higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

MATHEMATICS
(Second paper)
NQF LEVEL 2

XX February 2020

This marking guideline consists of 7 pages.

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✓ 1 mark √ ½ mark

QUESTION 1

1.1 1.1.1 Range: The difference between the highest✓ and lowest✓ data values in a data set. (2)

1.1.2 Raw data: The original data collected✓ before any processing has been done. ✓ (2)

1.2 1.2.1

Stem	Leaf
1	8 9✓
2	0 3 5 5 5 9✓
3	2 2 3 4 4 5 6 7✓
4	0 2✓
5	4 5✓

(5)

1.2.2 Median = $\frac{32+33}{2}$ ✓
= 32,5✓ (2)

1.2.3 Mean $(\bar{x}) = \frac{648}{20}$ ✓
$= 32{,}4$ ✓ (2)

1.2.4 Mode = 25 ✓ (1)

1.3 1.3.1 Range = 49 –2✓
= 47✓ (2)

1.3.2 2 3 3 6 10 11 11 18 26 29 32 33 35 42 42 47 49 49 (1)

1.3.3 $Q_1 = 10$ ✓✓

OR Q_1Position $= \frac{1}{4}(18+1) = 4{,}75$ ✓
$Q_1 = \frac{1}{2}(6+10) = 8$ ✓

OR Q_1Position $= \frac{1}{4}(18+1) = 4{,}75$ ✓
$\therefore Q_1 = 6 + 0{,}75(10-6) = 9$ ✓ (2)

1.3.4 $Q_3 = 42$ ✓✓

OR Q_3Position $= \frac{3}{4}(18+1) = 14{,}25$ ✓
$Q_3 = 42$ ✓ (2)

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1.3.5 $IQR = Q_3 - Q_1 = 42 - 10 = 32$

OR $IQR = 42 - 8 = 34$ ✓✓

OR $IQR = 42 - 9 = 33$ ✓✓ (2)

1.3.6 $Semi - IQR = \frac{32}{2} = 16$ ✓✓

OR $Semi - IQR = \frac{34}{2} = 17$ ✓✓

OR $Semi - IQR = \frac{33}{2} = 16{,}5$ ✓✓ (2)

1.3.7 P_{40} Position $= \frac{40}{100}(18 + 1) = 7{,}6$ ✓

$P_{40} = \frac{1}{2}(11 + 18) = 14{,}5$ ✓✓

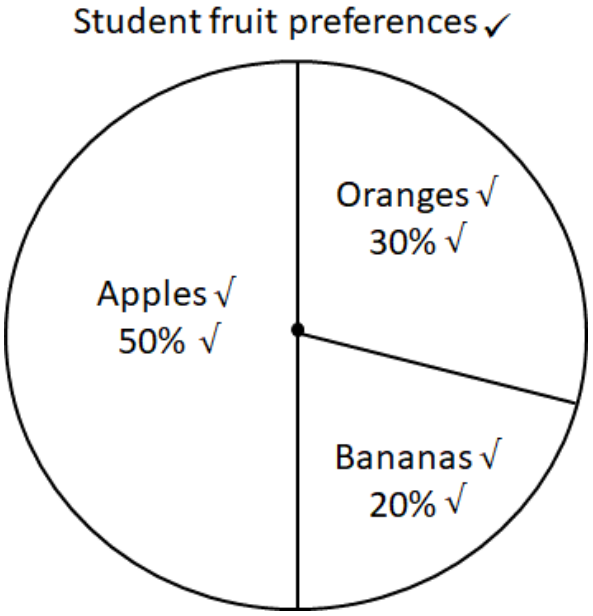
OR $P_{40} = 11 + 0{,}6(18 - 11) = 15{,}2$ ✓✓ (3)

1.4 1.4.1
1.4.2

FRUIT	TALLY	FREQUENCY	FREQUENCY PERCENTAGE
Apples	~~////~~ ~~////~~ ~~////~~ √	15√	50% ✓
Bananas	~~////~~ / √	6√	20% ✓
Oranges	~~////~~ //// √	9√	30% ✓
Total		30 ✓	100%

(7)

1.4.3



(4)

[40]

2.1 2.1.1 $E(\frac{-7+5}{2};\frac{-2+2}{2})$✓
$E(-1;0)$ ✓ (2)

2.1.2 Distance BC $= \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$= \sqrt{(-3-5)^2+(6-2)^2}$✓
$= \sqrt{(-8)^2+(4)^2}$ ✓
$= \sqrt{80}$
$= 4\sqrt{5}$ or $= 8{,}944$ ✓ (3)

2.1.3 $m_{BC} = \frac{y_2-y_1}{x_2-x_1}$
$= \frac{2-6}{5+3}$ ✓ ✓
$= -\frac{4}{8}$ √
$= -\frac{1}{2}$ √ (3)

2.2 Distance $= \sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$
$= \sqrt{(a-5)^2+(-1-3)^2}$
$5 = \sqrt{(a-5)^2+(-4)^2}$✓
$5 = \sqrt{(a-5)^2+16}$✓
$\sqrt{(a-5)^2+16} = 5$
$(a-5)^2+16 = 5^2$
$(a-5)^2 = 25-16$ ✓
$a-5 = \sqrt{9}$
$a = 3+5$
$a = 8$✓ (4)

2.3 2.3.1 $D'(-7;2)$✓✓
$E'(-2;5)$✓✓
$F'(-4;4)$✓✓ (6)

2.3.2 $E'(2;0)$ (2)

2.4 2.4.1 Reflection about $y = x$ (1)
2.4.2 Reflection about y-axis (1)

2.5 2.5.1 $V = l^3$
$= 21^3$ ✓
$= 9\,261\ cm^3$✓ (2)

2.5.2 $SA = 6 \times l^2$
$= 6 \times 21^2$ ✓
$= 2\,646\ cm^2$ ✓ (2)

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2.6 Volume of cylinder $= \pi \times r^2 \times h$
$= \pi \times 3^2 \times 10$ ✓
$= 282{,}743 \text{ cm}^3$ √

Volume of square hole $= lbh$
$= 4 \times 4 \times 10$ ✓
$= 160 \text{ cm}^3$ √

Volume of steel $= 282{,}74 - 160$ √
$= 122{,}743 \text{ cm}^3$ √ (4)
[30]

3.1 3.1.1 $\cos\theta = \frac{24}{25}$

$(25)^2 = (24)^2 + y^2$ ✓
$y^2 + 576 = 625$
$y^2 = 49$
$y = 7$ ✓
$\sin\theta = \frac{7}{25}$ ✓ (3)

3.1.2 $5\cos\theta - 12\tan\theta$
$= 5\left(\frac{24}{25}\right)$ ✓ $- 12\left(\frac{7}{24}\right)$ ✓
$= \frac{24}{5} - \frac{7}{2}$
$= \frac{48 - 35}{10}$
$= \frac{13}{10}$ or 1,3 ✓ (3)

3.2 3.2.1 $\sin 37° = \frac{6{,}4}{AB}$ ✓
$AB = \frac{6{,}4}{\sin 37°}$ ✓
$AB = 10{,}634\ km$ ✓ (3)

3.2.2 $\tan 37° = \frac{6{,}4}{AC}$ ✓
$AC = \frac{6{,}4}{\tan 37°}$ ✓
$AC = 8{,}493\ km$ ✓

OR alternate trig ratio may be used

OR using Pythagoras theorem:

$AB^2 = AC^2 + BC^2$

$10{,}634^2 = AC^2 + 6{,}4^2$ ✓

$AC = \sqrt{10{,}634^2 - 6{,}4^2}$ ✓ (3)

$AC = 8{,}492\ km$ ✓

3.3 3.3.1 Hypotenuse ✓ (1)

3.3.2 $\cos T = \frac{10}{15} = \frac{2}{3}$ ✓✓ (2)

3.3.3 $\hat{T} = \cos^{-1}\left(\frac{2}{3}\right)$ ✓

$\hat{T} = 48{,}190°$ ✓ (2)

3.3.4 $RT^2 = RS^2 + ST^2$

$15^2 = RS^2 + 10^2$ ✓

$RS = \sqrt{15^2 - 10^2}$ ✓

$RS = 5\sqrt{5}$ or $11{,}180$ units ✓

OR

$\sin 48{,}190° = \frac{RS}{15}$ ✓

$RS = 15 \sin 48{,}190°$ ✓

$RS = 11{,}180$ units ✓ (3)

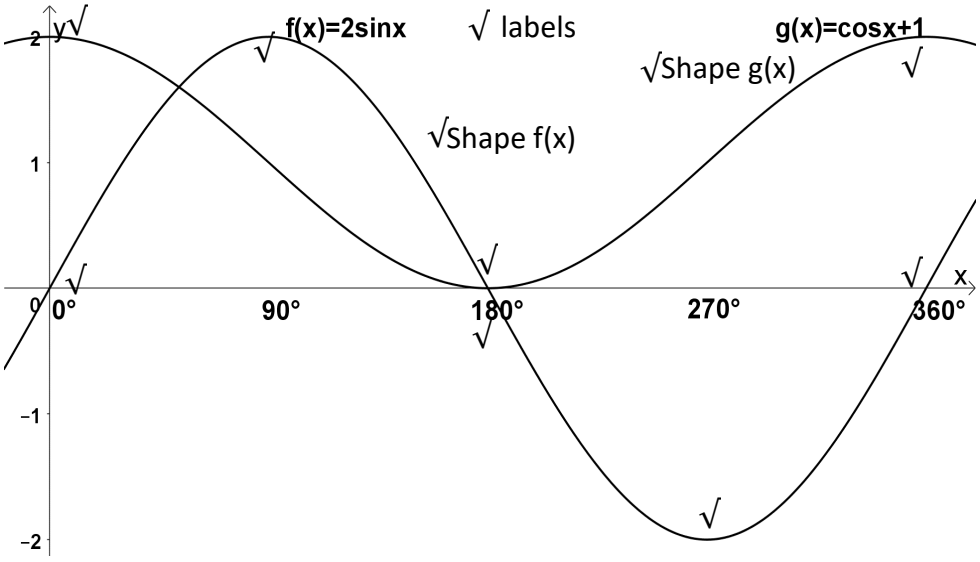
3.4 3.4.1 y ε [-2 ; 2] (2)

3.4.2

x	0°	45°	90°	135°	180°	225°	270°	315°	360°
$f(x) = 2\sin x$	0	1,4	2	1,4	0	**-1,4**	-2	-1,4	0
$g(x) = \cos x + 1$	2	1,7	1	0,3	0	**0,3**	1	1,7	2

Mark allocation for table: Total 3 marks
$^1/_2$ mark for 3 correct entries (including given values).

Mark allocation for graph: 5 marks
$^1/_2$ mark for both labels
$^1/_2$ mark for each graph for correct shape
$^1/_2$ mark each for maximum and minimum points
$^1/_2$ mark each for axis intercepts



(8)
[30]

TOTAL: 100

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