higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

MATHEMATICS
(Second paper)
NQF LEVEL 2

28 November 2022

This marking guideline consists of 7 pages.

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QUESTION 1

1 mark = ✓
½ mark = √
For incorrect or no units of measurement given, deduct 1 mark for the first occurrence only
For incorrect rounding, deduct 1 mark for the first occurrence only

1.1 1.1.1 Information obtained from a sample (survey or questionnaire, for example) before any statistical process has been applied

1.1.2 The number of times a value occurs within a data set

(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

1 mark for correct stem.
4 marks for correct leaves.
Deduct 1 mark per mistake.
For leaves in correct rows, but unordered: 2 marks.

(5)

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

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

1.2.4 Mode = 70 (1)

1.3 30, 35, 38, 39, 44, 47, 48, 50, 56, 59, 61

1.3.1 Range = 61 – 30 = 31 (1)

1.3.2 $Q_{1position} = \frac{1}{4}(11 + 1) = 3$ ✓
$Q_1 = 38$✓ (Answer only full marks) (2)

1.3.3 $Q_{3position} = \frac{3}{4}(11 + 1) = 9$ ✓
$Q_3 = 56$✓ (Answer only full marks) (2)

1.3.4 $\text{Interquartile} = Q_3 - Q_1$
$= 56 - 38$✓
$= 18$✓ (Answer only full marks) (2)

1.3.5 $\text{Semi-interquartile} = \frac{56-38}{2}$
$= 9$✓ (Answer only full marks) (1)

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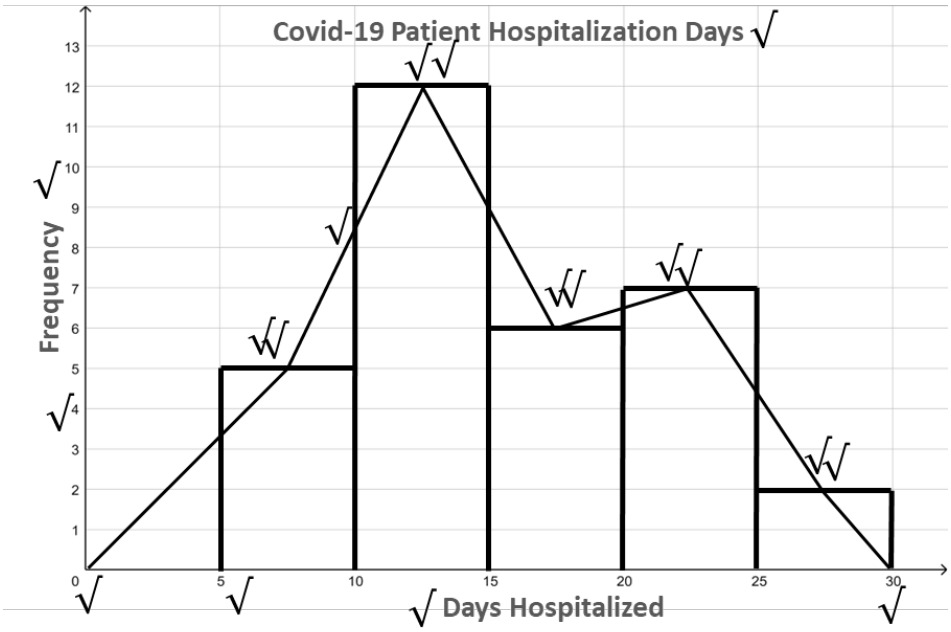
1.3.6 $P_{37position} = \frac{37}{100}(11 + 1) = 4{,}44$✓
$P_{37} = 39 + 0{,}44(44 - 39)$✓
$= 41{,}2$✓ (3)

1.4 1.4.1

DAYS (n) HOSPITALIZED	TALLY	FREQUENCY
$5 < n \leq 10$	√~~1111~~	√5
$10 < n \leq 15$	√ ~~1111~~ ~~1111~~ 11	√12
$15 < n \leq 20$	√~~1111~~ 1	√6
$20 < n \leq 25$	√~~1111~~ 11	√7
$25 < n \leq 30$	√11	√2
	TOTAL	32

(½ mark for each tally and ½ mark for each frequency) (5)

1.4.2 & 1.4.4



Histogram: ½ mark for each bar (2½ marks)
½ mark for each axis label (1 mark)
½ mark for main label
½ mark for each axis numbering (5)

Frequency polygon: ½ mark for each point including 0 and 30 (3½ marks)
½ mark for correct format (lines taken to centre of bars) (4)

1.4.3 The modal class is $\mathbf{10 < n \leq 15}$ (1)
[40]

QUESTION 2

2.1 2.1.1 Length of $BC = \sqrt{(2-(-1))^2 + (2-2)^2}$ ✓✓

$BC = 3$ ✓ (3)

2.1.2 Midpoint of $AC = \left(\frac{2+(-1)}{2}; \frac{2+2}{2}\right)$ √√

$= \left(\frac{1}{2}: 2\right)$ √√ (2)

2.1.3 Gradient of $AB = \frac{-1-2\sqrt{}}{2-(-1)\sqrt{}} = \frac{-3}{3} = -1$✓ (2)

2.2 2.2.1 $P^1 = (3; -2)$✓✓
$Q^1 = (6; -1)$✓✓
$R^1 = (5; -3)$✓✓ (6)

2.2.2 $P(2; 2) \rightarrow P^1(-2; -2)$✓✓ (2)

2.2.3 $Q(5; 3) \rightarrow Q^1(3; 5)$✓✓ (2)

2.3 2.3.1 $r = \frac{1}{2}(8) = 4\text{m}$ √

Area of the vegetable garden

$= \frac{1}{2}\pi r^2$√ (correct formula for semi-circle)

$= \frac{1}{2}\pi(4)^2$✓

$= 8\pi$ m^2 **OR** $= 25{,}133$ m^2✓ (3)

2.3.2 Perimeter of the vegetable garden

√ √

$= \frac{1}{2}(2\pi r) + \text{diameter}$ (correct formula for perimeter)

√ √

$= \frac{1}{2}(2\pi \times 4) + 8$

$= 20{,}566$ m✓ (3)

2.3.3 Whole metres for fencing: 21 m√

Cost $= 290 \times 21$√

$=$ R6 090 ✓ (carry forward error from 2.3.2) (2)

2.4 2.4.1 Surface area of the cylinder

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

$= 2\pi(3,5)(11 + 3,5)$ ✓✓ (correct substitution)
$= 318,872\ \text{cm}^2$✓ (3)

2.4.2 Volume of the cylinder
$= \pi r^2 h$
$= \pi(3,5)^2 11$ √√ (correct substitution)
$= 423,330\ \text{cm}^3$✓ (2)
[30]

QUESTION 3

3.1 3.1.1
$\tan\theta = \frac{4}{3}$✓
$\theta = \tan^{-1}\frac{4}{3}$✓
$\theta = 53,130°$✓ (3)

3.1.2
$DB^2 + 4^2 = 7^2$√
$DB^2 = 7^2 - 4^2$√
$DB = \sqrt{7^2 - 4^2}$√
$DB = \sqrt{33}$√ (2)

3.1.3
$\cos\alpha = \frac{4}{7}$✓
$\alpha = \cos^{-1}\frac{4}{7}$✓
$\alpha = 55,150°$✓ (3)

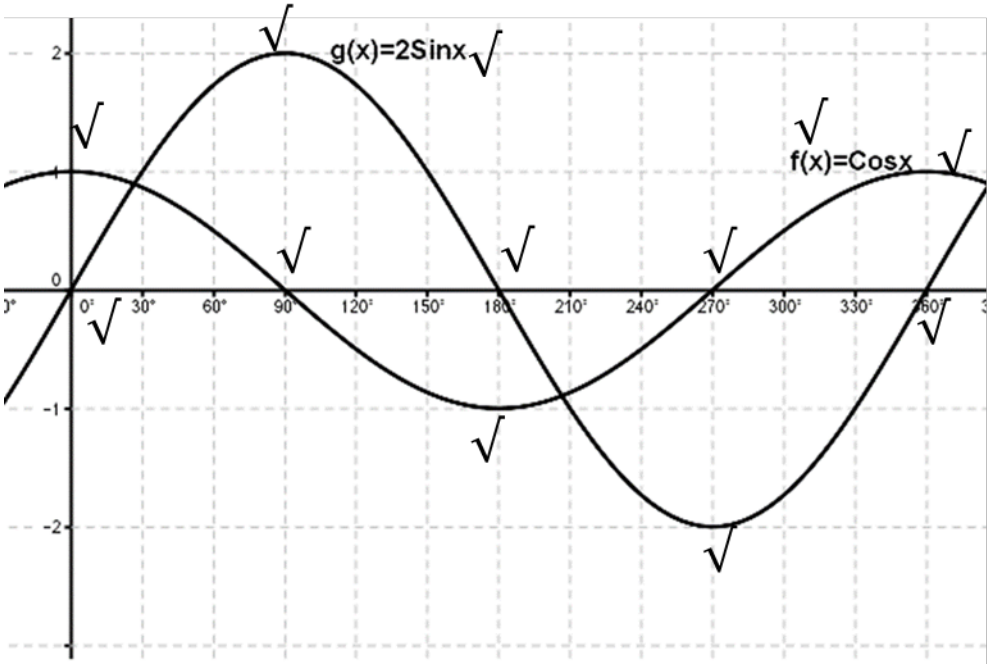
3.2 3.2.1
$PO^2 = 12^2 + (-5)^2$√
$PO = \sqrt{12^2 + (-5)^2}$√
$PO = 13$✓ (2)

3.2.2
$\frac{12}{13} + \left(-\frac{5}{13}\right)$✓ ✓
$= \frac{7}{13}$✓ (3)

3.2.3
$\alpha = 180°$✓ $- \tan^{-1}\frac{12}{5}$✓
$= 180° - 67,380°$√
$= 112,62°$√ (3)

3.3 3.3.1

x	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
$f(x) = \cos x$	1	0,86	0,5	0	$-0,5$	$-0,86$	-1	$-0,86$	$-0,5$	0	0,5	0,86	1
$g(x) = 2\sin x$	0	1	1,73	2	1,73	1	0	-1	$-1,73$	-2	$-1,73$	-1	0



$\frac{1}{2}$ mark for each maximum and minimum
$\frac{1}{2}$ mark each for each x −intercept
$\frac{1}{2}$ mark each for correct graph labels
This is 3 marks for each graph (6)

3.3.2 Period of $f(x) = 360°$ (1)

3.3.3 Range of $g(x)$: $-2 \leq y \leq 2; y \in R$ ✓ ✓ (2)

3.4 3.4.1 $C\hat{A}B = 90° - 30° = 60°$√
$\tan 60° = \frac{BC}{20}$ ✓
$BC = 20 \tan 60°$ √
$= 20\sqrt{3}$ OR 34,641 cm✓

OR
$\tan 30° = \frac{20}{BC}$ ✓

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$BC = \frac{20}{\tan 30°}$ ✓

$= 20\sqrt{3}$ OR 34,641 cm✓ (3)

3.4.2 $AB^2 = (20)^2 + \left(20\sqrt{3}\right)^2$ √

$AB = \sqrt{(20)^2 + \left(20\sqrt{3}\right)^2}$ √

$AB = 40$ cm✓

OR VALID ALTERNATIVE (2)

[30]

TOTAL: 100