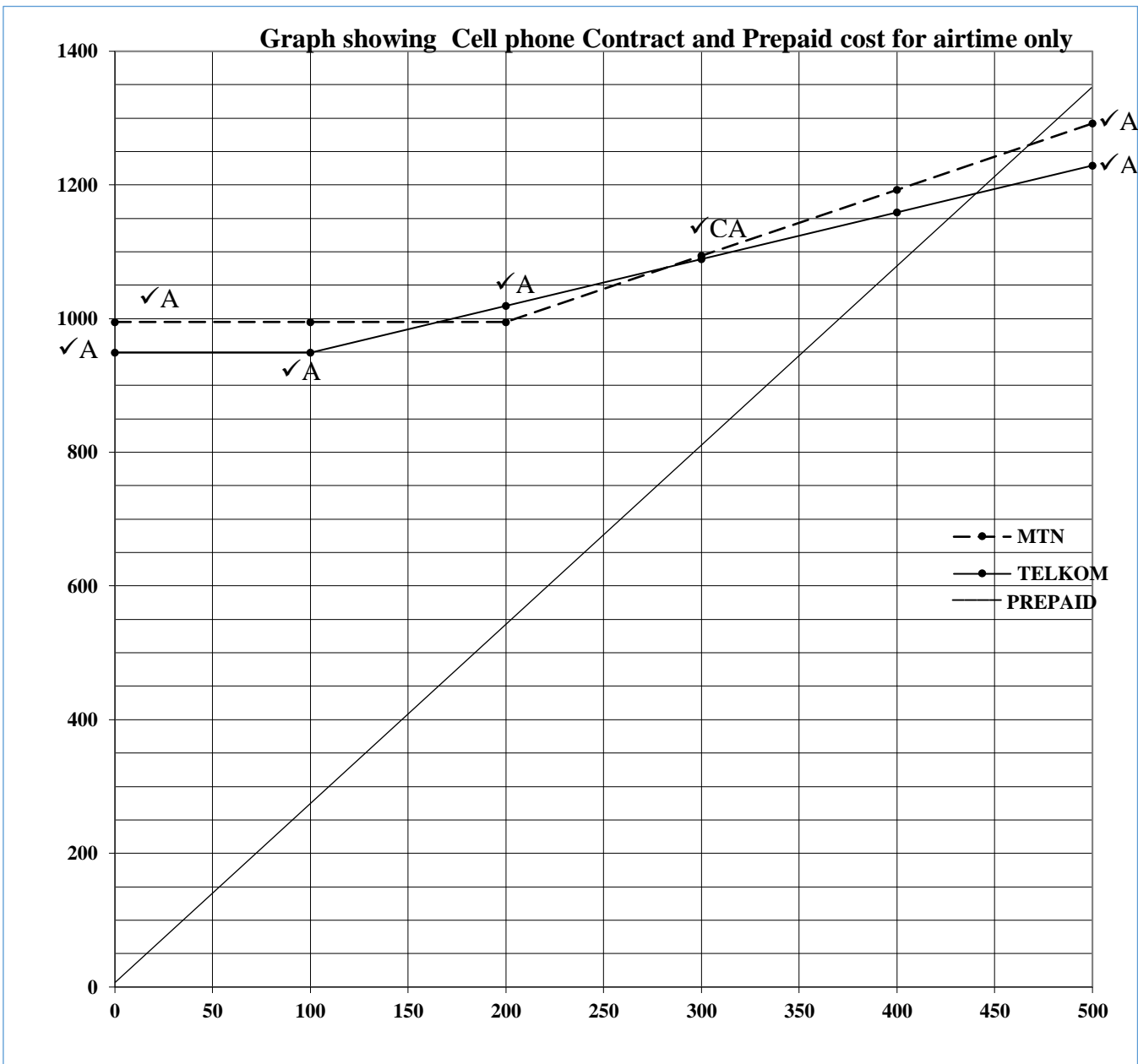
SEPTEMBER 2019

MARKS: 150

SYMBOL	EXPLANATION
M	Method
MA	Method with accuracy
CA	Consistent accuracy
A	Accuracy
C	Conversion
S	Simplification
RT/RG/RD/RM	Reading from a table/ graph/ diagram/Map
SF	Correct substitution in a formula
O	Opinion/ reason/deduction/example/Explanation
J	Justification
R	Rounding off
F	deriving a formula
AO	Answer only full marks
P	Penalty e.g. for units, incorrect rounding off etc.
NPR	No penalty for rounding / units

This marking guideline consists of 14 pages.

QUESTION 1 [42 MARKS]

Quest.	Solution	Explanation	T & L
1.1.1	Annual Taxable income = R 45 995 × 12 ✓MA = R551 940 ✓A	1MA multiplying by 12 1A annual taxable income **AO** (2)	F L2
1.1.2	✓A Monthly tax = 100 263 + 0,36(551 940 – 423 300) ✓SF =146 573,40 ✓CA =146 573,40 – (14 067 + 7 713) ✓MA =124 793,40 = 124 793,40 ÷ 12 ✓MA = R10 399,45 ✓CA	1A correct tax bracket 1SF amount above 1CA answer 1MA subtracting 2 rebates 1MA dividing by 12 1CA monthly tax (6)	F L3
1.1.3	National Treasury pays for; Social grants ✓✓O **OR** Health ✓✓O **OR** Defense ✓✓O **OR** Infrastructure ✓✓O **OR** **Any valid answer.**	2O explanation (2)	F L4
1.2.1	Cell C % increase = $\frac{1,98-0,21✓RT}{0,21} \times 100\%$ = 842,86% ✓A Telkom % increase = $\frac{2,10-0,13}{0,13}$✓RT $\times 100\%$ = 1 515,38% ✓CA Telkom has the biggest % price increase. ✓CA	1RT reading from the table 1A correct increase 1RT reading from the table 1CA correct increase 1CA conclusion (5)	F L4
1.2.2	Lower data rates compared to cellular call rates ✓✓O **OR** **Any valid answer**	2O explanation (2)	F L4

Quest.	Solution	Explanation		T &L
1.2.3	Telkom cost per minute = R2,10 ÷ 3 ✓MA = R0,70 Telkom airtime cost = R0,70 × (400 min – 100 min) ✓MA = R210 Telkom Data cost = R99 × (3GB – 1GB) ✓MA = R198 Total Cost for Telkom Contract = R949 + 210 + R198✓M = R1 357 ✓CA Vodacom cost per minute = R3,69 ÷ 3 ✓M = R1,23 Vodacom airtime cost = R1,23 × (400 min – 100 min) ✓MA = R369 Total Cost for Vodacom Contract = R875 + R369 + R149 = R1 393 ✓CA The claim is valid.✓O **OR** 400 – 100 = 300 minutes 300 ÷ 3-minute call = 100 minutes Telkom airtime cost = R2,10 × (100 min) ✓MA = R210 Telkom Data cost = R99 × (3GB – 1 GB) ✓MA = R198 Total Cost for Telkom Contract = R949 + 210 + R198 ✓M = R1 357 ✓CA Vodacom airtime cost = R3,69 × (100 min) ✓MA = R369 Vodacom data cost = R149 × (3 GB– 2 GB) ✓MA = R149 Total Cost for Vodacom Contract = R875 + R369 + R149 ✓M = R1 393 ✓CA The claim is valid.✓O	1MA dividing by 3 1MA subtracting 100 free minutes 1MA subtracting 1 free gigabyte 1M adding values 1CA total cost for Telkom 1M dividing by 3 1MA subtracting 100 free minutes 1CA total cost for Vodacom 1O explanation **OR** 1MA multiplying by 100 minutes 1MA subtracting 1 free gigabyte 1M adding values 1CA total cost for Telkom 1MA multiplying by 100 1MA subtracting 2 free gigabyte 1M adding values 1CA total cost for Vodacom 1O explanation (9)		F L4

1.2.4

Graph showing Cell phone Contract and Prepaid cost for airtime only

F

L3

1A   Telkom R949 ✓

1A   MTN R995 ✓

1A   (0 minutes – ✓ 100 minutes)

1A   (0 minutes - ✓ 200 minutes)

1A   Telkom 500 minutes =R1 229 ✓

1A   MTN 500 minutes = R1 292 ✓

1CA   Joining points of increasing straight line graphs ✓   (7)

Quest.	Solution	Explanation		T &L
1.3.1	50% of 17-year-old girls with Downs Syndrome weigh more than other 17-year-old girls with Downs Syndrome ✓✓J **OR** 50% of 17 year old girl with Downs Syndrome weigh less than other 17 year old girls with Downs Syndrome ✓✓J **OR** A 17 year old girl with Downs Syndrome has a median age to weight ratio compared to other 17 year old girls with Downs Syndrome ✓✓J	2J	justification (2)	DH L4

1.3.2	Weight in pounds: 71 kg ÷ 0,454 ✓C
	
	                = 156,39 pounds ✓A
	
	                = 95th percentile curve ✓RG
	
	                = 18 years old ✓RG
	
	 Claim is incorrect ✓CA
	
	 OR
	
	 17-year-old on 75th percentile
	          ✓✓RG
	 Weight in kg: 125 – 130 pounds × 0,454 ✓C
	              = 56 – 59,02 kg ✓A
	
	 Claim is incorrect ✓CA
		1C conversion
		
		 1A weight in pounds
		
		 IRG 95th percentile curve
		
		 RG 18 years
		
		 1CA conclusion
		
		 OR
		
		 2RG reading 125 – 130 pounds
		 1C conversion
		 1A weight in kg's
		
		 1CA conclusion
		
		(5)
				DH L4

1.3.3	Boys with Downs Syndrome have a different growth rate compared to girls with Downs Syndrome. ✓✓O	2O	explanation (2)	DH L4
			[42]	

QUESTION 2 [34 MARKS]

Quest.	Solution	Explanation	T & L
2.1.1	✓MA ✓MA ✓MA Total number of hay bales = $(9 \times 2) + (21 \times 2)$ = 60 hay bales✓CA **OR** ✓MA ✓MA ✓MA Total number of hay bales = $(3 \times 3) + (7 \times 3) \times 2$ = 60 hay bales✓CA **OR** ✓MA ✓MA✓MA Total number of hay bales = $10 \times 3 \times 2$ = 60 hay bales ✓CA	2MA multiplying 1MA adding 1CA number of hay bales **OR** 2MA multiplying 1MA adding 1CA number of hay bales **OR** 3MA multiplying 1CA number of hay bales (4)	M L2
2.1.2	Length of trailer excluding the gap in feet $= 3$ feet $\times 10$ ✓MA = 30 feet ✓C Length of trailer in metres = $(30 \text{ feet} \times 0,3048) + 1$ m ✓M = 10,144 m ✓CA Height of trailer in feet = 4 feet $\times 3$ ✓MA = 12 feet Height of trailer in metres = 12 feet $\times 0,3048$ ✓C = 3,658m ✓CA	1MA multiplying by 10 1C conversion 1M adding 1 metre 1 CA answer **NPR** 1MA multiplying by 3 1C conversion 1CA answer **NPR** (7)	M L3
2.1.3	Diameter = $(3 \text{ feet} \times 0,3048)$ ✓C = 0,9144m ✓A Height = $(4 \text{ feet} \times 0,3048)$ = 1,2192 m✓A Radius=0,9144m÷2 ✓M =0,4572m ✓SF Volume of a cylinder = $(3,142 \times (0,4572)^2 \times 1,2192)$ $\times 60$ ✓M = $48,044m^3$ Claim is correct ✓CA **OR**	1C conversion 1A answer in metres 1A height in metres 1M dividing diameter by 2 1SF substitution 1M multiplying by value from 2.1.1 1CA **NPR** (7)	M L3

Radius	=	3 feet ÷ 2 ✓M		1M dividing diameter by 2
	=	1,5 feet ✓A		1A radius
Radius in metres	=	1,5 x 0,3048 ✓C		1C conversion
	=	0,4572 m✓A		1A answer in metres
		✓SF		1SF substitution
Volume of a cylinder = $(3{,}142 \times (0{,}4572)^2 \times 1{,}2192)$				1M multiplying by value
$\times 60$ ✓M				from 2.1.1
= $48{,}044 \text{m}^3$				1CA
Claim is correct ✓CA				**NPR**

Quest.	Solution	Explanation		T &L

2.1.4	**Service provider A:**
	
	Cost = $27{,}68 + (6{,}95 \times 356 \text{ km})$ ✓SF
	
	    = AUD 2 501,88
	
	    = $2\,501{,}88 \times 9{,}9333$ ✓C
	
	    = R24 851,92 ✓A
	
	Service provider B:
	
	Cost = $17{,}62 + (356 \text{ km} - 50 \text{ km}) \times 12{,}08$ ✓SF
	
	    = AUD 3 714,10
	
	    = $3\,714{,}10 \times 9{,}9333$ ✓C
	
	    = R36 893,27 ✓CA
	
	Option A is cheaper ✓O
		1SF substitution
		
		1C conversion
		
		1A cost in rands
		
		1SF subtracting 50 km
		
		1C conversion
		
		1CA cost in rands
		
		1O opinion
			(7)	F
				L3

2.2.1	Bars to the left show a decrease in the price of the item. ✓ ✓O Bars to the right show an increase in the price of the item. ✓O	3E explanation	(3)	DH L4
2.2.2	✓RG Range = $9{,}1\% - (-5{,}3\%)$ ✓M = 14,4% ✓CA	1RG reading correct values 1M concept of range 1CA range	(3)	DH L2

2.2.3	Change in price of bread in 2018 = $R10{,}49 \times 3{,}1\%$ ✓MA
	
	                  = 0,33 cents
	
	                  = $R10{,}49 - 0{,}33$ ✓MA
	
	                  = R10,16 ✓A
	
	OR
	
	Change in price of bread in 2018 = 100% - 3,1% ✓MA
	                = 96,9%
	                = $R10{,}49 \times 0{,}969$ ✓MA
	                = R10,16 ✓A
		1MA multiplying by 3,1%
		
		1MA subtracting
		
		1A price of bread
		
		OR
		
		1MA subtracting 3,1%
		
		1MA multiplying by 0,969
		1A price of bread
			(3)	F
				L2

			[34]	

QUESTION 3　[30 MARKS]

Quest.	Solution	Explanation	T & L
3.1.1	North West / NW ✓✓RM	2RM reading from the map　(2)	MP L2
3.1.2	Travel from Malelane gate; Drive past Pretoriuskop ✓RM Turn left at Skukuza✓RM Pass Paul Kruger gate, Phabeni gate is at the end of the road✓RM	1RM　correct direction 1RM　correct direction 1RM　correct direction　(3)	MP L2
3.1.3	Time $= \dfrac{127 \text{ km}}{25 \text{ km/h}}$ ✓MA $= 5{,}08$ hours ✓A $= 0{,}08 \times 60$ ✓C $= 4{,}8$ minutes $= 5$ hours 5 minutes ✓R	1MA　dividing by 25 1A　correct time 1C　multiplying by 60 1R　rounding time　(4)	MP L3

Quest.	Solution	Explanation	T &L
3.1.4	19mm : 30km ✓A $\underset{19mm \quad 19mm}{\underline{19mm} : \underline{30\ 000\ 000mm}}$ ✓C ✓M 1 : 1 578 947 ✓CA✓R **OR** 38mm : 60km ✓A ✓C $\dfrac{38mm}{38mm} : \dfrac{60\ 000\ 000mm}{38mm}$ ✓M 1 : 1 578 947 ✓CA✓R **OR** 57mm : 90km ✓A ✓C $\dfrac{57mm}{57mm} : \dfrac{90\ 000\ 000mm}{57mm}$ ✓M 1 : 1 578 947 ✓CA✓R	1A measuring **Accept: 18 mm to 20 mm** 1C converting to mm 1M dividing by 19mm 1CA scale 1R rounded answer **OR** 1A Measuring **Accept: 37 mm to 39 mm** 1C converting to mm 1M dividing by 38mm 1CA scale 1R rounded answer **OR** 1A Measuring **Accept: 56 mm to 58 mm** 1C converting to mm 1M dividing by 57mm 1CA scale 1R rounded answer (5)	MP L3
3.1.5	Crocodile Bridge to Satara 1 : 1 578 947 60: actual distance ✓A Actual distance = 60 × 1 578 947 ✓M = 94 736 820 mm ✓CA = 94,74 km ✓CA **OR** Actual distance = 38 mm : 60 km ✓A 60 mm : ? km $= \dfrac{60 \times 60}{38}$ ✓M = 94,74 km ✓CA	**CA from 3.1.4** 1A for measuring **Accept: 59 mm - 61 mm** 1M multiply by scale 1CA mm 1CA actual distance **OR** 1A for measuring 2M multiplication and division 1CA actual distance (4)	MP L3

3.1.6	Distance measured as a straight line ✓✓O **OR** Distances in the chart are estimates ✓✓O **OR** The distance calculated using the scale is a straight line distance. ✓✓O	2O	Explanation	(2)	MP L4

Quest.	Solution	Explanation	T &L
3.2.1	✓M ✓MA Accommodation = 3 × (2490 + 430 + 215) = R9 405 ✓ MA Conservation fee = 3 days (R93 × 5 adults) + 3 days(R47) Total cost = R 10 941 ✓CA	1M multiplying by 3 1MA adding values 1MA multiplying by 3 1CA total cost (4)	F L2
3.2.2	Total distance = (725 km + 127 km) × 2 ✓ M = 1704 km ✓A Number of litres = (1704 × 8) ÷ 100✓ C = 136,32 ✓CA Cost of trip = 136,32 × R16,79 ✓M = R2 288,81 ✓CA	1M multiplying 852 km by 2 1A distance of 1704km 1 C conversion 1CA number of litres 1M correct rate 1CA cost of trip **Accept R1 947,64** (6)	F L3
3.3	P (temperature less than 15^0C) $= \dfrac{5}{12}$ ✓A ✓A = 0,42 ✓CA	1A numerator 1A denominator 1CA decimal probability answer (3)	P L2
		[33]	

QUESTION 4   [40] MARKS]

Quest.	Solution	Explanation	T & L
4.1.1	$A = 105 - (15 + 1 + 38 + 11 + 3 + 3 + 3 + 31)$ ✓MA $A = 0$ ✓CA **OR** $A = 1\ 227\ 482 - (10\ 050 + 858\ 039 + 70\ 167 + 26\ 513 + 12 + 262\ 701)$ ✓MA $A = 0$ ✓CA $B = 2\ 796\ 423 + 1\ 011\ 606 + 2\ 658\ 574 + 3\ 938\ 973 +$ $2\ 513\ 686 + 1\ 492\ 397 + 1\ 227\ 482 + 467\ 476 + 1\ 599\ 995$ ✓MA $B = 17\ 706\ 612$ ✓CA **OR** $B = 149\ 745 + 12\ 440\ 728 + 1\ 058\ 263 + 345\ 560 + 190\ 478$ $+3\ 521\ 733 + 105$✓MA $B = 17\ 706\ 612$ ✓CA	1MA subtracting correct values 1CA value of A 1MA adding correct values 1CA value of A 1MA adding correct values 1CA value of B 1MA adding correct values 1CA value of B (4)	DH L2
4.1.2	Old age grant $= \dfrac{\overset{✓RT}{3\ 521\ 733}}{17\ 706\ 612} \times 100$ ✓M $= 19{,}89\%$ ✓CA $\dfrac{19{,}89}{100}$ ✓ C $= \dfrac{1}{5}$ Statement is VALID ✓O	**CA from 4.1.1 value for B** 1RT reading from table 1M % concept CA % of old age grant 1C conversion 1O opinion (5)	DH L4
4.1.3	$3\ 521\ 733 : 1\ 058\ 263$✓✓ MA $3{,}33 : 1$ ✓A Claim is INVALID ✓O	1MA correct values 1MA correct order 1 A correct answer 1O opinion (4)	P L3
4.1.4	P(Child support grant in Gauteng) $= \dfrac{1\ 862\ 846}{17\ 706\ 612}^{\,✓A}_{\,✓CA} \times 100$ ✓MA $= 10{,}52\%$ ✓CA	**CA from 4.1.1** 1A numerator 1 CA denominator 1 MA % concept 1CA probability (4)	P L2

Question	Solution	Explanation		T &L
4.1.5	Median province: 467 476, 1 011606,1 227 482, 1 492 397, 1 599 995, 2 513 686, 2 658 574, 2 796 423, 3 938 973 ✓A Western Cape 1 599 995 ✓A	1A arranging 1A median	(2)	DH L2
4.1.6	No ✓A the median does not take into consideration all the data values ✓✓O	1A No 1O reason	(3)	DH L4
4.1.7	$\checkmark$RT KZN disability payout $= 232\ 674 \times R1\ 695$ ✓MA $= R394\ 382\ 430$ ✓A % of the total budget $= \frac{394\ 382\ 430}{22\ 100\ 000\ 000} \times 100$✓M $\checkmark$MA $= 1,78\%$ This claim is TRUE. ✓O OR $\checkmark$RT KZN disability payout $= 232\ 674 \times R1\ 695$ ✓MA $= R394\ 382\ 430$ ✓A % of the total budget $= \frac{0,394\ 382\ 43\ bn}{22,1\ bn} \times 100$✓M $\checkmark$MA $= 1,78\%$ This claim is TRUE ✓O	1RT correct value 1MA multiplying by R1 695 1A correct answer 1MA dividing by 22,1 billion 1M multiplying by 100 1O opinion OR 1RT correct value 1MA multiplying by R1 695 1A correct answer 1MA dividing by 22,1 billion 1M multiplying by 100 1O opinion	(6)	DH L4

Please Turn Over

4.2.1	Total length of the lines
	
	      ✓MA ✓M
	$= 2(2400 + 1200) + 2(4800 + 1200) + 4800 + 2400$
	
	$= 26\ 400$ mm ✓A
	
	$= 26\ 400 \div 1000$ ✓C
	
	$= 26,4$ m ✓CA
		1MA adding correct values
		1M adding values
		1A correct answer
		
		1C dividing by 1000
		
		1CA answer in metres
		
		                 (5)
			M
			L2

4.2.2	✓C
	
	$70 \div 1000 = 0,07$m ✓A
	
	Area $= 26,4$m $\times 0,07$m ✓MA
	
	      $=1,848$ m² ✓CA
		CA from 4.2.1
		1C dividing by 1000
		1A answer
		1M multiplying by 0,07
		1CA total area
		
		                 (4)
			M
			L2

4.2.3	Litres of paint $= 1,848 \div 0,5$ ✓C
	
	           $= 3,70$ litres
	
	Cost of paint $= 4$ litres $\times$R195,99 ✓M
	
	           $=$ R783,96 ✓CA
		CA from 4.2.2
		
		1M dividing by 0,5
		
		1M multiplying
		
		1CA cost of paint
		                 (3)
			F
			L3

		[40]	

TOTAL: 150