higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

MATHEMATICAL LITERACY
(First paper)
NQF LEVEL 4

1 November 2022

This marking guideline consists of 9 pages.

Symbol	Explanation
M	Method
MA	Method with accuracy
CA	Consistent accuracy
A	Accuracy
C	Conversion
S	Simplification
RT/RG/RD	Reading from a table/graph/drawing
F	Choosing correct formula
E	Explanation
SF	Substitution in formula
R/J	Reasoning/Justification
P	Penalty, e.g. for no units, incorrect rounding off, etc.
R	Rounding off
MF	Manipulating formula

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QUESTION 1

Do not deduct marks if the R or % signs are omitted.

Item	Subitem	Solution	Explanation	Marks
1.1	1.1.1	$1{,}2;\ \ 85\%;\ \ \frac{21}{50};\ \ 0{,}402;\ \ 0{,}375$ ✓✓	2A	(2)
	1.1.2	$\frac{4}{5};\ \frac{3}{4};\ \frac{1}{2};\ \frac{3}{8}$ ✓	1A	(1)
1.2	1.2.1	$4\frac{5}{8} - 3\frac{1}{4} + 1\frac{2}{5}$		
		$= \frac{37}{8} - \frac{13}{4} + \frac{7}{5}$ ✓	1M	
		$= \frac{185 - 130 + 56}{40}$ ✓	1MA	
		$= \frac{111}{40}$ ✓ **OR** $2\frac{31}{40}$	1A	(3)
	1.2.2	$7 + [8 - 3 \text{ of } (\sqrt{4} + 2)]$		
		$= 7 + (8 - 3 \times 4)$ ✓	1MA	
		$= 7 + (8 - 12)$ ✓	1MA	
		$= 7 - 4$ ✓	1MA	
		$= 3$ ✓	1A	(4)
1.3		$0{,}0156\ \text{m}^3$		
		$= 0{,}0156 \times 10^9$ ✓ **OR** $0{,}0156 \times (1\,000)^3$ ✓	1C	
		$= 15\,600\,000\ \text{mm}^3$ ✓	1A	(2)
1.4		1 kg of potatoes		
		$= \frac{\text{R}12{,}50}{4\ \text{kg}}$ ✓	1M	
		$= \text{R}3{,}13/\text{kg}$ ✓ **OR** R3,125	1A	
		11 kg of potatoes		
		$= 11 \times 3{,}13$ ✓ **OR** $\text{R}3{,}125 \times 11$	1MA	
		$= \text{R}34{,}43$ ✓ **OR** R34,38	1CA	(4)

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1.5	7:6 56,7:new weight✓		1Ratio form	
	New weight $= 67 \times 56,7$ kg✓ $= 48,6$ kg✓		1MA 1A	(3)
1.6	Percentage decrease			
	$= \frac{15,20 - 14,37}{14,37} \times 100$✓✓		2M	
	$= 5,78\ \%$✓		1A	(3)
1.7	$°F = (15° \times 1,8) + 32°$✓ $= 59\ °F$✓		1SF 1A	(2)
1.8	1.8.1	Add hours $= 3:00 + 1$ hour $= 4:00$✓	1M	
		Add minutes $= 45 + 30$ $= 75$ minutes $= 60 + 15$ $= 1$ hour and 15 minutes✓	1M	
		End time in 12-hour format $= 4:00 + 1$ hour and 15 minutes✓ $= 5:15$ pm✓	1MA 1A	(4)
	1.8.2	End time in 24-hour format $= 5:15 + 12$ hours✓ $= 17:15$✓	CA 1.8.1 1M 1A	(2) **[30]**

QUESTION 2

Penalise once for incorrect units unless stated otherwise.

Item	Subitem	Solution	Explanation	Marks
2.1	2.1.1	Area of a lawn		
		$= 6\text{ m} \times 8\text{ m}$✓	1M	
		$= 48\text{ m}^2$✓	1A	
		Area of a triangle		
		$= \frac{1}{2} \times 4\text{ m} \times 2\text{ m}$✓	1SF	
		$= 4\text{ m}^2$✓	1A	
		Area of the grass		
		$= 48\text{ m}^2 - 4\text{ m}^2$✓	1MA	
		$= 44\text{ m}^2$✓	1CA	(6)
	2.1.2	Cost to feed lawn	CA 2.1.1	
		$= 44\text{ m}^2 \times \text{R}10/\text{m}^2$✓	1M	
		$= \text{R}440$✓	1A	(2)
	2.1.3	Perimeter		
		$= 2 \times 8\text{ m} + 2 \times 6\text{ m}$✓ $- 0{,}5\text{ m}$✓	1SF; 1M	
		$= 27{,}5\text{ m}$✓	1A	
		Length of wire needed		
		$= 4 \times 27{,}5\text{ m}$✓	1MA	
		$= 110\text{ m}$✓	1CA	(5)
	2.1.4	Cost to fence the lawn	CA 2.1.3	
		$= 110\text{ m} \times \text{R}6/\text{m}$✓	1M	
		$= \text{R}660$✓	1A	(2)
2.2	2.2.1	1 km: 100 000 cm		
		Distance: 300 000✓	1M	
		Real-life distance in km		
		$= \frac{300\,000}{100\,000}$✓	1C	
		$= 3\text{ km}$✓	1A	(3)
	2.2.2	1: 300 000		
		6: distance✓	1M	
		Real-life distance in cm		
		$= 6 \times 300\,000$✓		
		$= 1\,800\,000\text{ cm}$✓	1C	
		1 km: 100 000 cm	1A	
		Distance: 1 800 000✓	1M	

	Real life distance in km $= \frac{1\,800\,000}{100\,000}$✓ $= 18$ km✓	1C 1CA	(6)
2.2.3	1 km: 100 000 cm 19,5 km: distance✓	1M	
	Real life distance in cm $= 19{,}5 \times 100\,000$✓ $= 1\,950\,000$ cm✓	1C 1A	
	1: 300 000 Distance: 1 950 000✓	1MA	
	Distance on the map $= \frac{1\,950\,000}{300\,000}$✓ $= 6{,}5$ cm✓	1M 1CA	(6)
			[30]

QUESTION 3

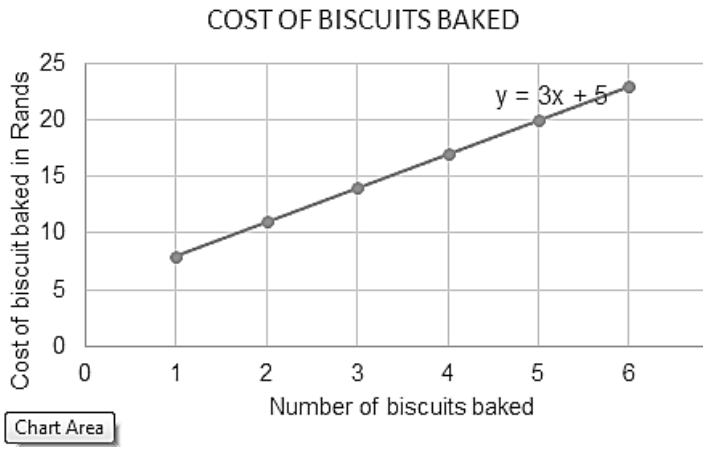
Do not penalise if R sign is omitted.

Item	Subitem	Solution	Explanation	Marks
3.1	3.1.1	5 gowns✓✓	2RG	(2)
	3.1.2	6 gowns✓✓	2RG	(2)
	3.1.3	They will make a net loss.✓✓	2R/J	(2)
	3.1.4	A✓	1RG	(1)
	3.1.5	B✓	1RG	(1)
	3.1.6	R9 100✓✓ (Accept R9 000 – R9 800)	2RG	(2)
	3.1.7	R11 200✓✓ (Accept R11 000 – R11 500)	2RG	(2)
	3.1.8	Total profit = R11 200 – R9 100✓ = R2 100✓	CA 3.1.6 & 3.1.7 1M 1A	(2)
	3.1.9	Total cost = R3 500✓ -R3 500 is a fixed cost, thus it is independent of the number of gowns sold.✓	1RG 1E	(2)

	3.1.10	Total income = R0,00✓ Nothing is sold.✓	1RG 1E	(2)
3.2	3.2.1	The size of the yard is 450 m², which is between 301 and 600, thus the tariff per month is R76,41.✓	1RT	
		Charge per month: $= 76{,}41 \times \frac{115}{100}$✓ = R87,87✓	1M 1A	
		OR		
		$= 76{,}41 + 76{,}41 \times \frac{15}{100}$✓ = R87,87✓		(3)
	3.2.2	Nothing✓	1A	(1)
	3.2.3	The size of the yard is 900 m², ✓thus the tariff per month is R136,23.✓	1A 1RT	
		Charge per month: $= (136{,}23 + 200)$✓ $\times \frac{115}{100}$✓ = R386,66✓	2M 1A	
		OR		
		$= (136{,}23 + 200) + (136{,}23 + 200) \times \frac{15}{100}$ = R386,66		(5)
	3.2.4	Charge per month: $= 281{,}76 \times \frac{100}{115}$✓ = R245,01✓	1M 1A	
		Thus, the size of the stand is more than 1 500 m².✓	1A	(3) **[30]**

QUESTION 4

Do not penalise if R sign is omitted.

Item	Subitem	Solution	Explanation	Marks
4.1	4.1.1	A = 17✓✓	2A	
		B = 6✓✓	2A	(4)
	4.1.2	The cost of biscuits increases by R3 as the number of biscuits increases by 1.✓ (Any relevant answer.)	1A	(1)
	4.1.3		1 labelling title 1 labelling axes (no mark if one is omitted) 3 line graph – cost: (2 for plotting and 1 for line)	
		Labelling title✓ Labelling axes✓ Drawing a line graph✓✓✓		(5)
	4.1.4	Cost of biscuits = R5✓ + R3✓ × number of biscuits✓	R5 1A R3 1A Number of biscuits 1A	(3)
	4.1.5	Cost of 15 biscuits = 5 + 3 × 15✓ = R50✓	 1M 1A	(2)
	4.1.6	Independent – number of biscuits baked✓ Dependent – cost of biscuits✓ Total cost of biscuits depends on number of biscuits baked✓ (Any relevant answer)	1A 1A 1R/J	(3)
	4.1.7	Direct relationship✓ As the number of biscuits baked increases, the cost increases.✓ (Any relevant answer.)	1A 1R/J	(2)

4.2	4.2.1	Number of days $= \frac{400\ ✓}{Number\ of\ painters\ ✓}$	1Numerator 1Denominator	(2)
	4.2.2	A $= \frac{400}{8}$ ✓ A = 50 days ✓	1M 1A	
		B $= \frac{400}{40}$ ✓ B = 10 painters ✓	1M 1A	(4)
	4.2.3	Inverse/Indirect relationship.✓ As the number of painters increase ✓, the number of days decrease. ✓	1A 2R/J	(3)
	4.2.4	400 days ✓	1A	(1) **[30]**

QUESTION 5

Item	**Subitem**	**Solution**	**Explanation**	**Marks**
5.1	5.1.1	Mean weight $= \frac{497 + 498 + 502 + 503 + 505}{5}$ $= \frac{2\ 505✓}{5✓}$ $= 501✓$	1Numerator (sum) 1Denominator 1A	(3)
	5.1.2	497; 498; 502; 503; 505✓ Median = 502✓	1order 1A	(2)
	5.1.3	Modal weight = 499✓ and 501✓	2A	(2)
5.2	5.2.1	Age group = 20 – 24✓ There are several reasons, possibly still physically active, exercise, no family stress and commitments✓ (Any relevant answer)	1RG 1R/J	(2)
	5.2.2	Percentage estimate ≈ 27%✓✓	2RG	(2)
	5.2.3	Fraction $= \frac{30}{100}$ ✓ = $\frac{3}{10}$✓	1RG; 1S	(2)

5.2.4 Percentage
$= 100\% - 20\%$✓ 1RG (20%)
$= 80\%$✓ 1A (2)

5.2.5 Women tend to get overweight after 34 years (gain weight after age 34 years).✓✓ 2R/J (2)

5.3 5.3.1

Blood type	Frequency
A	50✓
B	65✓
O	70✓
AB	15✓

4A (4)

5.3.2 Probability type O blood
$= \frac{70}{200}$✓✓ 1Numerator 1Denominator (2)

5.4 Number of girls walk to school
$= 18 \times \frac{2}{9}$✓
$= 4$✓ 1M 1A

Number of boys walk to school
$= 12 \times \frac{1}{4}$
$= 3$✓ 1A

Probability of boys
$= \frac{3}{7}$✓ 1CA (4)

5.5 Joe's probabilities sum
$= 0{,}3 + 0{,}2 \times 2 + 0{,}05 \times 13$✓ 1M
$= 1{,}35$✓ 1A
1R/J

Thus Joe is incoherent because the sum of the probability is never greater than 1.✓ (Any relevant answer.) (3)
[30]

TOTAL: 150

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