GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PREPARATORY EXAMINATION

2017

MARKING GUIDELINES

MATHEMATICAL LITERACY P2 (10602)

14 pages

GAUTENG DEPARTMENT OF EDUCATION

PREPARATORY EXAMINATION

MATHEMATICAL LITERACY
(Second Paper)

MEMORANDUM

MARKING RUBRIC

Codes	Explanation
M	Method
MA	Method with Accuracy
CA	Consistent Accuracy
A	Accuracy
C	Conversion
D	Define
J	Justification/Reason/Explain
S	Simplification
RD	Reading from a table OR a graph OR a diagram OR a map OR a plan
F	Choosing the correct formula
SF	Substitution in a formula
O	Opinion
P	Penalty, e.g. for no units, incorrect rounding-off, etc.
R	Rounding-off
NP	No penalty for rounding OR omitting units

KEY TO TOPIC SYMBOL:

F = Finance; M = Measurement; MP = Maps, Plans and other representations; DH = Data Handling; P = Probability

QUESTION 1

Q	ANSWER	EXPLANATION	LEVEL
1.1			
1.1.1	**Pension fund = 7,5% of basic salary** ✓*M* $=\frac{7,5}{100} \times R26\ 309,58$ A = R1 973,22 ✓*A* **Total Deductions:** B =R1 973,22 +R4 561,97 +R3 222,00 + R86,91 +R70,00 + R6,06 ✓*M* =R9 920,16✓*CA* **Nett Salary:** C=R53 819,16 – R9920.16 ✓*M* =R43 899,00 ✓ *CA*	1M Multiply by 7,5% 1A R1 973 1M Addition 1CA Answer 1M Subtracting 1CA Answer (6)	 F2 F3 F3
1.1.2	The R61 296 is derived from the maximum amount of the second tax rate. R33 840 +26 % (R293 600✓*SF* - R188 000) ✓*A* *R3 3840+274,56*✓*S* = R61 296	 1A Correct tax bracket 1SF substituting the value of 293 600 1S simplifying 274.56 (3)	 F3

Q	ANSWER	EXPLANATION	LEVEL
1.1.3	**Annual income** **=** (R26 309,58 x 13) + (R1 200 x 12) = R356 424,54 ✓A **Taxable income = Annual tax – Annual Pension Fund contribution** = R356 424,54 – (R1 973,22 x 12) = R332 745,90 ✓A **Annual tax before rebates** ✓RT R61 296 + 31% of income above R293 600 = R61 296 + 31% x (R332 745,90– R293 600)✓SF = R61 296 + (31% x R39 145,90) = R61 296 + R12 135,23 = R73 431,23 ✓A **Tax rebate** R73 431,23 – R13 500 ✓M = R59 931,23 **Medical tax credits** [(286 x 2) + (192 x 3)] x 12 ✓M = (R572,00 + R576) x 12 = R1 148 x 12 = R13 776 ✓CA **Total Annual Tax payable** = R59 931,23 – R13 776 = R46 155,23 ✓CA **Monthly Tax payable** $= \frac{R46\,155,23}{12}$ = R3 846,27 ✓CA Mr. Bush's statement is incorrect. He was under-taxed by R715, 70. ✓J	1A Annual income 1A Taxable income 1RT Correct tax bracket 1SF substituting R332 745,90 1A Answer 1M Subtract rebate 1M Correct values x 12 1CA Answer 1CA Answer 1CA Answer 1J Justification (11)	F4

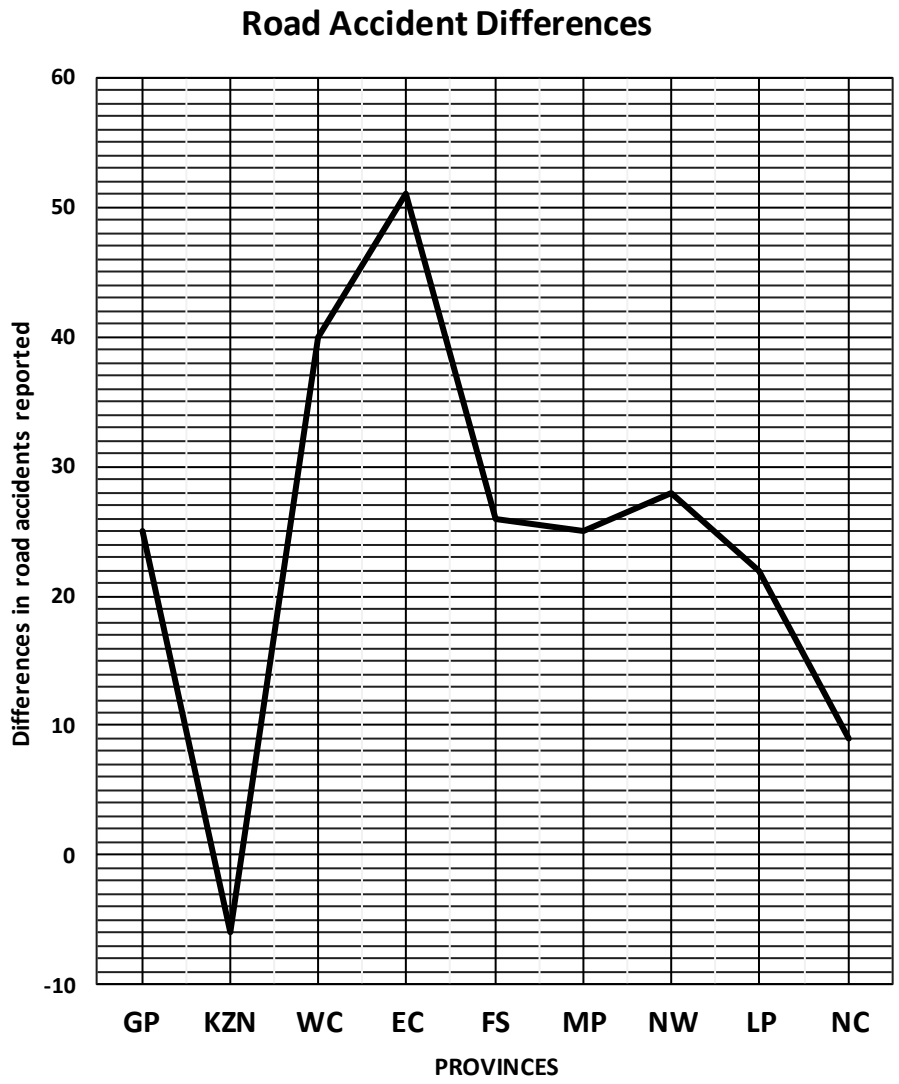
Q	ANSWER	EXPLANATION	LEVEL
1.2.			
1.2.1	23,4 kg/m^2 ✓✓RT	2RT Read from graph (2)	M2
1.2.2 (a)	Weight = 96 kg ✓C BMI = $\frac{96\ kg}{(1{,}74\ m)^2}$ ✓✓SF BMI = 31,71 kg/m^2 ✓A She falls above the 95th percentile which means she is overweight. ✓RT	1C Convert to kg 2SF Substitute 1A Answer 1RT Read from graph (5)	M3
(b)	Go on a diet. ✓✓O Eat healthily. Do regular exercise.	2O Any valid advice (2)	M4
1.3	Radius of big circle = 8 cm ✓A Area of the big circle = 2πrh +πr^2 = (2 x 3,142 x 8 cm x 10 cm) ✓ + (3,142 x (8 cm)^2) ✓F = 703,808cm^2 ✓A Area of the small circle = πr^2 = 3,142 x (3 cm)^2 ✓ = 28,278 cm^2 ✓A Total area covered : = 703.808 cm^2 – 28,278 cm^2 ✓M = 675,53 cm^2 ✓A	1A Calculate radius 2SF Substitute 1A Answer big circle 1SF Substitute 1A Answer small circle 1M Subtract 1A Answer (8)	M3
			[37]

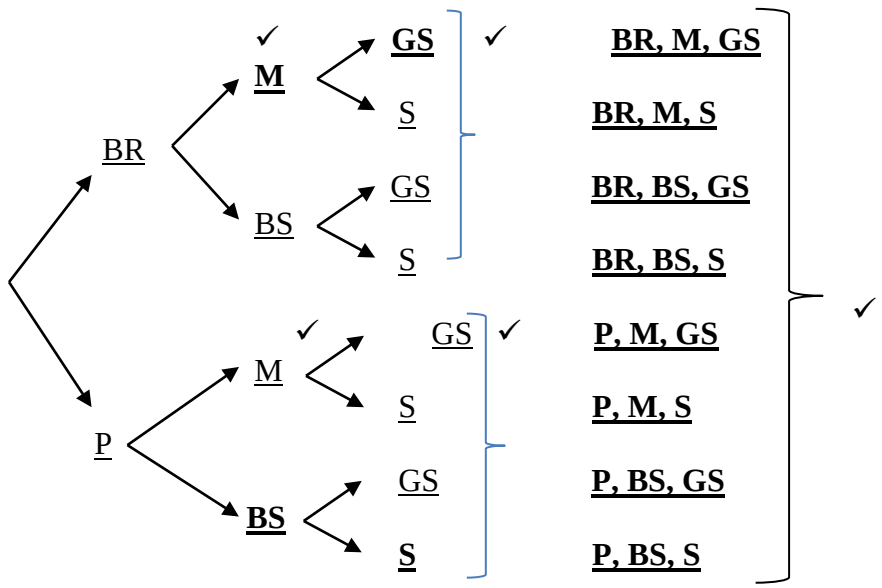
Q	ANSWER	EXPLANATION	LEVEL
2.1	**Brighton Beach:** = R1 200 x 4✓MA = <u>R4 800</u> ✓A **Bentley Lodge** = (R1 400 x 4) + (R60 x 2 x 4) ✓M = R5 600 + R480 = R6 080✓CA Discount: R5 600 x 15% = R840✓ Thus, R5 600 – R840 = R4 760✓ **OR** R5 600 x 85%✓ = R4 760 + R480 = R5 240 ✓CA **Camarque** = R1 800 x 4 = R7 200 ✓A Discount: R7 200 x 35% = R2 520 Thus, R7 200 – R2 520 = R4 680 **OR** R7 200 x 65% = R4 680 ✓CA Her claim is invalid. Camarque is cheaper. ✓O	1MA multiplying correct values 1A R4 800 1M Adding breakfast, multiply by 3 1CA Answer 1A R840 1CA answer OR 1A for multiplying by 85% 1CA answer 1A Answer 1CA for discounted price 1O Opinion (9)	F4

Q	ANSWER	EXPLANATION	LEVEL
2.2			
2.2.1 (a)	N2 ✓A N11 ✓A N3	2A National roads (2)	MP2
(b)	Less time spent on the road ✓✓O Save fuel ✓✓O Less obstructions	4O Any 2 valid opinions (4)	MP4
2.2.2	**Scale:** 2 cm : 300 km ✓M 2 cm : 30 000 000 cm 1 : 15 000 000 ✓M **Distance on map:** 4,5 cm ✓M 1 : 15 000 000 4,5 cm : 67 500 000 cm ✓M = 675 km ✓CA	1RG Scale on map 1M Number scale 1M Measure on map 1M Multiply by scale 1CA Answer **Measure on final copy** Accept answers in the range of 2 cm to 2,3 cm And 4,4 cm – 4,7 cm (5)	MP3
2.3			
2.3.1	**Distance:** $\frac{560\ 000}{1\ 000}$ = 560 km ✓C **Full tanks:** $\frac{886\ km}{560\ km}$ =1,582 tanks **For return trip** = 1,582 tanks x 2✓CA =3,164 tanks They will need more than 3 tanks. ✓✓O	1C Conversion 1CA from Q2.1.2 2O Opinion (4)	MP4

Q	ANSWER	EXPLANATION	LEVEL
2.3.2	**Toll gates:** R42 + R58 + R62 + R44 + R10+ R10 + R12+ R41,50 = R279,50 (one way) ✓A R279,50 x 2 = R559,00 (return trip) ✓A **Petrol – return trip will need 4 full tanks** 4 tanks x 62 litres = 248 litres ✓M 248 litres x R12,60 ✓M = R3 124,80 ✓CA **Total Cost = Tollgates + Petrol** = R559 + R3 124,80 = R3 683,80 ✓CA	1A Calculate toll fees 1A Tollgates return trip 1M Multiply by 62 1M Multiply by R12,62 1CA Answer 1CA Total (6)	F3
2.3.3	**Fuel Cost :** R3 683,80 x 1,39% ✓M = R51,20✓A R3 683,80 + R51,20 = R3 735,00✓CA **OR** R3 683,80 x 101,39% ✓✓M = R3 735,00✓CA His prediction is invalid. ✓O	1M Multiply by 1,39% 1A Answer 1CA Answer 1O Opinion (4)	F4
			[34]

Q	ANSWER	EXPLANATION	LEVEL
3..1			
3.1.1	1 535 – 1 487 ✓ M A = 48 ✓A **OR** A = 57-9✓M = 48✓A	1M 308 1A Answer (2)	D2
3.1.2	B = 308 + (-6) ✓M = 302✓A	1M Addition 1A Answer (2)	D2
3.1.3	C = 271 + 302 + 162 + 278 + 157 + 184 + 136 + 20 ✓ M = 1 755 ✓A **OR** 1 535 + 220✓M = 1 755✓A	1M Addition 1A Answer (2)	D2
3.1.4	Mean = $\frac{246+308+122+227+131+159+108+186+48}{9}$✓✓ =170,56✓	1SF Correct values 1M Multiply by 100 1A Answer (3)	D2
3.1.5	57, 136, 157, 162, <u>184</u>, 208, 271, 278, 302✓ Median = 184✓A Quartile 1 = $\frac{136+157}{2}$ = 146,5 ✓A Quartile 2 = $\frac{271+278}{2}$ = 274,5 ✓A IQR = Q3 – Q1 = 274,5 – 146,5 ✓SF = 128	1M arranging data 1A Median 1A Calculate Q1 1A Calculate Q3 1SF Substitute (5)	D3

Q	ANSWER	EXPLANA-TION	LEVEL
3.1.6	-6, 9, 22, 25, 25, 26, 28, 40, 51 ✓M Median = 25 ✓A	1M Arrange in ascending/ descending order 1A Answer (2)	D2
3.1.7	Likely **OR** good probability ✓A Most of the accidents increased from 2015/16 to 2016/17. ✓ J	1A Answer 1J Reason (2)	P4
3.1.8	 5M Any 5 correct plots 1M joining the dots (6)		D2

Q	ANSWER	EXPLANATION	LEVEL
3.2	1 : 3 000 000 5,4 x 3 000 000 ✓M = 16 200 000 cm ✓A 5,4 cm : $\frac{16\ 200\ 000\ cm}{100\ 000}$ = 162 km ✓CA **Time:** 17:30 to 19:22 = 1 hour 52 minutes ✓A 1 h 52 min = 1,87 hours ✓C **Average Speed =** $\frac{162\ km}{1.87\ hr}$ ✓M = 86,63 km/h ✓A The average speed was not 90 km/h. ✓O **OR** If rounded-off, the average speed was 90 km/h.	1M Multiply by scale 1A Answer 1CA Answer 1A Calculate time 1C Conversion 1M Division 1A Answer 1O Opinion (8)	MP4
3.3			
3.3.1	 Outcomes: **BR, M, GS** **BR, M, S** **BR, BS, GS** **BR, BS, S** **P, M, GS** **P, M, S** **P, BS, GS** **P, BS, S** 2A Branch 2 : M and BS 2A Branch 3 : GS and S 1A All correct outcomes (5)	P2
3.3.2	$P_{mutton} = \frac{4}{8} = \frac{1}{2}$ ✓M = 50% ✓A	1M Fraction 1A Answer (2)	P3

Q	ANSWER	EXPLANATION	LEVEL
3.4			
3.4.1	**Total cost = Cost per t-shirt x number of t-shirts bought + Cost for printing material x number of t-shirts bought** ✓F ✓F Cost = (R37 x n) + (R18 x n) **OR** ✓F ✓F Cost = (R37 + R18) x n **OR** ✓F ✓F Cost = R55 x n n = number of t-shirts bought	1F R37 x n 1F R18 x n **OR** 1F R37 + R18 1F x n **OR** 1F R55 1F x n (2)	F2
3.4.2	Cost = (R37 x 50) + (R18 x 50) ✓SF = R1 850 + R900 = R2 750 ✓A **OR** Cost = (R37 + R18) x 50 = R55 x 50 = R2 750	1SF Substitute 1A Answer (2)	F2
3.4.3	**Profit = Selling Price – Cost Price** = R90 – (R37 + R18) = R90 – R55 = R35 profit ✓A **Percentage profit** = $\frac{Profit}{Cost\ price} \times 100$ = $\frac{R35}{R55} \times 100$ ✓M = 63,64% **OR** 64% **OR** 63,3% ✓A	1A Calculate profit 1M Correct values 1A Answer (3)	F3
			[46]

Q	ANSWER	EXPLANATION	LEVEL
4.1			
4.1.1	Road rage: ✓A People get enraged and stop in the middle of the road. ✓✓J Road Conditions: Heavy rain and fog can cause poor visibility. Reckless driving: People don't obey the traffic rules. Speeding: People don't adhere to the speed limits. Fatigue: People are driving for long distance without resting. Drinking and driving: People drive recklessly. Cell phone usage: People lose focus as they concentrate on the cell phones.	1A Causes 2J Reasons (3)	D4
4.1.2	% of major repair cost = 100% - (81% + 1% + 14%) ✓M = 4% ✓A Cost claimed for major repairs. = 4% x R21 326 000 ✓ =R853 040 ✓	1M Adding other % 1A Answer 1M Multiplication 1CA answer (4)	D3
4.1.3	Cost of minor vehicle repair =14% x R21 326 000 ✓RG = R2 985 640 ✓A Cost for minor human casualty is R14 000 000 000✓RG Total cost= R2 985 640 + R14 000 000 000 = R14 002 985 640✓ The claim is correct. ✓J	1RG Read correct value from graph 1A Correct answer 1RG Read correct value from graph 1CA answer 1J Justification (5)	D4
4.1.4	• One car might have more than one passenger. ✓✓ • When cars are involved in fatal accidents, some dependants don't claim when their family member is deceased. • Any relevant opinion	2O (2)	D2

Q	ANSWER	EXPLANATION	LEVEL
4.2			
4.2.1	Plastic for one suitcase : 45 cm + 25 cm + 45 cm + 25 cm ✓M = 140 cm ✓A Double plastic : 140 cm x 2 ✓M = 280 cm ✓CA 2 Suitcases : 280 cm x 2 ✓M = 560 cm ✓CA $\frac{560}{100} = 5{,}6\ m$ ✓C	1M Addition 1A Answer 1M Multiply by 2 1CA Answer 1M Multiply by 2 1CA Answer 1C Conversion to m (7)	M3
4.2.2	R70 x 2 = R140 per suitcase ✓M R140 x 2 = R280 for both suitcases ✓M VAT exclusive price: $R280 \times \frac{100}{114}$ ✓M = R245,61 ✓A **OR** $R70 \times \frac{100}{114}$ ✓✓M = R61,40 ✓A R61,40 x 2 = R122,80 per suitcase ✓M R122,80 x 2 = R245,60 for both suitcases ✓M	1M Multiply by 2 1M Multiply by 2 1M Correct value for VAT exclusive 1A Answer (4)	F2
4.2.3	Volume = length x width x height ✓F = 56 cm x 25 cm x 45 cm ✓SF = 63 000 cm^3 ✓A 2 Suitcases: 63 000 cm^3 x 2 ✓M = 126 000 cm^3 ✓✓AU	1F Choose correct formula 1SF Substitute 1A Answer 1M Multiply by 1A Answer 1U Unit (6)	M3
4.2.4	Only a certain weight can go on board, or else a person needs to pay for an extra ticket. ✓✓J The plane has a weight limit. It is a safety factor. ✓✓J	2J Reason (2)	M2
			[33]
		TOTAL:	**150**