GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION

PREPARATORY EXAMINATION

2015

MEMORANDUM

SUBJECT:	MATHEMATICAL LITERACY P2 (10602)

Symbol	Explanation
M	Method
M/A	Method with accuracy
CA	Consistent accuracy
A	Accuracy
C	Conversion
S	Simplification
RT/RG/RM/RP	Read from Table / Read from graph / Read from Map / Read from Plan
SF	Substitution in formula
O	Opinion / Example / Deduction / conclusion
J	Justification
P	Penalise, for example, no units / incorrect rounding etc
R	Rounding

GAUTENG DEPARTMENT OF EDUCATION

PREPARATORY EXAMINATION

MATHEMATICAL LITERACY
(Second Paper)

MEMORANDUM

Q	Solution	Explanation	To-pic	TL
QUESTION 1			**(39 marks)**	
1.1.1	Area of roof = length ×breadth = 22 700 mm × 4 280 mm ✓**SF** = 22,7 m × 4,28m ✓**C** = 97,156 m^2 ✓**CA**	**1SF** – substitution in formula **1C –** Conversion to m / m^2; **1CA** – answer	**M** **(3)**	2
1.1.2	Volume = average rainfall x roof area x 85% = 638 × 97,156 × 85% ✓**SF** = 52 687, 6988 litre ✓**A**	**1SF** – substitution in formula **1A** – Correct answer in litre	**M** **(2)**	2
1.1.3 (a)	(a) measured scale diameter = 88 mm ✓**A**** Scale = measured diameter : actual diameter 88 mm : 1810 mm ✓**M/A** 1 : .20,568…….✓**CA** Scale is 1 : 21 ✓**R**	**1A** – correct measurement (range 87 to 89 mm) *** Use actual printed version and adjust memo accordingly* **1M/A** – use scaled diameter and actual ratio 1**CA** – follow up unit scale **1R** – rounding to nearest integer	**MP** **(4)**	3
(b)	Volume of cylinder = π × $radius^2$ × height ✓**A** 3,76 kl= 3,142 × $(1810/2mm)^2$× height ✓**SF** 3,76 m^3 = 3,142 × $(905mm)^2$ × height ✓**C** 3,76m^3 = 3,142 × $(0,905m)^2$ × height✓**C** 3,76m^3 = 2,57337655 m^2 × height 3,76m^3 ÷ 2,57337655 = height ✓ **S** height = 1,461 metres✓ **CA**	**1SF** – substitute in formula 1**A** – radius **1C** – convert kl↔ m^3 **1C** – convert mm↔m **1S** – manipulate/ simplify equation **1CA** – correct follow up answer	**M** **(6)**	3
1.2.1	25 tanks ✓✓**RG**	**2 RG**-correct answer	**D** **(2)**	2

Q	Solution	Explanation	To-pic	TL
1.2.2	40 tanks at the median position – it implies that half of the data values above and half below the 40. ✓ **RG** Concept median Number of months = 6 months ✓ ✓**A**	**1 RG – indicate knows half of values** **2A**-Correct answer	**D** **(3)**	4
1.2.3	Lowest – 25 ✓✓**RG** Highest = 30 ✓✓**RG**	2RG= Lowest value 2RG-Highest value	**D** **(4)**	4
1.2.4	Yes, B was the top salesman ✓**O** • For 6 months of the year he managed to sell from 47 to 63 tanks per month, where his nearest competitor, agent C, could only manage to sell from 43 and 52. ✓✓ **J** • In his worst 3 months he managed to sell from 25 to 30 tanks, where the other two had figures from 15 to 28 and 18 to 25. ✓✓ **J** • He recorded the highest sale when he sold 63 tanks in one month. The other two could only sell a maximum of 52 per month. ✓✓ **J**	**1O** – Agree top salesman **2J × 3** Give 2 marks for any valid reason which shows that Agent B out-performed the other. It is essential that the values of competitors/ nearest competitor should be mentioned. The quartile value markers(25%, 50% &75%) Or 3, 6, 9,12 months should be used as reference points in context.	**D** **(7)**	4
1.2.5	Agent C – Least number of tanks = 18 ✓✓**RG** Minimum commission= 18 × R713,76✓**M /A** = R12 847,68 ✓**CA**	**2RG**-lowest nr of tanks identified **1M/A**-multiply with correct amount **1CA**-follow up answer correct	**F** **(4)**	2
1.3.1	• No water available to flush toilets ✓✓ **O** **OR** • No water to wash hands✓✓ **O** • **OR** • There are many learners who need to use the toilets / wash their hands/ ✓✓ **O** **OR** Any other suitable <u>health</u> hazard	**Only 1 reason** **2O** – give valid reason	**D** **(2)**	4

Q	Solution	Explanation	To-pic	TL
1.3.2	The roofs of school buildings have large surface areas to catch/harvest/collect water, therefore tanks can still be filled from a low rainfall ✓✓ **O** **OR** Schools are built in communities which make them easy to reach ✓✓ **O**	**Only 1 reason** **2O** – give valid justification	**D** **(2)**	4
QUESTION 2			**TOTAL:49**	
2.1.1	Monthly salary = R21 650,00 **Annual salary** = R21 650x 12 ✓ **M/A** = R259 800 **Salary + Bonus** = R259 800 + R21 650 = R281 450 ✓**CA** **Pension fund contribution** = 7,5% of R259 800 ✓**M/A** = R19 485 **Taxable income =** R281 450 – R19 485✓**M** = R261 965✓**CA** OR Monthly salary = R21 650,00 **Annual salary** = 13 x R21 650x 13 ✓✓ **M/A** = R281 450 **Pension fund contribution** = 7,5% of R259 800 ✓**M/A** = R19 485 **Taxable income =** R281 450 – R19 485✓**M** = R261 965✓**CA**	**1M/A** – calculate annual salary (×12) **1CA** – bonus included **1M/A** – calculate annual pension fund amount bonus not included **1M** – subtraction from salary **1CA –** follow up answer correct **2M/A** – annual salary + bonus **1M/A** – calculate annual pension fund amount bonus not included **1M** – subtraction from salary **1CA –** follow up answer correct	**F** <

Q	Solution	Explanation	To-pic	TL
2.1.2	Medical tax credits = 2 × R257 + 2 × R172✓**1MA** = R514 + R344 ✓**M** = R858 ✓**CA** Annual tax credit = 12 x R858 ✓**M** = R10 296 ✓**CA** **OR** Medical tax credits = 2 × (R257 + R172) ✓**M/A** = 2 (R429) = R858 Annual tax credit = R858 x 12✓**M** = R10 296 ✓**CA**	**1MA –** both values correct + multiply by 2 **1M –** multiply by 12 **1CA** – follow up answer	**F** **(3)**	2
2.1.3	His age determines the amount of rebate he will receive in his tax payable. ✓✓ **J**	**2J** –link age to rebate	**F** **(2)**	4
2.1.4	**Tax before rebate** = R31 419 + 25% x (R261 965 – 174 550) ✓**A** = R 31 419 + 0,25 x (R87 415) ✓ **M/A** = R31 419 + R21 853,75 = R53 272,75✓**CA** **Tax payable after rebate** = R53 272,75– R12 726 p.a. ✓**M/A** = R40 546,75 Annual tax payable after medical tax credits = R40 546,75 – R10 296 ✓**M** = R30 250,75 ✓**CA**	**1A –** Identify correct tax bracket **1M/A** -substituting annual taxable salary in rate of tax **1CA** – tax before rebate **1M/A** deducting the correct rebate **1M –** deducting medical tax credits **1CA –** CA answer after medical credits deduction	**F** **(6)**	3
2.1.5	Annual tax = R2 069,85 ×12 + R5 412,50✓ **M** = R24 838,20 + R5 412,50✓**M/A** = R30 250,70✓**CA** Yes, the employer deducted enough tax✓**O**	**1M** – multiply monthly tax by 12 **1M/A** – add tax on bonus **1CA** – follow up annual Tax **1O** – CA opinion	**F** **(4)**	**4**
2.2.1	Fuel needed = 1530 km × $\frac{8{,}1\ litre}{100\ km}$ ✓ **M/A** = 123,93 litre Fuel cost = 123,93 × R14,24 ✓**M** = R1 764,7632 ≈ R1 764,76 ✓**CA** Yes, he budgeted enough (R1 800) ✓O	**1MA** –use correct consumption rate to determine litres **1M –** multiply litres with petrol price **1CA** – follow up answer **1O** – Opinion CA	**F** **(4)**	3

Q	Solution	Explanation	To-pic	TL
2.2.2	• A budget is a planned amount of spending. The idea is not to spend more than the planned amount. ✓✓**J** • Normally one would rather plan for a higher amount to ensure that one does not get into trouble when the actual amount is exceeded. • Emergencies can force a person to take unplanned trips	**2J –** Concept of budget	**F** **(2)**	4
2.2.3	Total km between house and workplace $= \frac{11}{18} \times 1\,512$ ✓**A** ✓**M** = 924 km Distance per return trip = 924 ÷ 14 ✓**M** = 66 km✓**C/A** Distance between house and workplace = 66 km ÷ 2 = 33 km✓**C/A**	**1A** – correct numerator and denominator **1M** – multiply by 1512 km **1M** – divide by 14 return trips **1CA** – single trip	**M** **(4)**	3
2.3.1	Range = Highest – Lowest R30 020 = R34 720 – A A = R34 720 – R28 020 ✓**M** = R6 700 ✓ **A**	**1M –** range concept **1A –** correct value for A	**D** **(2)**	2
2.3.2	$14702 = \frac{34720 + 17482 + ... + .B + 15400}{16}$ ✓**SF** ✓**M/A** $14702 = \frac{223882 + B}{16}$ ✓**S** $14702 \times 16 = 223882 + B$ $235232 - 223882 = B$ ✓ **CA** B = R11350	**1SF** – Mean value substituted on LHS **1M/A –** addition includes variable and correct denominator used **1S –** simplify /manipulate **1CA** – follow up solution correct	**D** **(4)**	3
2.3.3	Arrange terms: 6 700 8 400 9 800 10 000 11 200 11 350 12 996 13 420 13 550 14 837 15 400 16 245 17 482…17 482 21 650 34 720 ✓**M** Median = $\frac{13\,420 + 13\,550}{2}$ ✓**CA** $= \frac{26\,970}{2}$ = R13 485 ✓**CA**	**1M** – arrange **1CA** – correct values identified (CA) in median concept **1CA** – answer	**D** **(3)**	2

Q	Solution	Explanation	To-pic	TL
2.3.4	Probability = $\frac{7}{16}$ ✓**A** ✓**A** = 0,4375 ✓**CA**	**A** – correct numerator used(CA) **1A** – correct denominator **1CA** – decimal	**P** **(3)**	2
2.3.5	The median. ✓**A** The extreme values like R34 720 makes the mean higher.✓**O**✓**O**	**1A-** correct answer **2O** – Justify – refer to outliers/extreme values	**D** **(3)**	4
2.3.6	**ANY TWO SUITABLE JUSTIFICATIONS** The highest salary may be that of the manager who may be a graduate with several years' experience.✓ ✓**J** **AND/OR** Some of the lowest earners may be unskilled cleaners with no formal education.✓✓**J** **AND/OR** The higher paid workers possess special skills essential for the business.✓✓**J** **AND/OR** All other valid explanation for gaps	**2O –-** Justify the possible reasons for large gaps by referring to high or low salaries	**D** **(4)**	4
QUESTION 3			**TOTAL 32**	
3.1.1	Measurements of Eastern side = 38 feet Eastern side = 38 ft × 0,3048 m/ft ✓ **C** = 11,5824 m Southern Side = 29 feet10 inches =29 × 0,3048m/ft + 10inch x 2,54 cm/inch = 8,8392 m + 25,4 cm = 8,8392 m + 0,254m = 9,0932 m ✓ **A** Area = length × breadth = 11,5824 m × 9,0932 m ✓**SF** = 105,3210….m^2 ✓ **CA** with **P**	**1C** – method used conversion ft ↔ m **1A –** correct conversion southern side only **1SF** – substitute in formula **1CA** – follow up area **(penalty for incorrect/ no unit)**	**M** **(4)**	3

Q	Solution	Explanation	To-pic	TL
3.1.2	Current house = 100% House on plan = 100% - 37% = 63% ✓**M** Floor area of current house = 105,321m^2 × 100/63 ✓ **M** = 167,1761 m^2 ✓**CA**	**1M –**using 37% less than 100% **1M –** Use ratio / proportion which will increase floor area 1**CA –** correct follow up answer	**M** **(3)**	2
3.1.3	The master bedroom and the dining room/kitchen area. ✓ ✓ **A A** They face North, ✓**J** hence in winter the sun will fall into those rooms and heat them. ✓**J**	**1A –** master bedroom / master ste **1A –** Dining / dining&kitchen **1J –** North facing **1J** – Heat from sun	**M** **P** **(4)**	4
3.1.4	Eastern✓✓ **A** or East	**2A –** correct direction	**M** **P** **(2)**	2
3.1.5	None of the bathrooms have windows ✓**RP** The dressing rooms / rooms linked to the bathrooms✓**RP** A person will have to switch a light on when entering the room – increases electricity consumption ✓**J** **OR** In a bathroom one cannot open a window to assist to get rid of the steam **OR** Any well motivated explanation	**2RP –** Identify rooms without windows **1J –** provide a real life challenge	**M** **P** **(3)**	4
3.1.6	Bathrooms placement✓ **O** reposition the second bathroom to face an outside wall in order to put in windows✓ **J** **OR** Swop bathroom 2 with dressing room ✓ **O** to install windows in both bathrooms ✓**J** **OR** Make changes to get the entrance of both bedrooms from the family room section ✓ **O** Prefer that the main bedroom entrance should not be from kitchen – food smells ✓**J** **OR** Accept any practical layout change with motivation.	**1O** – identify a change **1J** – justify the change **If no justification no mark for identified change**	**M** **P** **(2)**	4

Q	Solution	Explanation	To-pic	TL
3.2.1 (a)	Savings =Total Scheduled payments – Total payments R1 060 452,85 – R834 320,92 ✓**RT** = R226 131,93 ✓ **CA** No, she is not correct ✓ **O** **OR** Savings = Total interest (scheduled) – Actual interest =560 452,85 - R334 320,92 ✓ **RT** R226 131,93 ✓ **CA** No, she is not correct. ✓ **O**	**1RT –** Read values from table **1CA -** follow up difference **1O –** CA conclusion OR **1RT –** Read correct values from table **1CA –** follow up difference **1O –** CA conclusion	**F** **(3)**	4
3.2.1 (b)	154 months ÷ 12 months per year ✓ **M** = 12 years and 10 months (12 full years end Dec 2027) extra 10 months Year = 2016 + 12 = 2028 Start in January on the first hence 10 full months to pay in 2028 He will finish in October ✓**A** 2028. ✓**A**	**1M** – divide by 12 **1A** – correct year (CA) **1A** – correct month	**M** **(3)**	3
3.2.2 (a)	When values in the graph B/second graph is read off, it is clear that in graph A /the first graph, the shorter bar hides a section of the longer bar. ✓✓**J** The interest paid in the first year is approximately R43 000 (accept R42 000 to R44 000) ✓ ✓**RG**	**2J –** explain shorter graph on top of longer one in the stacked graph **2RG –** approximate value read from the graph	**F** **(4)**	4
3.2.2 (b)	5 years ✓ ✓**RG**	**2RG –** correct answer	**F** **(2)**	2
3.2.2 (c)	Graph B/second graph ✓**O** the length of the interest bar is clearly shorter in year 6 ✓**J** **OR** Graph A / first graph✓**O** The change in the colour of the shorter bar in year 6 makes it obvious ✓**J**	**1O** – identify graph **1J** – supply a reason which is suitable for the specific graph	**F** **(2)**	4

Q	Solution	Explanation	To-pic	TL
QUESTION 4				**TOTAL 13**
4.1.1 (a)	Probability = $\frac{6\,000}{54\,002\,000}$ ×100 ✓**A** ✓**A** = 0,011110% ✓**CA**	**1A** – numerator **1A** – denominator **1CA** – correct follow up percentage	**P** **(3)**	3
4.1.1 (b)	The chances are **very unlikely** that a person can be killed by a drunken motorist ✓**A**✓**M**	**1A** – correct word **1M** – explanation includes **what** is very unlikely	**P** **(2)**	2
4.1.1 (c)	Murders by gun for Mpumalanga = $\frac{4\,229\,300}{54\,002\,000}$ × 5000 ✓**M/A** = 391,587… ✓**CA** ≈ 392 people He is correct. Difference is due to rounding. ✓**O** **OR** Mpumalanga has 7,8% of the total SA population, hence if they have 7,8% of the murders by gun it will be 7,8% × 5 000 ✓**M/A** = 390 ✓**C/A** He is correct. ✓**O**	**1M/A** multiply 5000 by correct ratio **1CA –** follow up calculation correct **1O** – conclusion based on answer **1M/A** multiply 5000 by 7,8% **1CA –** follow up calculation correct **1O** – correct conclusion based on number of murders	**D** **(3)**	3
4.1.2 (a)	Estimated cost in Rand due to drunken driving = 0,5 ×R309 billion ✓**M** = 154,5 billion = R154 500 000 000 ✓**CA** **/R154 500 million**	**1M** – calculate half of the cost **1CA** – cost written without word billion	**F** **(2)**	2
4.1.2 (b)	Increased cost 108,23% × R309 billion ✓**M/A** =R 33,443 billion ✓ **CA** = R33 443 million/R33 443 000 000 ✓**CA** (1 billion = 1000 million)	**1M/A** – Increase the correct amount by 8,23% **1CA** – after increase **1CA**-answer in millions	**F** **(3)**	2

Q	Solution	Explanation	To-pic	TL
QUESTION 5			**TOTAL 17**	
5.1.1	Deposit = 10% of (R1 270 + R2 530) = 10% × R3 800✓ **M/A** = R380 Balance = R3 800 – R380 = R3 420 ✓ **CA** **OR** Balance = 90% of (R1 270 + R 2530) ✓**M/A** = 0,90 × R3 800 = R3 420 ✓**CA**	**1M/A** – Calculate 10% of cost for <u>both</u> items **1CA** – follow up balance-deposit subtracted **OR** **1M/A** – Calculate 90% of cost for <u>both</u> items **1CA** – follow up balance	**F** **(2)**	2
5.1.2 (a)	Monthly instalment/Amount payable per R100 = R4,8533 ✓ **RT** Instalment per R3 420 = $\frac{3\,420}{100}$ × R4,8533 ✓**M/A** = R165,98286 ≈ R165,98 pm ✓**CA**	**1RT** – <u>correct</u> value selected from table **1M/A** – Multiply by $\frac{3\,420}{100}$ **1CA** – follow up answer	**F** **(3)**	3
5.1.2 (b)	Instalments = (R165,98 × 30) ✓**M** = R4979,40 Interest is the amount more, hence Interest = R4 979,40 – R3 420 ✓**M** = R1 559,40 ✓**CA** **OR** Total Payment = instalments + deposit = (R165,98 ×30) + R380 ✓**M** = R 4 979,40 + R380 = R5 359,40 Amount above selling price = Total Payment – Total marked prices = R5 359,40 – R3 800 ✓**M** = R1 559,40 ✓**CA**	**1M** – multiply answer in (a) with 30 **1M** – difference between balance(5.1.1) and 30 instalments **1CA** – follow up answer **1M** – calculate total repayment **1M** – difference between Total repayment and cost **1CA** – follow up answer	**F** **(3)**	3
5.1.2	**ONLY ONE REASON - CHOOSE**		**F**	4

Q	Solution	Explanation	To-pic	TL
(c)	• People do not always have the cash to buy the product. ✓✓**O** • The monthly instalment is more affordable✓✓**O** • If a person's appliance suddenly stops working, he/she urgently needs to buy a new appliance– ✓✓**O** • Any valid reason ✓✓**O**	**2O –** one valid reason for willingness to pay more	**(2)**	
5.2	**Step 1:** Take the bottom shelves (B) and the top shelf (A) and one of the side panels (C). Put the side panel on the floor as illustrated. Slide the shelves into the grooves indicated in the illustration and push them downwards to slip in place. **Step 2:** Take the other **side pane**l and align shelves and grooves. Push down to secure shelves. **Step 3:** Stand shelf upright and move **back panel (F)** into position. Push **shelves downwards.** **Step 4:** Move base top cover **(E)** in by sliding backwards **Step 5:** Fit the **top cover** into position as seen in picture.	**1A** – Parts used. Names and /or letters correct for step 1. **1A** – Instruction in line with the illustration step 1 **1A** – instruction and parts suitable for step 2 **1A** – instruction and parts suitable for step 3 **1A** – instruction and parts suitable for step 4 **1A** – instruction and parts suitable for step 5 **1A** – Direction for pushing parts downwards or backwards correctly at least mentioned once. (any step)	**(7)**	**4**
		TOTAL:	**150**	