basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL
SENIOR CERTIFICATE

GRADE 12

MARKS: 150

SYMBOL	EXPLANATION
M	Method
MA	Method with accuracy
CA	Consistent accuracy
A	Accuracy
C	Conversion
S	Simplification
RT/RG	Reading from a table/graph/diagram
SF	Correct substitution in a formula
O	Opinion/Example/Definition/Explanation
P	Penalty, e.g. for no units/incorrect rounding off, etc.
R	Rounding off
NPR	No penalty rounding or omitting units
AO	Answer only, if correct, full marks

This marking guideline consists of 16 pages.

Question 1 [30 MARKS]

Ques	Solution	Explanation	Topic/L
1.1.1	D ✓✓RT	2RT correct letter (2)	F L1
1.1.2	G✓✓ RT	2 RT correct letter (2)	D L1
1.1.3	C ✓✓ RT	2 RT correct letter (2)	M L1
1.2.1	Profit = R18 700 – R 14 960 ✓ M = R 3 740 ✓A	1M subtracting correct values 1A calculating profit **AO** (2)	F L1
1.2.2	✓M $\overbrace{10:15 + 5h50}$ = 16:05 ✓A 16:05 **OR** 4:05 pm **OR** 5 past 4 in the afternoon	1M adding 1A correct time of sale **AO** (2)	M L1
1.2.3 (a)	Radius = 32,8 mm ÷ 2 ✓MA = 16,4 mm ✓CA	1MA dividing diameter by 2 1CA radius **AO** (2)	M L1

1.2.3
(b)
	Distance = (71,8 mm – 32,8 mm) ÷ 2 ✓MA
	
	     = 19,5 mm ✓CA
	
	OR
	71,8 mm ÷ 2 = 35,9 mm
	
	✓MA
	Distance = 35,9 mm – 16,4 mm
	     = 19,4 mm ✓CA
		1MA subtracting and dividing
		
		1CA distance
		
		OR
		
		1MA subtracting and dividing
		
		1CA distance
		AO (2)
			M
			L1

Ques	Solution	Explanation	Topic/L
1.3.1	Cost of diluted juice per litre = R 44,95 ÷ 14 ℓ ✓MA = R 3, 210714286 ≈ R 3,21 ✓CA	1MA dividing 1CA cost per litre **NPR** **AO** (2)	M L1
1.3.2	2 ℓ : 12 ℓ ✓A 1 : 6 ✓CA	1A correct volume of water and order 1CA simplification **Accept** $\dfrac{1}{6}$ **AO** (2)	M L1
1.3.3	Number of glasses of juice = $\dfrac{14}{0,175}$ ✓MA = 80 ✓CA	1MA dividing the correct values 1CA simplification to a whole number **AO** (2)	M L1
1.4.1	✓RT ✓MA 35 39 39 60 63 84 93 107 117 120 126 142	1RT all values 1MA ascending order (2)	D L1
1.4.2	July **OR** 7ᵗʰ month ✓✓A	2A correct month (2)	D L1
1.4.3	9 ✓✓A	2A correct mode (2)	D L1
1.4.4	April **OR** 4ᵗʰ month ✓✓A	2A correct month (2)	D L1
1.4.5	✓A May and July ✓A **OR** 5ᵗʰ month and 7ᵗʰ month	1A May 1A July (2)	D L1
		[30]	

QUESTION 2 [46 MARKS]

Ques	Solution	Explanation	Topic/L
2.1.1	R465,00 ✓✓RT	2RT correct bus fare (2)	F L1
2.1.2	Queenstown ✓RT and King William's Town ✓RT	2RT correct cities (2)	F L1
2.1.3 (a)	Port Elizabeth to Bloemfontein $= $ R435,00 ✓RT Cost $=$ R755,00 – R435,00 $=$ R320,00 ✓CA	1RT R435 1CA cost **Accept** trial and error method $\boxed{\text{AO}}$ (2)	F L1
2.1.3 (b)	King William's Town ✓✓RT	**CA from Q2.1.3(a)** 2RT correct city (2)	F L2
2.1.4	Cost excluding VAT $= $ R365,00 $\times \dfrac{100✓M}{114}$ ✓M $=$ R320,175… $\approx$ R320,18 ✓CA **OR** Cost excluding VAT $= \dfrac{\text{R365}}{1,14}$ ✓M ✓MA $\approx$ R320,18 ✓CA **OR** 114 : 365 $=$ 100 : x $x =$ price excl. VAT ✓M $x = $ R365,00 $\times \dfrac{100}{114}$ ✓M $=$ R320,175… $\approx$ R320,18 ✓CA **OR** VAT $=$ R365 $\times \dfrac{14}{114}$ ✓M $=$ R44,82 Cost excluding VAT $=$ R365 – R44,82 ✓M $\approx$ R320,18 ✓CA	1M × 100 1M ÷ 114 1CA simplification **OR** 1M dividing 1MA 1,14 1CA simplification **OR** 1M proportion 1M x as subject of formula 1CA simplification **OR** 1M multiplying with ratio 1M subtracting VAT 1CA simplification **NPR** $\boxed{\text{AO}}$ (3)	F L2

Ques	Solution	Explanation	Topic/L
2.1.5	From Queenstown to Bloemfontein return trip ✓RT = R410 × 2 = R820 ✓CA Total travelling cost = 12 × R820 ✓M = R9 840 ✓CA **OR** Number of trips = 2 × 12 ✓M = 24 ✓CA Total travelling cost = 24 × R410 ✓RT = R9 840 ✓CA **OR** One way cost for a year ✓RT = R410 × 12 ✓M = R4 920 Total traveling cost = R4 920 × 2 ✓M = R9 840 ✓CA **OR** ✓RT ✓M Traveling cost = R410 × 2 × 12 ✓M =R9 840 ✓CA	1RT correct fare 1CA for calculating the return trip 1M multiplying by 12 1CA total cost **OR** 1M multiplying by 12 1CA total trips 1RT correct fare 1CA total cost **OR** 1RT correct fare 1M multiplying with 12 1M multiplying with 2 1CA total cost **OR** 1RT correct fare 1M multiplying with 2 1M multiplying with 12 1CA cost AO (4)	F L2

Ques	Solution	Explanation	Topic/L
2.2.1	✓RT July 2013 **OR** 07/2013 **OR** 07/13 ✓RT	1RT month 1RT year (2)	F L1
2.2.2	Water and Sewerage ✓RT Refuse Removal ✓RT	1RT water and/or sewerage 1RT refuse Penalty for including property rates (2)	F L1
2.2.3	November = 3 days, December = 20 days ✓M end date 2016/12/20 **OR** 20 December 2016 ✓A	1M adding 1A end date 20 Dec **Accept** 19 Dec AO (2)	F L1

2.2.4	Daily average consumption
	    ✓RT
	= 12,00 kℓ ÷ 23 days ✓M
	
	≈ 0,522 kℓ
	
	OR
	
	Verifying the consumption rate per day:
	    ✓RT
	= 12,00 kℓ ÷ 0,522 kℓ/day ✓M
	
	≈ 23 days
	OR
	
	0,522 kℓ/day × 23 days ✓M
	≈ 12,00kℓ ✓A
		1RT correct value
		1M dividing in correct order
		
		OR
		
		1RT correct value
		1M dividing in correct order
		
		OR
		
		1M multiplying
		1A volume
		(2)
			F
			L1

2.2.5	Water ✓R The amount of water consumption is not the same every month. ✓✓O	1R variable expense 2O explanation clearly showing change (3)	F L1

Ques	Solution	Explanation	Topic/L
2.2.6 (a)	$\checkmark$RT A = R690 000 × R0,0069160 ÷ 12 = R397,67 $\checkmark$CA	1RT all values from bill 1CA simplification Note value for B can be used to calculate A **AO** (2)	F L1

2.2.6 (b)	B = R397,67 – R115,27 $\checkmark$M
	
	   = R282, 40 $\checkmark$CA
	
	OR
	
	B = R880,10 – R167,58 – R430,12 $\checkmark$M
	
	   = R282,40 $\checkmark$CA
		1M subtracting correct values
		1CA simplification
		
		OR
		
		1M subtracting correct values
		1CA simplification
		AO
		(2)
			F
			L1

2.2.7	Sewerage rate per m² = $\dfrac{R298,36}{463}$ $\checkmark$RT
	
	             = R0,6444060475 $\checkmark$A
	
	       $\checkmark$RT **OR**
	463m² : R 298,36
	
	1m² : R0, 6444… $\checkmark$A
		1RT correct values
		
		1A simplification
		
		OR
		1RT Correct values
		
		1A simplification
		NPR
		AO
		(2)
			F
			L1

2.2.8	R919,33 $\checkmark\checkmark$RT	2RT unpaid amount (2)	F L1
2.2.9	Rounding up $\checkmark\checkmark$A **OR** $\checkmark\checkmark$A Rounding (off) to the nearest R10,00 **OR** $\checkmark\checkmark$A Rounding (off) to the nearest R100,00	2A Rounding up **OR** 1A rounding 1A nearest 10 rand **OR** 1A rounding 1A nearest 100 rand (2)	F L1
2.3.1	Commission = 1,95% × £360,00 $\checkmark$MA = £7,02 $\checkmark$A	1MA calculating % 1A commission in pound **AO** (2)	F L1

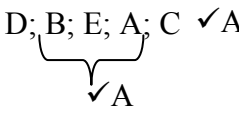| Ques	Solution	Explanation	Topic/L
2.3.2	$£360,00 = \dfrac{360}{0,05773}$ ✓M/A $= R6\ 235,9258..$ ✓A $\approx R6\ 235,93$ or $R6\ 235$ or $R6\ 236$ ✓CA **OR** $£1 = \dfrac{R1,00}{0,05773}$ $= R17,32201628$ ✓MA $£360 = R17,32201628 \times 360$ $= R62\ 35,925862$ ✓A $\approx R6\ 235,93$ ✓CA OR $R1,00 = £0,05773$ $x = £360,00$ $x = R\dfrac{1 \times 360}{0,05773}$ ✓A ✓MA $= R6\ 235,93$ ✓CA	1MA conversion 1A simplification 1CA rounding **OR** 1MA conversion 1A simplification 1CA rounding **OR** 1A multiplying with 360 1MA conversion 1CA rounding **NPR** AO (3)	F L2
2.3.3	Interest after 1 year = R5 000 × 6,3% $\qquad\qquad = R315$ ✓M Amount after year 1 = R5 000 + R315 $\qquad\qquad = R5\ 315,00$ ✓A Interest for full 2nd year = R5 315 × 6,3% $\qquad\qquad \approx R334,845$ ✓CA $\therefore$ Interest for $\frac{1}{2}$ year = R334,845 ÷ 2 $\qquad\qquad = R167,42$ ✓M Value of the fixed deposit = R5 315 + R167,42 $\qquad\qquad = R5\ 482,42$ ✓CA **OR**	1M calculate interest for first year 1A simplification 1CA 2nd year amount 1M half year interest 1CA simplification **OR**	F L2

Ques	Solution	Explanation	Topic/L
	Interest after 1 year = R5 000 × 6,3% $\qquad$ = R315 $\quad$ ✓M	1M calculate interest for first year	
	Amount after year 1 = R5 000 + R315 $\qquad$ = R5 315,00 $\quad$ ✓A	1A simplification	
	Second year interest rate = $\dfrac{6,3\%}{2}$ $\quad$ ✓M	1M 2nd year rate	
	$\qquad$ = 3,15% $\quad$ ✓CA Interest for $\frac{1}{2}$ year = R5 315 × 3,15% $\qquad$ ≈ R167,42	1CA half year interest	
	Value of the fixed deposit = R5 315 + R167,42 $\qquad$ = R5 482,42 ✓CA	1CA simplification	
	OR	**OR**	
	Amount after year 1 = R5 000 (1 + 0,063) ✓M $\qquad$ = R5 315,00 $\quad$ ✓A	1M calculate amount for first year 1A simplification	
	$\qquad$ ✓CA Value of fixed deposit after $1\frac{1}{2}$ years	1CA 2nd year amount	
	$\qquad$ = $R5\,315\left(1+\dfrac{0,063}{2}\right)$ ✓M	1M half year	
	$\qquad$ ≈ R5 482,42 ✓CA	1CA simplification $\qquad$ (5)	
			[46]

QUESTION 3 [21 MARKS]

Ques	Solution	Explanation	Topic/L
3.1.1	Number of tables $= 240 \div 8 = 30$ ✓A Number of balloons $= 4 \times 30 = 120$ ✓CA	1A correct number of tables 1CA minimum number of balloons **AO** (2)	M L1
3.1.2	Length of decorative ribbon in cm $= 2 \times (\text{length} + \text{width}) + 1$ ✓✓SF $= 2 \times (10 + 6) + 1 = 33$ ✓A	2SF substituting correct values into the formula 1A minimum length **AO** (3)	M L2
3.1.3	Volume $= \pi \times (\text{radius})^2 \times \text{height}$ ✓A ✓SF $= 3{,}142 \times (6 \text{ cm})^2 \times 28 \text{ cm}$ $= 3\ 167{,}136 \text{ cm}^3$ ✓CA	1A radius 1SF correct height and 3,142 1CA simplification **NPR** (3)	M L2

3.1.4	$\overset{✓A}{}$
	Volume $= 1\ 680 \text{ cm}^3 \times 45\% = 756 \text{ cm}^3$
	
	Mass of sand $= 756 \text{ cm}^3 \times 1{,}53\text{g/cm}^3$ ✓M
	     ✓CA
	$= 1\ 156{,}68 \text{ g} \div 1\ 000$
	
	$\approx 1{,}16 \text{ kg}$ ✓C
	
	OR
	$1{,}53 \text{ g/cm}^3 = 0{,}00153 \text{ kg/cm}^3$ ✓C
	         ✓A
	Volume $= 1\ 680 \text{ cm}^3 \times 45\% = 756 \text{ cm}^3$
	              ✓M
	Mass of the sand $= 0{,}00153 \text{ kg/cm}^3 \times 756 \text{ cm}^3$
	
	$= 1{,}15668 \text{ kg} \approx 1{,}16 \text{ kg}$ ✓CA
	
	OR
		1A calculating 45%
		
		1M multiply by rate
		
		1CA mass in grams
		
		1C converting to kg to 2decimal places
		
		OR
		1C converting to kg
		1A calculating 45%
		
		1M multiplying with the rate
		
		1 CA mass in kg to 2 dec. places
		OR
			M
			L2

Ques	Solution	Explanation	Topic/L
	Mass of sand in a full vase $= 1\,680 \text{ cm}^3 \times 1,53 \text{g/cm}^3$　✓M $= 2\,570,4 \text{ g}$　✓A $= 2,5704 \text{ kg}$　✓C Mass of sand if filled to 45% $= 2,5704 \text{ kg} \times 45\%$ $= 1,16 \text{ kg}$ ✓CA	1M multiplying with the rate 1A mass 1C conversion 1CA mass of sand to two decimal places (4)	
3.2.1	Area of triangle $= \overset{\checkmark\text{A}}{\dfrac{1}{2}} \times 4 \text{ cm} \times \overset{\checkmark\text{RT}}{3,464 \text{ cm}}$ $= 6,928 \text{ cm}^2$ ✓CA	1A substituting correct values in formula 1RT height 1CA simplification **NPR** AO (3)	M L2
3.2.2	Total surface Area of a triangular prism $= 2 \times \overset{\checkmark\text{CA}}{6,928} + \overset{\checkmark\text{SF}}{3 \times 6 \text{ cm} \times 4\text{cm}}$ $= 13,856 \text{ cm}^2 + 72 \text{ cm}^2$ ✓CA $= 85,856 \text{ cm}^2$ ✓CA	**CA from Q3.2.1** 1CA substituting area of triangle 1SF substituting correct values in formula 1CA simplification 1CA total surface area (4)	M L3
3.2.3	30 minutes $= 1\,800$ seconds ✓C Average time to cover 1 box $= \dfrac{1\,800}{20}$ seconds $= 90$ seconds ✓CA **OR** Average time to cover 1 box $= \dfrac{30 \text{ min}}{20} = 1,5 \text{ min}$ ✓M $= 1,5 \text{ min} \times 60 \text{ sec/min} = 90$ seconds ✓C	1 C conversion to seconds 1CA simplification **OR** 1M time per box 1C conversion AO (2)	M L1
		[21]	

QUESTION 4 [27 MARKS]

NOTE :MPU & NC maximum [23 MARKS] to be scaled to 27 MARKS

Ques	Solution	Explanation	Topic/L
4.1.1	✓✓A Bar scale **OR** Scaled bar **OR** Linear scale **OR** Graphical scale	2A identifying type of scale (2)	M&P L1
4.1.2	Top view **OR** Aerial view **OR** Bird's eye view✓✓A **OR** Satelite view	2A correct view of the map (2)	M&P L1
4.1.3	✓✓A South East **OR** SE **OR** East of South	2A identifying correct direction (2)	M&P L1
4.1.4	5 ✓✓A	2A exact number of medical points **Accept** 4 (2)	M&P L2
4.1.5	✓A ✓A Mowbray and Observatory	2A identifying correct suburbs **Accept** Maitland and Saltriver (2)	M&P L1
4.1.6	✓A ✓A ✓A Castle De Goede Hoop, Old Biscuit Mill , Planetarium **OR** 4, 5 and 6	3A identifying correct tourist attractions (3)	M&P L2

Ques	Solution	Explanation	Topic/L
4.2.1	D; B; E; A; C ✓A ✓A	**NOTE:** **[MPU & NC not to be marked]** 1A order BEA 1A end with C (2)	M&P L2
4.2.2	E **OR** B ✓✓A	**NOTE:** **[MPU & NC not to be marked]** 2A correct letter (2)	M&P L1
4.2.3 (a)	✓✓A 0 % **OR** Impossible **OR** 0 **OR** $\dfrac{0}{130}$ **OR** None	2A probability (2)	P L2
4.2.3 (b)	Total blocks = 20 + 25 + 28 + 30 + 27 = 130 ✓A Probability of taking out a blue block $= \dfrac{25}{130}$ ✓A ✓A **OR** $\dfrac{5}{26}$ **OR** 19,23% **OR** 0,19	1A total 130 1A numerator 1A denominator AO (3)	P L2
4.2.4 (a)	✓MA Number of layers = 35 cm ÷ 16, = 2,12… ≈ 2 ✓CA	1MA dividing correct values 1CA exact number of layers AO (2)	M&P L1
4.2.4 (b)	Number of cans which can be packed lengthwise = 56 cm ÷ 12,6 cm ✓MA = 4,444… ≈ 4 Number of cans which can be packed width-wise = 41 cm ÷ 12,6 cm = 3,253… ≈ 3 ✓A Maximum number of cans = 4×3×2 = 24 ✓CA	1MA dividing the width or length by 2,6 1A rounding both down to whole numbers 1CA for max number of cans AO (3)	M&P L3
		[27]	

QUESTION 5 [26 MARKS]

Ques	Solution	Explanation	T/L
5.1.1	Broken line graph **OR** line graph ✓✓A	2A correct type of graph (2)	D L1
5.1.2	Number of candidates = 287 453 + 389 615 ✓M = 677 068 ✓CA	1M adding Math and Math Lit 1CA max number of candidates **AO** (2)	D L2
5.1.3	100% **OR** 1 **OR** certain **OR** definite ✓✓A	2A correct probability (2)	P L2
5.1.4	Accounting, Business Studies, Economics and Mathematical Literacy ✓RT ✓RT ✓RT	1RT 1st subject 1RT 2nd subject 1RT last two subjects (3)	D L1
5.1.5	Mathematics ✓✓RT	2RT correct subject (2)	D L1
5.1.6	The data of one variable is grouped into subjects ✓✓A **OR** The data of one variable is not numerical ✓✓A	2A explanation (2)	D L1
5.1.7	Business Studies ✓✓RT	2RT correct subject (2)	D L1

Ques	Solution	Explanation	T/L
5.2.1	Copyright payments, advertising costs, bursary, ✓✓O grants etc. (OR any other valid expenditure)	2O an example of other type of expenditure (2)	D L1
5.2.2	Donations ✓M $= [R63 - (R27{,}09 + R21{,}02 + R3{,}78)]$ billion $= R11{,}11$ billion ✓CA Percentage donations $= \dfrac{11{,}11}{63} \times 100\%$ $\approx 17{,}6\%$ ✓CA **OR** $R27{,}09 + 21{,}02 + 3{,}78$ $= R51{,}89$ billion Percentage income shown $= \dfrac{R51{,}89}{R63} \times 100\%$ $\approx 82{,}4\%$ ✓M Percentage donations $=100\% - 82{,}4\%$ ✓M $=17{,}6\%$ ✓CA **OR** Percentage $= \dfrac{R27{,}09}{R63} \times 100\% = 43\%$ ✓M $\dfrac{R21{,}02}{R63} \times 100\% \approx 33{,}365\%$ $\dfrac{R3{,}78}{R63} \times 100\% = 6\%$ Percentage donations $= 100\% - (43\% + 33{,}4\% + 6\%)$ ✓M $= 17{,}6\%$ ✓CA	1M subtracting from R63 billion 1CA simplification in billions 1CA donations as a % **OR** 1M percentage income shown 1M subtracting from 100% 1CA simplification **OR** 1M percentage calculation 1M subtracting from 100% 1CA simplification **NPR** **AO** (3)	D L2

Ques	Solution	Explanation	T/L
5.2.3	$\checkmark$RT Interest in Rand = 54 100 000 000 × 0,7% $\checkmark$M $\checkmark$CA = 378 700 000 OR 378,7 million **OR** $\checkmark$RT Interest in rand = 54,1 billion × 0,7% $\checkmark$M = 0,3787 billion $\checkmark$CA = 378 700 000 OR 378,7 million	1RT correct amount 1M multiplying with 0,7% 1CA interest amount **OR** 1RT correct amount 1M multiplying with 0,7% 1CA interest amount AO (3)	F L1
5.2.4	Difference = income – expenditure $\checkmark$M = R63 billion – R54,1 billion = R8,9 billion $\checkmark$CA $\checkmark$C = R8 900 million **OR** R8 900 000 000 **OR** Difference = income – expenditure $\checkmark$M $\checkmark$C = R63 000 million – R54 100 million $\checkmark$CA = R8 900 million **OR** R8 900 000 000	1M subtracting 1CA simplification in billions 1C for difference in millions **OR** 1M subtracting 1C converting to millions 1CA difference in millions (3)	D L2
		[26]	
		TOTAL: 150	