higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

MATHEMATICS
NQF LEVEL 2
(Second paper)

10 November 2023

This marking guideline consists of 7 pages.

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One mark = ✓
Half mark = √

QUESTION 1

1.1 1.1.1 Discrete data is the information gathered✓ from a survey or questionnaire.✓

1.1.2 The mean of data is the numerical value found by adding together all the separate values of the data ✓and dividing the answer by the numerical values.✓

(2 × 2) (4)

1.2 1.2.1

STEM	LEAF
5	0, 7, 7, 9✓
6	3, 5, 9✓
7	0, 0, 0, 4, 7✓
8	5, 6✓
9	2, 3, 5, 7, 8, 9✓

(5)

1.2.2 $\text{Mean} = \frac{1\,526}{20}$ ✓
$= 76{,}3$ ✓ (2)

1.2.3 $\text{Median} = \frac{1}{2}(20+1)\text{ position}$
$= 10{,}5\text{ position}$ ✓
$= \frac{70+74}{2} = 72$ ✓ (2)

1.2.4 Mode = 70 (1)

1.3 12, 14, 17, 22, 25, 29, 30, 30, 32, 33, 35, 48

1.3.1 Range = 36 (1)

1.3.2 $Q1_{\text{position}} = \frac{1}{4}(12+1)$
$= 3{,}25\text{ position}$✓
$Q1 = 17 + 0{,}25(22-17) = 18$ ✓

Accept Q1 = $\frac{17+22}{2}$ ✓= 19,5 ✓ (2)

1.3.3 $Q3_{\text{position}} = \frac{3}{4}(12+1) = 9{,}75\text{ position}$
$Q3 = 32 + 0{,}75(33-32) = 32{,}75$ ✓ (2)

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Accept : $Q3 = \frac{32+33}{2}$ ✓
$= 32,5$ ✓

1.3.4 Interquartile $= Q3 - Q1$
$= 32,75 - 18$ ✓
$= 14,75$ ✓
OR
Accept: Interquartile $= Q3 - Q1$
$= 32,5 - 19,5$ ✓
$= 13$ ✓ (2)

1.3.5 Semi-interquartile $= \frac{14,75}{2}$
$= 7,375$ ✓
OR
Semi-interquartile $= \frac{13}{2}$
$= 6,5$ ✓ (1)

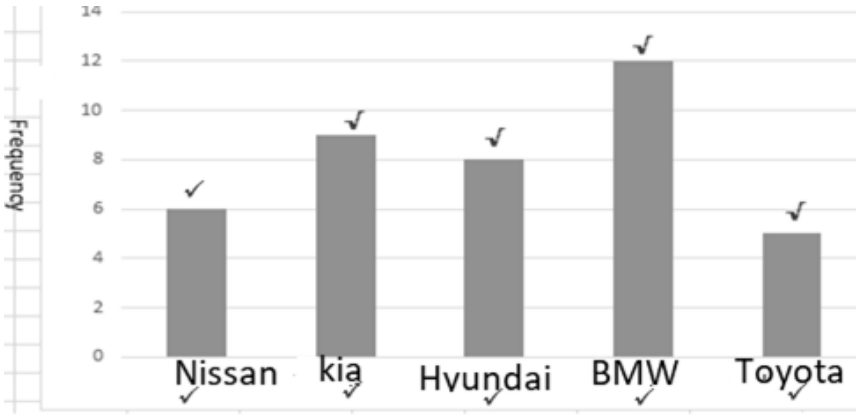
1.3.6 67th percentile $= \frac{67}{100}(12+1)$ ✓
$= 8,71$ position ✓
$= 30 + 0,71(32 - 30) = 31,42$ ✓ (3)

1.4 1.4.1

CARS	TALLY	FREQUENCY
NISSAN	~~1111~~ 1√	6√
HYUNDAI	~~1111~~ 111√	8√
BMW	~~1111~~ ~~1111~~ 11√	12√
KIA	~~1111~~ 1111√	9√
TOYOTA	~~1111~~√	5√
		40

(5)

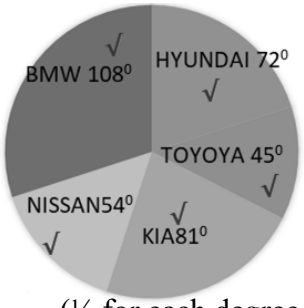
1.4.2



(½ for each bar + ½ for each label) (5)

1.4.3

CARS	FREQUENCY	PERCENTAGE	DEGREE
NISSAN	6	15%	54°√
HYUNDAI	8	20%	72°√
BMW	12	30%	108°√
KIA	9	22,5%	81°√
TOYOTA	5	12,5%	45°√
TOTAL	**40**	**100%**	**360°**



(½ for each degree + ½ for each correct sector) (5)
[40]

QUESTION 2

2.1 2.1.1

$AC = \sqrt{(-3-1)^2 + (-1-4)^2}$ ✓
$= \sqrt{16+25}$ ✓
$= \sqrt{41}$
$= 6{,}4$ units ✓ (3)

2.1.2

$m_{CD} = \frac{-4-4}{1-9}$ ✓
$= 1$ ✓ (2)

2.1.3

$M_{BC}\left(\frac{9+1}{2}; \frac{4-4}{2}\right)$ ✓
$M(5;-0)$ ✓✓
The *y*- co-ordinate is 0 , therefore the line lies on the *x*-axis. ✓ (4)

2.1.4 $m_{AB} = \frac{4-(-1)}{9-(-3)} = \frac{5}{12}$ ✓

$y = \frac{5}{12}x + c$

At point B

$c = 4 - \frac{5}{12}(9)$ ✓

$= \frac{1}{4}$ ✓

Equation of AB

$y = \frac{5}{12}x - \frac{1}{4}$ ✓ (4)

2.2 2.2.1 $A^1 = (4;0)$ ✓

$B^1 = (8;1)$ ✓

$C^1 = (6;-2)$ ✓ (3)

2.2.2 $A^1 = (-3;-2)$ ✓✓ (2)

2.3 2.3.1 $A = 2(20 \times 30) + 2(50 \times 30) + (50 \times 20)$ ✓✓✓

$= 5200\,\text{cm}^2$ ✓ (4)

2.3.2 $A = 2\pi r(h + r)$

$= 2\pi(2{,}5)[10 + 2{,}5)$ ✓✓

$= 196{,}35\,\text{cm}^2$ ✓ (3)

2.3.3 $V_{\text{tank}} = 50 \times 20 \times 30 = 30000\,\text{cm}^3$ ✓✓

$V_{cylinder} = \pi(2{,}5)^2 \times 10$ ✓

$= 196{,}35\,\text{cm}^3$ ✓

$V_{\text{new}} = 30000 - 196{,}35 = 29803{,}65\ \text{cm}^3$ ✓ (5)

[30]

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QUESTION 3

3.1 3.1.1

$$P = \sqrt{5^2 + 7^2} \checkmark$$
$$P = \sqrt{74} \checkmark$$
$$P = 8{,}602 \checkmark$$

(3)

3.1.2

$$\cos\theta = \frac{5}{8{,}602} \checkmark$$
$$\sin\theta = \frac{7}{8{,}602} \checkmark$$
$$\frac{\cos\theta}{\sin\theta} = \frac{5}{8{,}602} \times \frac{8{,}602}{7} \checkmark = \frac{5}{7} = 0{,}714 \checkmark$$

(4)

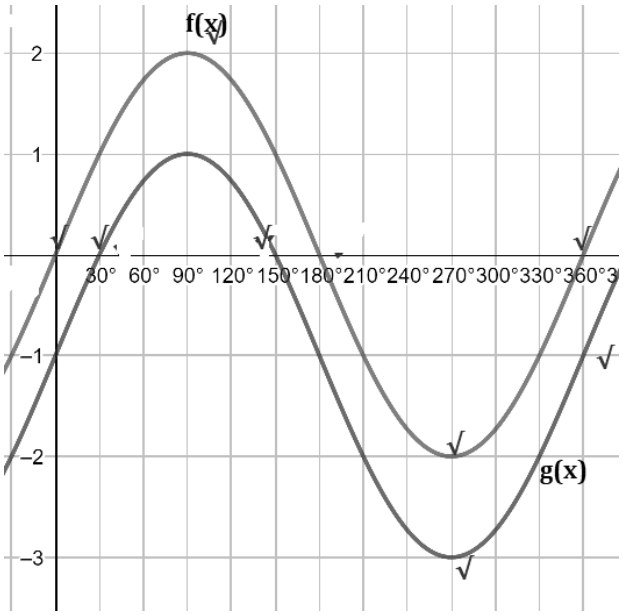
3.1.3

$$\theta = \tan^{-1}\left(\frac{7}{5}\right) \checkmark$$
$$\theta = 54{,}462° \checkmark\checkmark$$

(Use any trig function) (3)

3.2 3.2.1

x	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
$f(x)$	0	1	1,732	2	1,732	1	0	-1	-1,732	-2	-1,732	-1	0
$g(x)$	-1	0	0,732	1	0,732	0	-1	-2	-2,732	-3	-2,732	-2	-1



(2 for table + 4 for graph) (6)

3.2.2 $f(x)\ a = 2$ ✓✓ (2)

3.2.3 $g(x)\ a = 2$ ✓✓ (2)

3.2.4 Range of $g(x) = -3 \le y \le 1$ ✓✓ and domain is $0° \le x \le 360°$ ✓ (2)

3.2.5 360°✓✓ (2)

3.2.6 No point of intersection (1)

3.3 $\tan 35° = \frac{\text{height}}{45\text{ m}}$ ✓

Height $= 45 \times \tan 35°$ ✓

$= 31{,}51\text{ m}$ ✓

$x = 31{,}51\text{ m} + 1{,}5\text{ m}$ ✓

$x = 33{,}01\text{ m}$ ✓ (5)

[30]

TOTAL: 100

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