higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

# MARKING GUIDELINE

## NATIONAL CERTIFICATE

## NOVEMBER EXAMINATION

## MATHEMATICS N1

## 14 NOVEMBER 2014

**This marking guideline consists of 8 pages.**

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## QUESTION 1

1.1 8
1.2 2
1.3 75
1.4 $\frac{x}{y}$
1.5 2 & 4
1.6 $87,8^0$
1.7 |||
1.8 -2
1.9 -6
1.10 $\frac{9}{a}$

(10 x 1) **[10]**

## QUESTION 2

2.1 2.1.1

$$\left(a^5\right)^{b+c} \bullet \left(a^6\right)^{b-c}$$
$$= a^{5b+5c} \bullet b^{6b-6c} \checkmark$$
$$= a^{5b+6b}.b^{5c-6c} \checkmark$$
$$= a^{11b}.b^{-c} \checkmark$$
$$= \frac{a^{11b}}{a^c} \checkmark$$

(4)

2.1.2

$$(243)^{\frac{1}{5}} + 8^0 + (27)^{\frac{1}{3}}$$
$$= (3^5)^{\frac{1}{5}} + 1 + \left(3^3\right)^{\frac{1}{3}} \checkmark\checkmark$$
$$= 3 + 1 + 3 \checkmark$$
$$= 7 \checkmark$$

(4)

2.1.3

$$\frac{\sqrt{D}\ \log 3^{\sqrt{D}}}{3}$$
$$= \sqrt{D}.\sqrt{D}\log_3 3 \checkmark$$
$$= D.(1)$$
$$= D \checkmark$$

(2)

2.2

$$2\log_e e^3 + \log_2 16 - \log 100$$
$$= 2\left(3\log o_e e\right) + 4\log_2 2 - 2\log 10 \checkmark\checkmark\checkmark$$
$$= 6 + 4 - 2$$
$$= 8 \checkmark$$

(4)

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2.3 $(-4a)^2 \times (3a)^3$

$= 16a^2 \times 27a^3$ ✓ ✓

$= 432\,a^5$ ✓ (3)

2.4 $a^2 - 3a + 1$ ✓ ✓ ✓

$$a-1 \;\overline{)\; a^3 - 4a^2 + 4a - 1}$$

$a^3 - a^2$ ✓

$-3a^2 + 4a$

$-3a^2 + 3a$ ✓

$a - 1$

$a - 1$

$0$

$(a-1)(a^2 - 3a + 1)$ (6)

2.5 $6a - [a + 3(a+2)]$

$= 6a - [a + 3a + 6]$ ✓

$= 6a - 4a - 6$ ✓

$= 2a - 6$ ✓ (3)

**[26]**

## QUESTION 3

3.1 3.1.1 $40x^4y^2 - 24x^2y + 16xy^3$

$= 8xy\left(5x^3y - 3x + 2y^2\right)$ ✓ ✓ (2)

3.1.2 $3(m+n) + am + an$

$3(m+n) + a(m+n)$ ✓

$(m+n)(3+a)$ ✓ (2)

3.2 $40a^4b^6c^4 = 2 \times 2 \times 2 \times 5a^4b^6c^4$ ✓

$90a^4b^3c^2 = 2 \times 3 \times 3 \times 5a^4b^3c^2$ ✓

$60a^2b^5c^3 = 2 \times 2 \times 3 \times 5a^2b^5c^3$ ✓

$LCM = 2^3 \times 3^2\; 5a^4b^6c^4$ ✓

$= 360a^4b^6c^4$

$HCF = 2 \times 5a^2b^3c^2$ ✓

$= 10a^2b^3c^2$ (5)

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3.3 $\frac{5-y}{3}-\frac{y}{2}=10$

$\frac{2(5-y)-3(y)}{6}=10$ ✓

$10-2y-3y=60$ ✓

$-2y-3y=60-10$

$-5y=50$

$y=-10$ ✓ (3)

3.4 $\frac{2a+2b+2c}{4a-4b}\div\frac{5a+5b+5c}{15a^2-15ab}$

$=\frac{2(a+b+c)}{4(a-b)}\times\frac{15a(a-b)}{5(a+b+c)}$ ✓ ✓ ✓ 1 mark for multiplication, 2 marks for common f

$=\frac{2}{4}\times\frac{15a}{5}$ ✓

$=\frac{1}{2}\times\frac{3a}{1}$

$=\frac{3a}{2}$ ✓ (5)

**[17]**

## QUESTION 4

4.1 $\frac{1}{R_T}=\frac{1}{R_1}+\frac{1}{R_2}$

$\frac{1}{R_T}-\frac{1}{R_1}=\frac{1}{R_2}$ ✓

$\frac{R_1-R_T}{R_TR_1}=\frac{1}{R_2}$ ✓

$R_2(R_1-R_T)=R_TR_1$ ✓

$R_2=\frac{R_TR_1}{R_T-R_1}$ ✓ (4)

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4.2 $v = 2\pi rn$

$= 2\pi(20)50$ ✓ $\qquad r = \frac{D}{2} = \frac{40}{2} = 20$ ✓

$= 6283{,}185 mm/\min$ ✓

$m/s = \frac{6283{,}185}{1000}$

$= 6{,}283 m/\min$ ✓

$= \frac{6{,}283}{60}$

$= 0{,}105\ m/s$ ✓ (5)

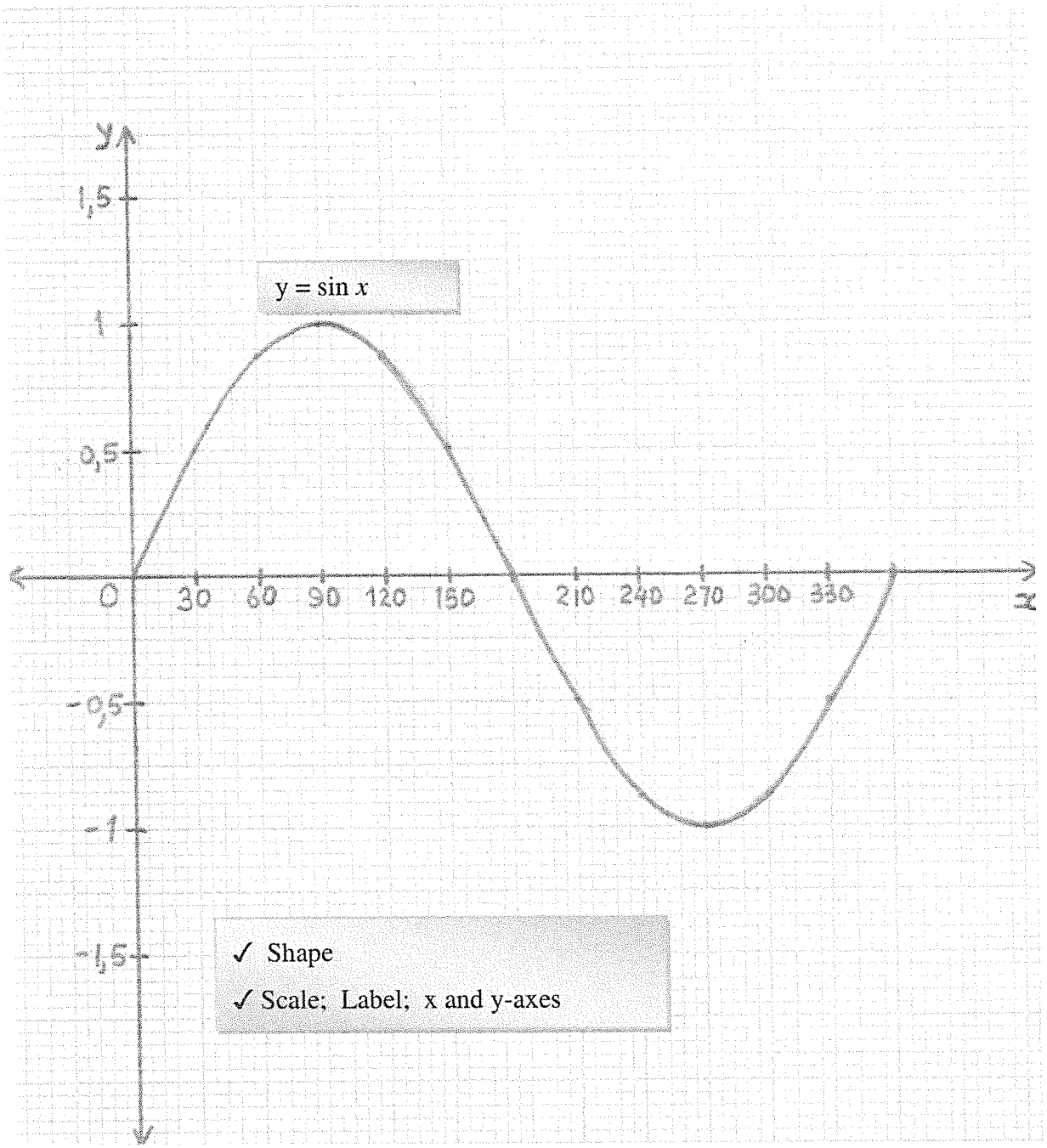
**[9]**

## QUESTION 5

5.1

| $y$ | $0^0$ | $30^0$ | $60^0$ | $90^0$ | $120^0$ | $150^0$ | $180^0$ | $210^0$ | $240^0$ | $270^0$ | $300^0$ | $330^0$ | $360^0$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $x$ | 0 | 0,5 √ | 0,9 √ | 1 √ | 0,9 √ | 0,5 √ | 0 √ | -0,5 √ | -0,9 √ | -1 √ | -0,9 √ | -0,5 √ | 0√ |

(6)




7 marks for graph

(7)
**[13]**

## QUESTION 6

6.1 6.1.1 Isosceles triangle ✓

because two sides are equal in length ✓

OR

AB=AC ✓

(Any 1 reason) (2)

6.1.2 $\hat{A}+\hat{B}+\hat{C}=180^0$ ✓ Isosceles triangles

$\hat{B}=\hat{C}$

$y+37^0+37^0=180^0$ ✓

$y=180^0-74^0$ ✓

$y=106^0$ ✓ (4)

6.2 $$\frac{4\sin 30^0\times\cos 60^0\times\tan 60^0}{\tan 30^0}$$

$$=\frac{4\bullet\frac{1}{2}\times\frac{1}{2}\times\frac{\sqrt{3}}{1}}{\frac{1}{\sqrt{3}}}$$ ✓✓✓

$$=\frac{\frac{1}{1}\times\frac{\sqrt{3}}{1}}{\frac{1}{\sqrt{3}}}$$

$$=1\times\frac{\sqrt{3}}{1}\times\frac{\sqrt{3}}{1}$$ ✓

$=3$ ✓ (5)

6.3 $B=\tan 60^0 28'$

$=\tan 60{,}467^0$ ✓

$B=1{,}765$ ✓ (2)

**[13]**

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## QUESTION 7

7.1 $x^2 = 14^2 + 16^2$ ✓

$= \sqrt{196 + 256}$ ✓

$= \sqrt{452}$

$= 21{,}260$ ✓ (3)

7.2 Extra brick required $= \frac{6}{100} \times 12\,000$ ✓ $= 720$ ✓

Total no of bricks = 12 000 + 720

= 12 720 ✓ (3)

7.3 Area of the semi-circle $= \frac{1}{2}\pi r^2$ ✓

$= \frac{1}{2}\pi 40^2$ ✓

$= 2513{,}274\ mm^2$ ✓

Area of the triangle $= \frac{1}{2}bh$ ✓

$= \frac{1}{2} \times 80 \times 120$

$= 4\,800 mm^2$ ✓

Total area $= 2\,513{,}274 + 4\,800$

$= 7\,313{,}274\ mm^2$ ✓ (6)

**[12]**

**TOTAL: 100**

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