higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

APRIL EXAMINATION

MATHEMATICS N2

1 APRIL 2015

This marking guideline consists of 8 pages.

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INSTRUCTIONS AND INFORMATION

1. ✓ *equals 1 mark.*

2. Half marks are not allocated, unless indicated otherwise.

3. Using the wrong formula when a formula is required is a principle error and NO marks are allocated.

4. Students should show ALL formulae, intermediate steps and simplify where possible.

5. ALL final answers must be rounded off to THREE decimal places (unless indicated otherwise).

6. Questions may be answered in any order, but subsections of questions must be kept together. If subsections are separated, the student can be penalised by ONE mark.

7. Where a student copied incorrectly from the question paper and the standard of the question is still the same the student will be penalised by ONE mark. If the copying error simplifies the question and makes it easier, the student forfeits the marks.

8. Questions must be answered in blue or black ink. Answers in PENCIL are not marked as it is regarded as rough work.

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QUESTION 1

1.1 1.1.1

$$\frac{\sqrt[3]{x^6y^3}}{\left(2xy^{\frac{1}{2}}\right)^2}$$

$$=\frac{x^2y}{4x^2y} \quad \checkmark \quad \checkmark$$

$$=\frac{1}{4} \quad \checkmark$$

(3)

1.1.2

$$\log(x+2)^2-\log(x^2-4)$$

$$=\log\frac{(x+2)^2}{x^2-4} \quad \checkmark \quad \checkmark$$

$$=\log\frac{(x+2)^2}{(x+2)(x-2)} \quad \checkmark \quad \checkmark$$

$$=\log\frac{x+2}{x-2}$$

(4)

1.2

$$5^{x-1}.25^{x-1}=1$$

$$5^{x-1}.5^{2x-2}=5^0 \quad \checkmark \quad \checkmark$$

$$5^{3x-3}=5^0 \quad \checkmark$$

$$3x-3=0 \quad \checkmark$$

$$x=1$$

(4)

[11]

QUESTION 2

2.1 $9x^2+15x-6$

$=3(3x^2+5x-2)$ ✓

$=3(3x-1)(x+2)$ ✓ ✓ (3)

2.2 2.2.1 $3(x-3)(x+3)$ ✓

$5a(x+3)$ ✓

$(x-3)(x-3)$ ✓ (3)

2.2.2 $HCF:1$ ✓ ✓ (2)

2.2.3 $LCM:15a(x+3)(x-3)^2$ ✓ ✓ ✓ (3)

2.3 2.3.1 $\frac{b^2+4b+3}{b^2}\div\frac{b^2+3b+2}{b}$ ✓ ✓

$=\frac{(b+3)(b+1)}{b^2}\times\frac{b}{(b+1)(b+2)}$ ✓

$=\frac{(b+3)}{b(b+2)}$ ✓

✓

(5)

2.3.2 $\frac{1}{x}+\frac{2}{y}-\frac{3}{z}$ ✓

$=\frac{yz+2xz-3xy}{xyz}$ ✓ ✓ (3)

2.4 A=distance$[\frac{\text{1st+last}}{2}+\text{sum of the ordinates}]$

2437=distance$[\frac{210+101}{2}+1599]$ ✓

2437=distance[1754,5] ✓ ✓

1,389=distance ✓ ✓ (5)

[24]

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QUESTION 3

3.1 3.1.1 $3x^2+14x-5=0$ ✓ (1)

3.1.2
$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$
$$x=\frac{-14\pm\sqrt{196-4(3)(-5)}}{2(3)}$$ ✓ ✓
$$x=\frac{-14\pm\sqrt{256}}{6}$$ ✓
$x=0,333$ or $x=-5$ ✓ (4)

3.2 $3x-4y=2$ and $6x-4y=7$ ✓

$3x-4y=2$
$6x-4y=7$

$-3x=-5$ ✓
$x=1,667$

$3(1,667)-4y=2$ ✓
$y=0,75$ ✓ (4)

3.3 3.3.1
$$A=r\sqrt{\frac{b}{c^2}}$$
$$\frac{A}{r}=\sqrt{\frac{b}{c^2}}$$ ✓
$$\frac{A^2}{r^2}=\frac{b}{c^2} \quad .....(c)$$ ✓
$$c^2A^2=br^2$$
$$c=\pm\sqrt{\frac{br^2}{A^2}}$$ ✓ ✓ (4)

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3.4 $(x)(x+4)=96$ ✓
$x^2+4x-96=0$
$(x+12)(x-8)=0$ ✓
$x=-12$ or $x=8$
the lenght of the room is 12 m ✓
while the breadth is 8 m ✓ (4)
[17]

QUESTION 4

4.1 4.1.1
$$D=h+\frac{x^2}{4h}$$ ✓
$$D=45+\frac{23^2}{4(45)}$$ ✓ ✓
$D=47,939$ cm (3)

4.1.2
$$A=\pi r^2$$
$$A=\pi(\frac{47,939}{2})^2$$ ✓
$A=1804,961\text{cm}^2$ ✓ ✓ (3)

4.1.3
$V=$ area $\times$ height ✓
$V=(1804,961)(5)$ ✓
$V=9024,805\text{ cm}^3$ ✓
**Follow up on wrong diameter in 4.1.2* (3)

4.2 4.2.1
$$w=\frac{455,12}{60}\,rad/s$$ ✓
$w=7,585$ *radians / second* ✓ (2)

4.2.2 $w=2\pi n$ ✓
$7,585=2\pi n$
$1,207=n$ ✓ ✓

**Follow up on wrong answer of 4.2.1* (3)

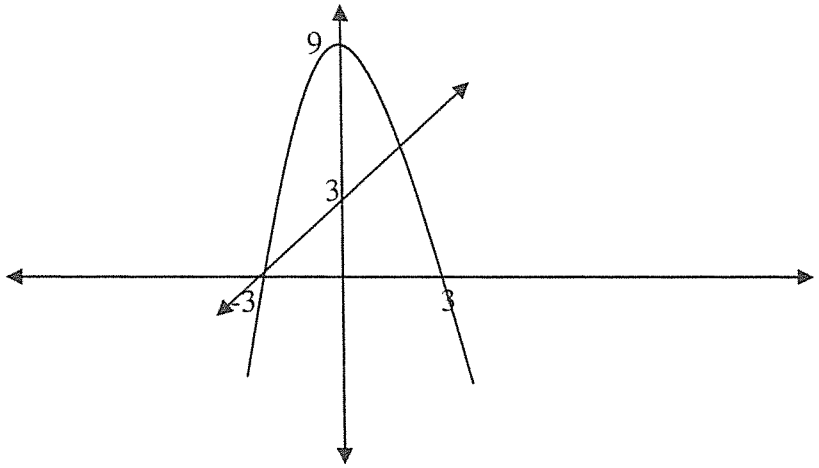
4.2.3 $v=\pi Dn$ ✓
$$v=\pi(\frac{13}{100})(1,207)$$ ✓
$v=0,493$ m/s ✓ (3)

4.3 $134,359^o$ ✓ (1)
[18]

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QUESTION 5

5.1 5.1.1



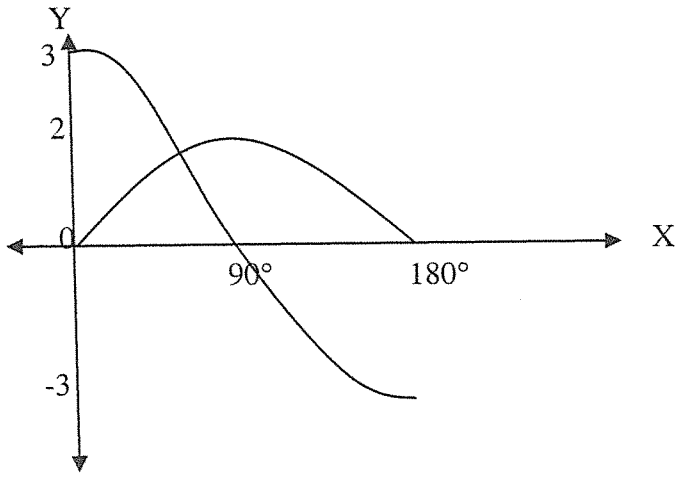
✓ ✓ ✓ *x – and y intercepts of straightline; positive slope*

✓ ✓ ✓ ✓ *x – and y – intercepts of parabola, turning point, shape* (7)

5.1.2 (-3;0) and (2;5)
**Follow up on graphs of student* (2)

5.2 5.2.1 Amplitude: 3 (1)

5.2.2



*Not drawn to scale

✓✓✓Shape of graph, maximum turning point, x-intercept
✓✓✓Shape of graph, maximum turning point, x-intercept (6)

5.2.3 $x = 57°$ ✓ ✓

Only value in the interval

$[45°; 65°]$ (2)

[18]

QUESTION 6

6.1 $0,5\cos\theta + 0,5 = 0,7$

$\cos\theta = \frac{0,2}{0,5}$ ✓ ✓

$\cos\theta = 0,4$

$\theta = 66,422°$ or $\theta = 293,578°$

✓ ✓ (4)

6.2 ✓ $\tan 62° = \frac{h}{12}$ ✓

$12\tan 62° = h$ ✓

$h = 22,569$ m ✓ (4)

6.3 6.3.1 $\frac{3\sin 12°42'}{4\tan 42°}$

$= \frac{0,660}{3,602}$ ✓

$= 0,183$ ✓ (2)

6.3.2 $\sqrt{9\cos 360°} + 1 - 2\sin^2\frac{\pi}{3}$

$= 3 + 1 - \frac{3}{2}$ ✓

$= 2,5$ ✓ (2)
[12]

TOTAL: 100

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