



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS

MATHEMATICAL LITERACY P2

2017

MARKING GUIDELINES

MARKS: 150

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

These marking guidelines consist of 15 pages.

KEY TO TOPIC SYMBOL:

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

QUESTION 1 [39 Marks]

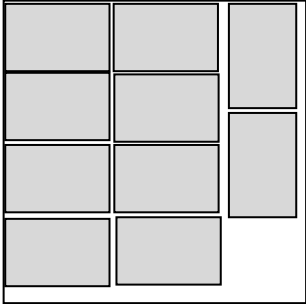
Ques	Solution	Explanation	T&L
1.1.1	$\text{Probability} = \frac{3}{15}$ $= 0,2$	1A numerator 1A denominator 1CA simplification AO (3)	P L2
1.1.2	6 members scoring decreased: 6 out of 15 team members As a percentage $= \frac{6}{15} \times 100\%$ $= 40\%$	1A no. decreased 1MA percentage with denominator 15 1CA simplification AO (3)	D L2
1.1.3 (a)	Arranging scores in ascending or descending order: 27; 28; 30; 32 ; 34; 38; 41; 42 ; 43; 43; 44; 46 ; 53; 56; 62 Median is 42.	1MA ordered data 2A median AO (3)	D L2
1.1.3 (b)	43	2A mode (2)	D L2
1.1.3 (c)	$\text{IQR} = \text{upper quartile} - \text{lower quartile}$ $= Q_3 - Q_1$ $= 46 - 32$ $= 14$	CA from 1.1.3(a) 1RT 46 1RT 32 1CA IQR value (3)	D L3
1.1.4	The interquartile range of 1 st tournament is smaller than that of the 2 nd tournament (i.e. 14 compared to 50) Range of scores is smaller in the 1 st tournament compared to a range of 90 points scored in 2 nd tournament. Majority improved their scores. OR	2J comparison 2J comparison	D L4

Ques	Solution	Explanation	T&L
	<p style="text-align: center;">OR</p> <p style="text-align: right;">✓✓J</p> <p>Highest score by a player in 1st tournament is 38 points less than a player in 2nd tournament.</p> <p style="text-align: right;">✓✓J</p> <p>The interquartile range of 2nd tournament is higher than of 1st tournament (i.e. 50 points higher than 14 points).</p> <p style="color: red;">The lowest score of tournament 2 is 17 less than the lowest score in tournament 1.</p> <p style="text-align: center;">OR</p> <p style="text-align: right;">✓✓J</p> <p style="color: red;">Players' performance in Tournament 1 were more consistent because the IQR is smaller and also the range is smaller.</p> <p style="text-align: right;">✓✓J</p>	<p>2J comparison</p> <p>2J comparison</p> <p style="text-align: center;">OR</p> <p>2J comparison</p> <p>2J comparison</p> <p style="text-align: right;">(4)</p>	
1.2.1	<p style="text-align: right;">✓MA</p> <p>Points : $3 \times 1 = 3$</p> <p style="text-align: right;">8 × 2 = 16</p> <p style="text-align: right;">3 × 3 = 9 ✓M ✓A</p> <p>Point scored = $3 + 16 + 9 = 28$</p> <p>Player F ✓CA</p> <p style="text-align: center;">OR</p> <p style="text-align: right;">✓MA ✓M ✓A</p> <p>$3 \times 1 + 8 \times 2 + 3 \times 3 = 28$ points</p> <p>Player F ✓CA</p>	<p>1MA point in relation to position (multiply)</p> <p>1M adding points</p> <p>1A accumulated points</p> <p>1CA player</p> <p>1MA balls multiply by points</p> <p>1M adding</p> <p>1A total points</p> <p>1CA player</p> <p style="color: red;">AO</p> <p style="text-align: right;">(4)</p>	D L3
1.2.2	<p style="text-align: right;">45 : 3,66 ✓MA</p> <p style="text-align: right;">✓C</p> <p>0,45 : 3,66</p> <p style="text-align: right;">15 : 122 ✓CA</p> <p>OR</p> <p>45 : 3,36 ✓MA</p> <p>45 : 366 ✓C</p> <p>15 : 122 ✓CA</p>	<p style="color: red;">1MA writing in correct ratio</p> <p>1C to cm to m</p> <p>1CA answer</p> <p>OR</p> <p style="color: red;">1MA writing in correct ratio</p> <p>1C to m to cm</p> <p>1CA answer</p> <p style="text-align: right;">(3)</p>	M L2

Ques	Solution	Explanation	T&L
1.2.3	$\text{Shaded Area} = \pi r^2_{(\text{hoop})} - \pi r^2_{(\text{ball})}$ $= 3,142 \times (22,5\text{cm})^2 - 3,142 \times (12,4\text{cm})^2$ $= 1\,590,6375\text{ cm}^2 - 483,11392\text{ cm}^2$ $= 1\,107,52\text{ cm}^2$ <p style="text-align: center;">OR</p> <p>Area of circle (hoop) = $\pi \times (\text{radius})^2$</p> $= 3,142 \times (22,5)^2$ $= 1\,590,6375\text{cm}^2$ <p>Area occupied by the ball = $\pi \times (\text{radius})^2$</p> $= 3,142 \times (12,4)^2$ $= 483,11392\text{ cm}^2$ <p>Shaded area = $1\,590,6375 - 483,11392\text{ cm}^2$</p> $= 1\,107,52358\text{ cm}^2$	<p>1A radius hoop 1A radius ball 1M subtracting 1SF values 1CA area in cm^2 1CA area occupied by the ball 1CA answer</p> <p>1A radius 1SF correct values 1CA area 1A radius of a ball 1CA area occupied by the ball 1M difference 1CA answer NPR</p> <p style="text-align: right;">(7)</p>	M L3
1.3	<p>Proportional price money:</p> $\text{Y group share R}8,1\text{ mil} \times \frac{3}{9} = \text{R}2,7\text{ mil}$ <p>Each member of Y group will receive = $\frac{2,7\text{ million}}{5}$</p> $= \text{R}0,54\text{ mil.}$ $0,54 \times 1\,000\,000 = \text{R}540\,000$ <p>The player was correct.</p>	<p>1MA getting 9 1M multiply by ratio 1CA price money to share 1M divide by 5 1CA each member share 1C to 1000s 1O conclusion based on calculation</p> <p style="text-align: right;">(7)</p>	F L4

Ques	Solution	Explanation	T&L
	<p style="text-align: center;">OR</p> <p>Group Y receives $\frac{3}{9}$ of the share ✓✓MA</p> <p>Each member receives $\frac{1}{5}$ ✓A</p> <p>A player from Y = $\frac{3}{45} \times 8,1$ million ✓M</p> <p style="padding-left: 40px;">= 0,54 million ✓CA</p> <p style="padding-left: 40px;">= R540 000 ✓C</p> <p>The statement is correct ✓O</p>	<p>2MA correct ratio</p> <p>1A each member's share</p> <p>1M multiply with ratio</p> <p>1CA simplification</p> <p>1C conversion</p> <p>1O conclusion</p> <p style="text-align: right;">(7)</p>	
		[39]	

Ques	Solution	Explanation	T&L
	<p>.Per period per bread</p> <p>600 g: Apr 2015 – Jan 2016 : The price increased. ✓J Jan 2016 – Apr 2016: The price remained the same. ✓J</p> <p>700 g: Apr 2015 – Jan 2016 : The price increased. ✓J Jan 2016 – Apr 2016 The price increased. ✓J</p>	<p>600g: 1J both increased 1J constant 700g 1J increased 1J increased (4)</p>	
2.1.3	<p>He will have to adjust his spending to cater for the increased price. That is money that he was saving to use for other things will be used for wheat products. ✓✓J</p> <p>OR ✓✓J Will experience financial difficulties (i.e. unable to afford bread any longer).</p> <p>OR If he buys the wheat products it will cost him more and he will have less money to spend on other stuff ✓✓J</p> <p>OR ✓✓J Can buy less and less</p> <p>OR ✓✓J Any other valid reason</p>	<p>2J explanation</p> <p>OR</p> <p>2J explanation</p> <p>OR</p> <p>2J explanation</p> <p>OR</p> <p>2J explanation</p> <p>OR</p> <p>2J explanation (2)</p>	F L4
2.2	<p>Increase in 2017 = $6,6\% \times R6,72$ ✓MA = R0,44 ✓A</p> <p>Increased price = $R6,72 + R0,44$ ✓M = R7,16 ✓CA</p> <p>Increase in 2018 = $R7,16 \times 6\%$ = R0,43 ✓CA</p> <p>Increased price = $R7,17 + R0,43$ = R7,59 ✓CA</p> <p>OR</p> <p>2017: $R6,18 \times 1,066 = R 7,16$ ✓MA ✓A ✓M ✓CA 2018: $R7,16 \times 1,06 = R7,59$ ✓CA</p> <p>OR</p> <p>$R6,72 \times 1,066 \times 1,06 = R7,59$ ✓MA ✓✓A ✓✓M ✓CA</p>	<p>1MA multiplying correct values 1A increase amount</p> <p>1M adding 1CA increased price</p> <p>1CA increase %</p> <p>1CA increased price (6)</p>	F L3

Ques	Solution	Explanation	T&L
2.3.1	$V = 690 \text{ mm} \times 445 \text{ mm} \times 180 \text{ mm}$ $= 55\,269\,000 \text{ mm}^3$	1SF correct values 2CA volume P if units is wrong (3)	M L2
2.3.2	<p>Number of crates lengthwise</p> $= \frac{2}{0,69}$ $= 2,89$ <p>∴ 2 crates</p> <p>Number of crates breadthwise</p> $= \frac{2}{0,445} = 4,4$ <p>∴ 4 crates</p> <p>Now the remaining space is 0,62 m × 2 m</p> <p>∴ Turn crates: 1 more fit in $\left(\frac{0,62}{0,445}\right)$ and two down</p> <p>Total</p> $= (2 \text{ Lengthwise} \times 4 \text{ breadth wise} + 2) \times 9 \text{ on top of each other}$ $= 90 \text{ crates}$ <p>∴ 80 will fit</p> <p>Layout:</p> 	1C conversion 1M dividing 1CA number length wise 1CA number 1M finding the total Number 1CA number of crates 1J reason (7)	M L3

Ques	Solution	Explanation	T&L
2.3.3	$\begin{aligned} \text{Cost price per bread} &= \frac{R5\,350}{80 \times 8} \quad \checkmark M \quad \checkmark A \\ &= R8,36 \quad \checkmark CA \end{aligned}$ $\begin{aligned} \text{Number of loaves to break even} &= \frac{FC}{SP - CP} \\ &= \frac{R1\,720,70}{R11,50 - R8,36} \quad \checkmark SF \\ &= 548 \quad \checkmark CA \end{aligned}$	1M dividing 1A total number of loaves 1CA cost price 1SF substitution 1CA number of loaves (5)	F L3
		[37]	

QUESTION 3 (38 marks)

Ques	Solution	Explanation	T&L
3.1.1	$\text{Total population} = \frac{22\,574\,500}{41,1\%}$ $= 54\,925\,790,75$ $\approx 54\,925\,800 \text{ people}$	1RT correct values 1M dividing by % 1CA population 1R number of people (4)	D L3
3.1.2 (a)	$P_{(\text{White female})} = \frac{2\,325\,100}{55\,908\,900}$ $= 0,042 \quad \text{OR} \quad 4,2\% \quad \text{OR} \quad \frac{1}{24}$	1MA numerator and denominator 1CA simplification AO (2)	P L3
3.1.2 (b)	$\text{Total males} = \text{RSA population} - \text{Female population}$ $= 55\,908\,900 - 28\,529\,100$ $= 27\,379\,800$ $P_{(\text{male})} = \frac{27\,379\,800}{55\,908\,900} \approx 0,49 \quad \text{OR} \quad 48,97\%$ <p>OR</p> $P_{(\text{female})} = \frac{28\,529\,100}{55\,908\,900} = 0,51027... \approx 0,51 \text{ or } 51,03\%$ $P_{(\text{male})} = 1 - 0,51027.. \text{ or } 1 - 0,51 \text{ or } 100\% - 51,03\%$ $= 0,489721672 \text{ or } 0,49 \text{ or } 49,97\%$	1MA difference 1CA males total 1CA probability OR 1A P(female) 1A subtracting from 1 1CA P(male) (3)	P L3
3.1.3	$2016 = \frac{684\,100}{28\,529\,100} \times 100\%$ $= 2,3979024 \approx 2,4\%$ <p>OR</p> $2015 = \frac{673\,900}{28\,078\,700} \times 100\% = 2,4\%$ <p>OR</p> $2014 = \frac{664\,900}{27\,635\,900} \times 100\% = 2,4\%$	1MA numerator and denominator 1M multiply by 100% 1CA percentage 1MA numerator and denominator 1CA percentage OR	D L4

Ques	Solution	Explanation	T&L
	$2014: 100\% - (80,2\% + 8,9\% + 8,5\%) = 2,4\%$ $2015: 100\% - (80,4\% + 8,9\% + 8,3\%) = 2,4\%$ $2016: 100\% - 80,6\% - 8,9\% - 8,1\% = 2,4\%$	1MA subtracting from 100% 1M adding other values 1CA percentage 1MA another year 1CA another year (5)	
3.2.1 Afri	Total distance of a space and a post $= 100 \text{ mm} + 40 \text{ mm}$ $= 140 \text{ mm}$ ✓A Distance between posts that must have a space and a post $= 3\,460 \text{ mm} - 100 \text{ mm}$ $= 3\,360 \text{ mm}$ ✓M $\text{Number of small posts} = \frac{3360}{140}$ $= 24$ ✓CA Total number of post = $24 + 2 = 26$	1A correct distance Convert to m OR 1M subtracting 1M adding lengths and dividing 1CA number of small post (4)	M L2
3.2.2	Direct sunlight coming into the rooms through the windows or doors for much longer. OR Sun spend most of the time on the north side of the house. OR It is the side on which the sun shines most of the time during the day.	2J sun and time OR 2J direction and time OR 2J sunshine (2)	MP L4
3.2.3	Open outward because they have short width ✓✓O OR Designed to store things, as such they will obstruct inward opening of the doors. ✓✓O OR Storage space will be lost if doors open inwards ✓✓O OR Other rooms open inward. Their purpose is entrance into the room. ✓O ✓O	2O wideness OR 1O purpose OR 2O space OR 1O way of opening 1O purpose (2)	MP L4

Ques	Solution	Explanation	T&L
3.2.4	<p>Carpeted floor = Area of a Passage + Dining + Living rooms</p> <p>DR area = $3,3274 \times 3,6576$ ✓SF $= 12,17029824 \text{ m}^2$ ✓CA</p> <p>LR area = $4,5720 \times 4,2672$ $= 19,5096384 \text{ m}^2$ ✓CA</p> <p>Area of passage = 15% of (12,17 + 19,51) ✓M $= 15 \%$ of 31,68 m $= 4,751990496 \text{ m}^2$ ✓CA</p> <p>Total area = $12,17 \text{ m}^2 + 19,51 \text{ m}^2 + 4,75 \text{ m}^2$ ✓M $= 36,43 \text{ m}^2$ ✓CA $\approx 37 \text{ m}^2$ ✓R</p>	<p>1SF finding area</p> <p>1CA area of DR</p> <p>1CA area of LR</p> <p>1M finding 15%</p> <p>1CA area of passage</p> <p>1M adding 3/4 values 1CA total area 1R rounding [Max 6 marks if total area is calculated]</p> <p>(8)</p>	M L3
3.2.5	<p>Labour Cost: $R1\ 600 + 37 \times R70$ ✓MA $= R1\ 600 + R2\ 590$ $= R4\ 190$ ✓CA</p> <p>Number of boxes = $37 \div 2,15$ ✓M $= 17,209$ ≈ 18</p> <p>Cost for Boxes: $18 \times R299,90$ $= R5\ 398,20$ ✓CA</p> <p>Number of underlay rolls: $37 \div 10$ $= 3,7$ ≈ 4</p> <p>Underlayer: $4 \times R56,90$ $= R227,60$ ✓CA</p> <p>Total cost = $R4\ 190 + R5\ 398,20 + R227,60$ ✓MA $= R9\ 815,80$ ✓CA</p> <p>The budget is sufficient. ✓O</p>	<p>Area CA from 3.2.4 above 1MA finding labour</p> <p>1CA labour cost</p> <p>1M dividing by 2,15</p> <p>1CA cost of boxes</p> <p>1CA underlayer cost</p> <p>1MA adding all 3 cost types 1CA total cost</p> <p>1O conclusion</p> <p>(8)</p>	F L4
		(8)	
		[38]	

QUESTION 4 [36 marks]

Ques	Solution	Explanation	T&L
4.1.1	<p style="text-align: center;">✓RT ✓RT ✓RT</p> <p>Tax bracket 3, 4 and 5</p> <p style="color: red;">Tax bracket 1 may be included due to typing error</p> <p style="text-align: center;">OR</p> <p>\$37 001 – \$87 000 ✓RT</p> <p style="padding-left: 100px;">✓RT</p> <p>\$87 001 – \$180 000.</p> <p>\$180 001 and over. ✓RT</p> <p style="color: red;">\$0 – \$1 200</p>	<p>1RT bracket3</p> <p>1RT bracket 4</p> <p>1RT bracket 5</p> <p style="text-align: center;">OR</p> <p>1RT interval bracket</p> <p>1RT interval bracket</p> <p>1RT interval bracket</p> <p style="text-align: right;">(3)</p>	F L2
4.1.2	<p>Pay <u>extra</u> 2% on taxable income ✓✓O</p> <p style="text-align: center;">OR</p> <p style="padding-left: 100px;">✓✓O</p> <p>The levy is an <u>extra</u> tax on their income.</p> <p style="text-align: center;">OR</p> <p style="padding-left: 100px;">✓✓O</p> <p><u>Higher income earners</u> are subjected to <u>an extra tax</u> in addition to usual income tax rates.</p>	<p>2O reason</p> <p style="text-align: center;">OR</p> <p>2O reason</p> <p style="text-align: center;">OR</p> <p>2O reason</p> <p style="text-align: right;">(2)</p>	F L4

Ques	Solution	Explanation	T&L
4.1.3	<p>Tax due 2016:</p> $= \$54\,547 + 45\% \times (\$289\,303,26 - \$180\,000)$ $= \$54\,547 + 45\% \times \$109\,303,26$ $= \$54\,547 + \$49\,186,47$ $= \$103\,733,47 \quad \checkmark\text{CA}$ <p>Medical levy = $\\$289\,303,26 \times 2\%$ $= \\$5\,786,07 \quad \checkmark\text{MA}$</p> <p>Total due = $\\$103\,733,47 + \\$5\,786,07$ $= \\$109\,519,54 \quad \checkmark\text{CA}$</p> <p>Tax due 2017:</p> $= \$54\,232 + 45\% \times (\$311\,001 - \$180\,000)$ $= \$54\,232 + 45\% \times \$131\,001$ $= \$54\,232 + \$58\,950,45$ $= \$113\,182,45 \quad \checkmark\text{CA}$ <p>Medical levy = $2\% \times \\$311\,001$ $= \\$6\,220,02$</p> <p>Total for 2017: $\\$113\,182,45 + \\$6\,220,02 \quad \checkmark\text{CA}$ $= \\$119\,402,47$</p> <p>Tax due difference: $\\$119\,402,47 - \\$109\,519,54 \quad \checkmark\text{M}$ $= \\$9\,882,93 \quad \checkmark\text{CA}$</p> <p>The statement is VALID. $\checkmark\text{O}$</p>	<p>1MA correct values 1 RT correct values</p> <p>1CA tax due</p> <p>1MA levy value</p> <p>1CA total due</p> <p>1RT tax bracket 1MA correct values</p> <p>1CA tax due</p> <p>1CA total</p> <p>1M finding difference</p> <p>1CA simplification</p> <p>1O conclusion</p> <p>(12)</p>	F L3/4
4.2.1	<p>Mary Rose restaurant; Denmark hotel; Civic Centre</p>	<p>3A venues Accept hotel</p> <p>(3)</p>	MP L2

Ques	Solution	Explanation	T&L
4.2.2	<p style="text-align: right;">✓✓O</p> <p>Because it runs over the river.</p> <p style="text-align: center;">OR</p> <p style="text-align: right;">✓✓O</p> <p>Portions of a river not visible from above where the highway crosses or passes the river.</p>	<p>2O reason</p> <p style="text-align: center;">OR</p> <p>2O reason</p> <p style="text-align: right;">(2)</p>	MP L4
4.2.3	<p style="text-align: center;">✓✓RT ✓✓RT ✓✓RT</p> <p>North west OR NW OR West of North</p>	<p>2RT direction</p> <p style="text-align: right;">(2)</p>	MP L2
4.2.4	<p>Turn right walk along Walker Str ✓A</p> <p>Turn right into Strickland Str ✓A</p> <p>Pass South Coast Highway</p> <p>And turn left into Mount Shadforth Rd ✓A</p> <p>Restaurant will be on his right</p> <p style="text-align: center;">OR</p> <p>Turn SW into Walker Street and proceed. ✓A</p> <p>At the corner turn NW and continue. ✓A</p> <p>Cross South Coast Highway ✓A</p> <p>Turn W into Mount Shadforth Rd. ✓A</p> <p>The restaurant is on the northern side of the road.</p>	<p>1A route and turn</p> <p>1A route and turn</p> <p>1A turn and road</p> <p>1A route and turn</p> <p>1A route and turn</p> <p>1A turn and road</p> <p style="text-align: right;">(3)</p>	MP L3
4.2.5	<p>Measured distance between = 23 mm ✓✓MA</p> <p>Scale 23 mm is 100 m ✓C</p> <p>How long it will take him = Time = $\frac{\text{Distance}}{\text{Speed}}$ ✓A</p> <p style="text-align: center;">$= \frac{100\text{m}}{1,1\text{m/s}}$ ✓A</p> <p style="text-align: center;">$= 90,91 \text{ seconds}$ ✓CA</p> <p style="text-align: center;">In minutes $90,909 \div 60 = 1,52 \text{ minutes.}$ ✓C ✓CA</p> <p>No. He can walk in less than 2 minutes at that speed. ✓O</p> <p style="text-align: center;">OR</p> <p style="text-align: center;">2 min = 120 sec ✓C ✓A</p> <p style="text-align: center;">Distance = 1,1 m/s x 120 s = 132 m ✓CA</p> <p style="text-align: center;">Measured distance = 23 mm ✓✓MA</p> <p style="text-align: center;">Scale 23 mm = 100 m ✓C</p> <p style="text-align: center;">He will be past the Indigo Cuisine restaurant ✓O</p> <p style="text-align: center;">[Accept measurements 23 mm to 25 mm]</p>	<p>2MA measuring</p> <p>1C using scale</p> <p style="color: red;">1A formula</p> <p>1A speed</p> <p>1CA calculating time</p> <p>1C divide by 60</p> <p>1CA minutes</p> <p>1O conclusion</p> <p style="text-align: center;">OR</p> <p>1C multiply by 60</p> <p>1A time in seconds</p> <p>1A speed</p> <p>1A formula</p> <p>1CA distance</p> <p>2MA measurement</p> <p>1C using scale</p> <p>1O conclusion</p> <p style="text-align: right;">(9)</p>	MP L4
		[36]	

TOTAL: 150