



**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.**

## QUESTION 1

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

$$\begin{aligned} \text{Median} &= \frac{32+33}{2} \checkmark \\ &= 32,5 \checkmark \end{aligned} \quad (2)$$

1.2.3      Mean ( $\bar{x}$ ) =  $\frac{648}{20} \checkmark$   
                       =  $32.4 \checkmark$  (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  $Q_1 = 10 \checkmark \checkmark$

**OR**  $Q_1 \text{Position} = \frac{1}{4}(18 + 1) = 4,75 \checkmark$

$Q_1 = \frac{1}{2}(6 + 10) = 8 \quad \checkmark$

**OR**  $Q_1 \text{Position} = \frac{1}{4}(18 + 1) = 4,75 \checkmark$

$\therefore Q_1 = 6 + 0,75(10 - 6) = 9 \quad \checkmark$

(2)

1.3.4  $Q_3 = 42$  ✓✓

**OR**  $Q_3 \text{Position} = \frac{3}{4}(18 + 1) = 14,25$  ✓

$Q_3 = 42$  ✓

(2)

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

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

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

(3)

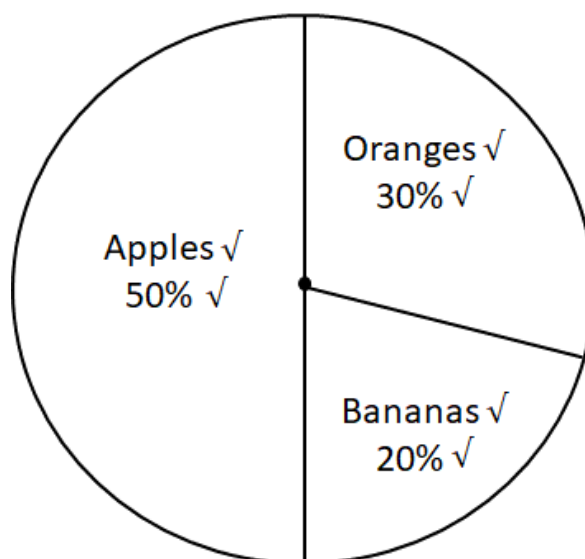
1.4  
1.4.1  
1.4.2

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

(7)

1.4.3

Student fruit preferences ✓



(4)

[40]

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

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

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

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

2.3      2.3.1       $D'(-7; 2) \checkmark \checkmark$   
 $E'(-2; 5) \checkmark \checkmark$   
 $F'(-4; 4) \checkmark \checkmark$  (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       $V = l^3$   
 $= 21^3 \checkmark$   
 $= 9\,261 \text{ cm}^3 \checkmark$  (2)

2.5.2       $SA = 6 \times l^2$   
 $= 6 \times 21^2 \checkmark$   
 $= 2\,646 \text{ cm}^2 \checkmark$  (2)

$$\begin{aligned}
 2.6 \quad \text{Volume of cylinder} &= \pi \times r^2 \times h \\
 &= \pi \times 3^2 \times 10 \quad \checkmark \\
 &= 282,743 \text{ cm}^3 \quad \checkmark
 \end{aligned}$$

$$\begin{aligned}
 \text{Volume of square hole} &= lbh \\
 &= 4 \times 4 \times 10 \quad \checkmark \\
 &= 160 \text{ cm}^3 \quad \checkmark
 \end{aligned}$$

$$\begin{aligned}
 \text{Volume of steel} &= 282,74 - 160 \quad \checkmark \\
 &= 122,743 \text{ cm}^3 \quad \checkmark
 \end{aligned}$$

(4)  
[30]

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

$$(25)^2 = (24)^2 + y^2 \quad \checkmark$$

$$y^2 + 576 = 625$$

$$y^2 = 49$$

$$y = 7 \quad \checkmark$$

$$\sin \theta = \frac{7}{25} \quad \checkmark$$

(3)

$$\begin{aligned}
 3.1.2 \quad &5 \cos \theta - 12 \tan \theta \\
 &= 5 \left( \frac{24}{25} \right) - 12 \left( \frac{7}{24} \right) \quad \checkmark \\
 &= \frac{24}{5} - \frac{7}{2} \\
 &= \frac{48 - 35}{10} \\
 &= \frac{13}{10} \text{ or } 1,3 \quad \checkmark
 \end{aligned}$$

(3)

$$3.2 \quad 3.2.1 \quad \sin 37^\circ = \frac{6,4}{AB} \quad \checkmark$$

$$AB = \frac{6,4}{\sin 37^\circ} \quad \checkmark$$

$$AB = 10,634 \text{ km} \quad \checkmark$$

(3)

$$3.2.2 \quad \tan 37^\circ = \frac{6,4}{AC} \quad \checkmark$$

$$AC = \frac{6,4}{\tan 37^\circ} \quad \checkmark$$

$$AC = 8,493 \text{ km} \quad \checkmark$$

OR alternate trig ratio may be used

OR using Pythagoras theorem:

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

$$10,634^2 = AC^2 + 6,4^2 \quad \checkmark$$

$$AC = \sqrt{10,634^2 - 6,4^2} \quad \checkmark$$

$$AC = 8,492 \text{ km} \quad \checkmark$$

(3)

3.3      3.3.1      Hypotenuse     $\checkmark$

(1)

3.3.2       $\checkmark$   
 $\cos T = \frac{10}{15} = \frac{2}{3} \quad \checkmark$

(2)

3.3.3       $\hat{T} = \cos^{-1}\left(\frac{2}{3}\right) \quad \checkmark$   
 $\hat{T} = 48,190^\circ \quad \checkmark$

(2)

3.3.4       $RT^2 = RS^2 + ST^2$   
 $15^2 = RS^2 + 10^2 \quad \checkmark$   
 $RS = \sqrt{15^2 - 10^2} \quad \checkmark$   
 $RS = 5\sqrt{5} \text{ or } 11,180 \text{ units} \quad \checkmark$

OR

$$\sin 48,190^\circ = \frac{RS}{15} \quad \checkmark$$

$$RS = 15 \sin 48,190^\circ \quad \checkmark$$

$$RS = 11,180 \text{ units} \quad \checkmark$$

(3)

3.4      3.4.1       $y \in [-2 ; 2]$

(2)

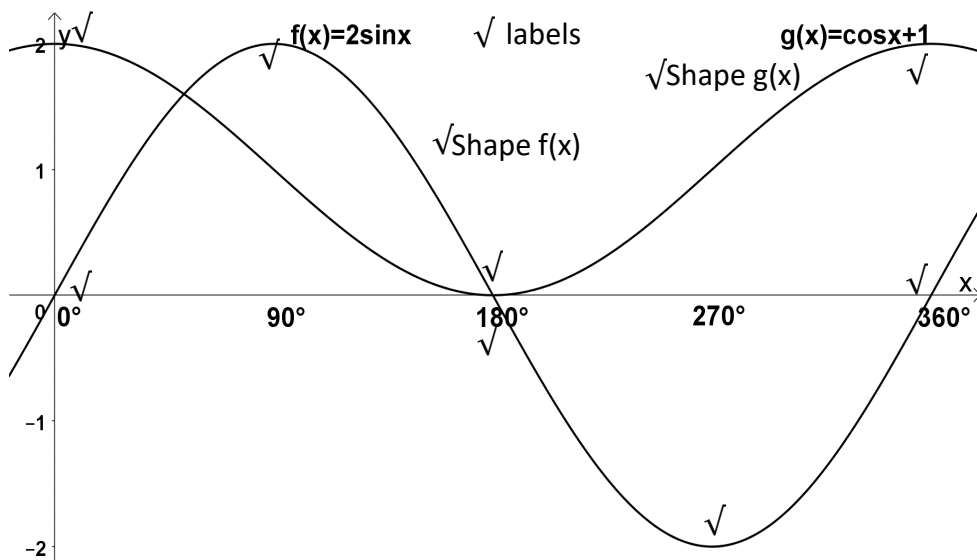
3.4.2

$x$	$0^\circ$	$45^\circ$	$90^\circ$	$135^\circ$	$180^\circ$	$225^\circ$	$270^\circ$	$315^\circ$	$360^\circ$
$f(x) = 2 \sin x$	0	1,4	2	1,4	0	<b>-1,4</b>	-2	-1,4	0
$g(x) = \cos x + 1$	2	1,7	1	0,3	0	<b>0,3</b>	1	1,7	2

Mark allocation for table: Total 3 marks

 $\frac{1}{2}$  mark for 3 correct entries (including given values).

Mark allocation for graph: 5 marks

 $\frac{1}{2}$  mark for both labels $\frac{1}{2}$  mark for each graph for correct shape $\frac{1}{2}$  mark each for maximum and minimum points $\frac{1}{2}$  mark each for axis intercepts

(8)  
[30]

**TOTAL: 100**