

MARKING GUIDELINE

NATIONAL CERTIFICATE

NOVEMBER EXAMINATION

MATHEMATICS N2

17 NOVEMBER 2014

This marking guideline consists of 9 pages.

5. ALL final answers must be rounded off to THREE decimal places (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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$$= xy(x-1)(x+9)$$

✓ ✓ ✓

(3)

1.2 $x^2 - 15x + 36 = (x-12)(x-3)$ ✓

✓✓ mark per expression

$3x^2 - 27 = 3(x-3)(x+3)$ ✓

$5bx - 15b = 5b(x-3)$ ✓

✓ ✓

$LCM = 15b(x-3)(x+3)(x-12)$

$HCF = (x-3)$ ✓ ✓

Penalise with a half mark for missing factor or unwanted factors.

(7)

1.3 1.3.1 $\frac{2x^2-32}{4xb+b} \times \frac{b}{x+4} \div \frac{8x-32}{4x+1}$

$\frac{2x^2-32}{4xb+b} \times \frac{b}{x+4} \div \frac{8x-32}{4x+1}$

$= \frac{2(x-4)(x+4)}{b(4x+1)} \times \frac{b}{x+4} \times \frac{4x+1}{8(x-4)}$ ✓ ✓ ✓

$= \frac{1}{4}$ ✓

(4)

1.3.2

$\frac{3x}{x-3} - \frac{2x}{x^2-6x+9}$

✓ ✓

$= \frac{3x}{(x-3)} - \frac{2x}{(x-3)(x-3)}$

✓ factorisation
✓ common denominator
✓✓ like fractions
✓ simplification

$= \frac{3x(x-3)-2x}{(x-3)(x-3)}$

✓

$= \frac{3x^2-11x}{(x-3)^2}$ ✓ ✓

(5)
[22]

$$(F-v)^2 a^2 c = \frac{1}{x} \quad \checkmark$$

$$x = \frac{1}{(F-v)^2 a^2 c} \quad \checkmark$$

(5)

2.2

$$(x+3)^2 = 25$$

$$x^2 + 6x + 9 = 25 \quad \checkmark$$

$$x^2 + 6x - 16 = 0$$

$$(x+8)(x-2) = 0$$

$$\therefore x = -8 \text{ or } x = 2 \quad \checkmark$$

✓ multiplication
✓ factorisation
✓ answers

alternative solution

$$(x+3)^2 = 25 \quad \checkmark$$

$$x+3 = \pm 5 \quad \checkmark$$

$$\therefore x = -8 \text{ or } x = 2 \quad \checkmark$$

✓ draw square roots
✓ $\pm$
✓ two solutions

(3)

2.3

$$3(x-2) - 2(2x+1) = 7 - (3x+2)$$

$$3x - 6 - 4x - 2 = 7 - 3x - 2 \quad \checkmark$$

$$2x = 13 \quad \checkmark$$

$$\therefore x = 6\frac{1}{2} \quad \checkmark$$

✓ removing brackets
✓ simplify
✓ solution

(3)

width = 2 m

2.5

A = distance $\left(\frac{1^{\text{st}} + 1^{\text{st}}}{2} + \text{sum of other ordinates} \right)$

✓ ✓ substitution
✓ distance

$$A = 31 \left(\frac{8+4}{2} + 74 \right)$$

$$A = 31(80)$$

$$A = 2\,480 \text{ mm}$$

(3)
[19]

QUESTION 3

3.1

$$\ln x = \frac{1}{3} \ln 5897 - \ln 0.12 - 3 \ln 3.5$$

✓ ✓ expand
✓ ✓ values

$$\ln x = 2.894 - (-2.12) - 3.758$$

$$\ln x = 1.256 \quad \text{or} \quad \ln x = 1.253146$$

$$\therefore x = 3.511$$

(4)

3.2

$$(\log_3 x)(\log_x 9)$$

✓

$$= \frac{\log x}{\log 3} \times \frac{\log 9}{\log x}$$

$$= 2$$

✓

✓

✓ change of bases
✓ ✓ simplify

(3)

3.3

$$x = 3^4$$

✓

$$x = 81$$

✓

✓ exponential form
✓ answer

(2)

$$h^2 = 7\,595$$

$$h = 87,149$$

✓

(2)

3.5.2

$$V = \frac{1}{3}\pi r^2 h$$

$$V = \frac{1}{3}\pi(53)^2(87,149)$$

$$V = 256\,355,574\text{ cm}^3$$

$$V = 256,356\text{ l}$$

✓

Follow up on the height calculated in QUESTION 3.5.1

✓ using the correct formula

✓✓ substituting and simplify

✓ writing answer as liter

✓

(4)
[18]

QUESTION 4

4.1

4.1.1

$$\theta = 56 \times \frac{\pi}{180} = 0,977\text{ rad}$$

✓

Using degrees or the diameter – NO marks

$$\theta = \frac{s}{r}$$

✓

✓ use rad

✓ use radius

✓ substitution

$$0,977 = \frac{s}{149}$$

✓

✓ simplify

$$s = 145,630\text{ mm}$$

✓

(4)

4.1.2

$$A = \frac{1}{2}r^2\theta$$

✓

✓ formula

✓ substitution

$$A = 0,5(149)^2(0,977)$$

✓

using the correct formula

✓ simplify

$$A = 10\,849,455\text{ mm}^2$$

✓

(3)

4.2

4.2.1

$$V = \pi D n$$

✓

✓ formula

$$2,3 \times 60 = \pi D(130)$$

✓

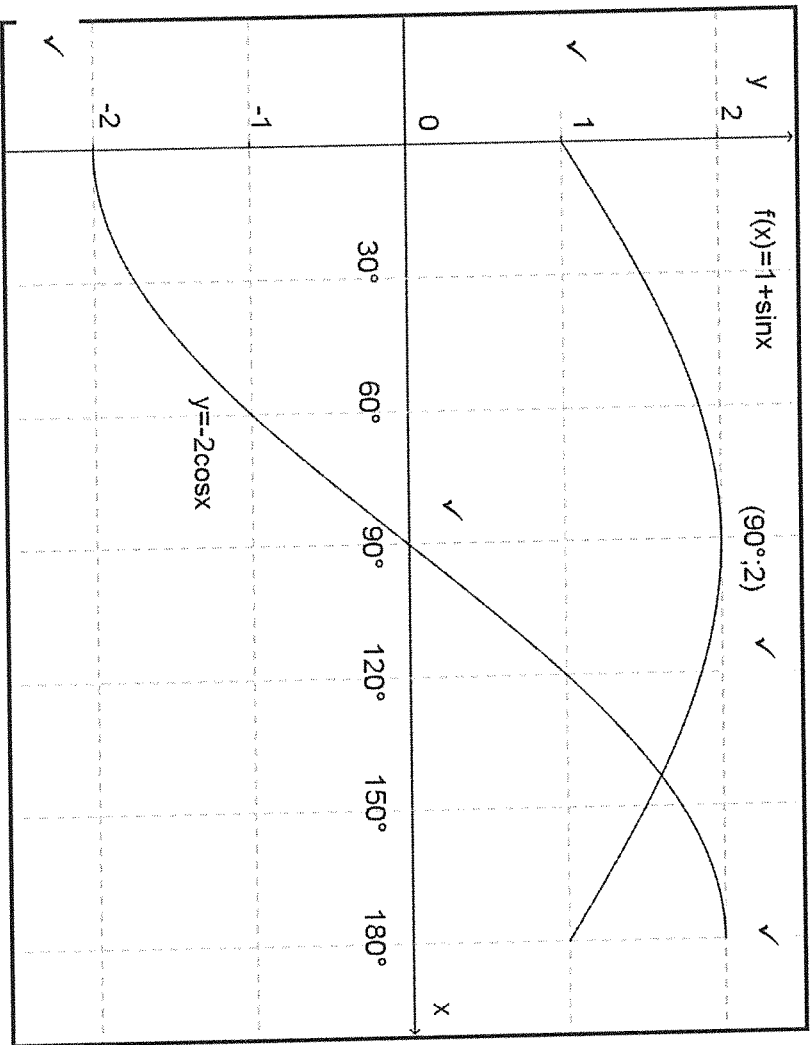
✓ both values units per minute

$$0,338\text{ m} = D$$

✓

✓ simplify

(4)

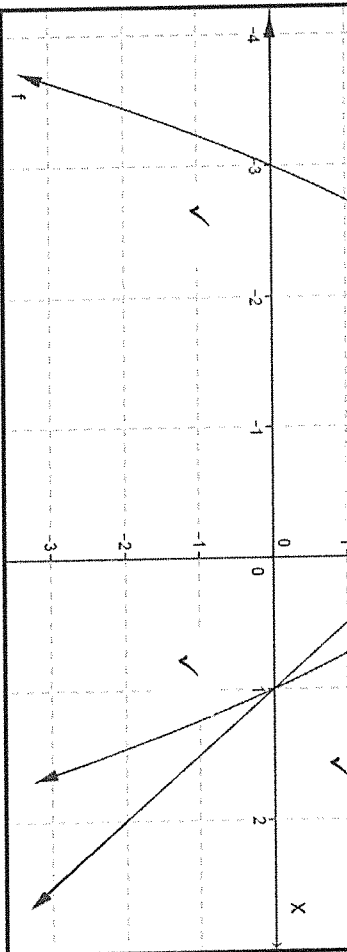


intercepts

✓ x-intercept

✓ turning point

✓ shape



(6)

5.2.2 (-1; 4) and (1;0) ✓

✓ follow
up on
students
graph
(2)
[13]

QUESTION 6

6.1 $\frac{7}{9} \times 90^\circ = \frac{7}{9} \times \frac{\pi}{2} = 1,222 \text{ rad}$ ✓ ✓ correct rounded off to
three places after the comma (2)

6.2 $e^0 - \log_3 1 + \cos^2 0^\circ + 0,25 \cos \left(\ln \frac{\pi}{4} \right)$ ✓ ✓ correct rounded off to
three places after the comma (2)

$= 1 - 0 + 1 + 0,243$ ✓

$= 2,243$

6.3 $\cos \beta = 0,6$ ✓ ✓ ratio

$\beta = 53,13^\circ$ ✓ ✓ two angles

or

$\beta = 306,87^\circ$ ✓ (3)

$$\tan B = \frac{30}{3}$$

$$B = \tan^{-1}(10) = 84,289^\circ$$

✓

✓

✓

✓ substituting
✓ solving

TOTAL: 100

(3)
[14]