T910(E)(J24)T

AUGUST EXAMINATION

NATIONAL CERTIFICATE

MATHEMATICS N1

(16030121)

24 July 2014 (Y-Paper)
13:00–16:00

Scientific calculators may be used.

This question paper consists of 6 pages, a graph paper and a formula sheet of 2 pages.

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA
NATIONAL CERTIFICATE
MATHEMATICS N1
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.

2. Read ALL the questions carefully.

3. Number the answers according to the numbering system used in this question paper.

4. The answers of ALL calculations must be approximated to THREE decimals.

5. Rough calculations may be done at the back of the ANSWER BOOK.

6. Use a pencil for drawings.

7. Start each question on a NEW page.

8. Write neatly and legibly.

QUESTION 1

Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (1.1–1.10) in the ANSWER BOOK.

1.1   24 km/h equals 667 m/s.

1.2   The graph of $3y = 12x + 5$ has the gradient of 12.

1.3   The coefficient of x^4 in the term of $-10x^4$ is 10.

1.4   Natural numbers start at 1.

1.5 $\dfrac{3}{7} + \dfrac{8}{5} = \dfrac{11}{12}$

1.6   The following expression has three terms:

$6a^2 + 3(b - 2a) - \dfrac{8b^4}{3c}$

1.7 $\equiv$ is the symbol to indicate congruent triangles.

1.8   320 cm^2 is equal to 0,0320 m^2.

1.9   If 20% of an amount of money is R105,25, then the amount of money is R526,25.

1.10   The exterior angle of a triangle can be obtained when one side of a triangle is extended.

(10×1) **[10]**

QUESTION 2

2.1   Simplify the following without the use of a calculator:

2.1.1 $\sqrt[3]{\dfrac{27a^3b^9}{81\,b^{12}}} \times \left(2a\,^\circ b\right)^3$ (5)

2.1.2 $64b^9 \times \dfrac{1}{8}b^{-2} \div b^4$ (4)

2.1.3 $\log_2 64 - 6\log 1\,000 - 8\log_e^{\sqrt{e}} + 3\log 10$ (5)

2.2   Subtract $6qr + 115pq + 35bd$ from $15qr + 108pq - 140bd$.   (3)

2.3   Divide $6x^4 + 3x^3 - x^2 + \dfrac{1}{2}x - 3$ by $2x + 1$. Show ALL the steps.   (7)

[24]

QUESTION 3

Simplify by factorising fully:

3.1 $\dfrac{51D^3 - 85D^8}{17D^2}$ (2)

3.2 $\dfrac{7p^2 - 21p^3}{4q} \div \dfrac{2p - 6p^2}{8q}$ (4)

3.3 Add: $\dfrac{3}{x^2} - \dfrac{4x^2 + 2x}{x} + 3$ (4)

3.4 Determine from $21x^4 y^3 z^3$; $15x^2 y^2 z^2$ and $27xyz^4$

    3.4.1 The LCM (4)

    3.4.2 The HCF by using prime factors (1)

3.5 Fully factorise the following expressions:

    3.5.1 $45pq - 27pqz - 63pqd$ (2)

    3.5.2 $x + 6y - 6ay - ax$ (4)

[21]

QUESTION 4

4.1 Solve for x:

$5(x - 3) = 3(x + 6)$ (3)

4.2 Change the subject of the formula so that the symbol in brackets becomes the new subject.

$A = \dfrac{Qr^2}{2}$ ....(r) (3)

4.3 The difference between twice a number and six is equal to twelve.

Calculate the number.

Let the number be x. (4)

[10]

QUESTION 5

Given: $y = 4x - 1$ and $y = -\dfrac{3}{x}$

Hence answer the following questions.

5.1	Give the equation of the straight-line graph.	(1)
5.2	Is the slope of the straight-line graph positive or negative?	(1)
5.3	Give the name of the other graph.	(1)
5.4	In which quadrant(s) will the other graph be sketched?	(1)
5.5	Give the value of the slope of the straight-line graph.	(1)
5.6	Give the y-intercept of the straight-line graph.	(1)

5.7 Use x-values of $\dfrac{1}{2}$; 1; 2; 3; 4 to sketch the graph mentioned in QUESTION 5.3; use the scale of 1 cm = 1 unit.

(4)

[10]

QUESTION 6

6.1 In $\triangle ABC$: BC = 5 cm; AC = 7 cm and $\hat{B} = 90^0$
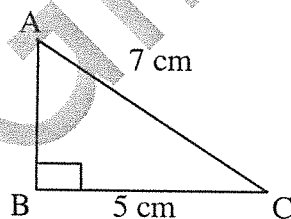
6.1.1 Calculate the magnitude of angle C. (3)

6.1.2 Calculate AB with the aid of the theorem of Pythagoras. (3)

6.2 By means of a line drawing, distinguish between the following:

6.2.1 An obtuse angle

6.2.2 Opposite angles
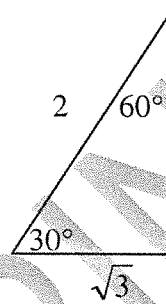
6.2.3 An acute angle

6.2.4 A right angle

(4 × 2) (8)

6.3 Calculate the value of B in each of the following with the use of a calculator:

    6.3.1 $\tan B = 3{,}775$ (1)
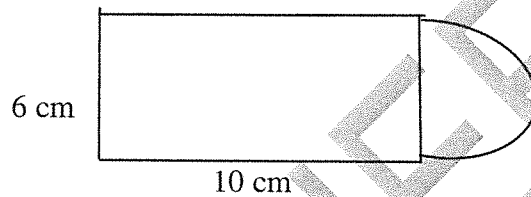
    6.3.2 $B = \sin 23^0 54' + \cos 62^0 36'$ (2)

6.4 Simplify the following expression by making use of the special angles. Do not use a calculator.

$$\frac{6\sin 30^0 \bullet \tan^2 60^0}{\sin 30^0}$$
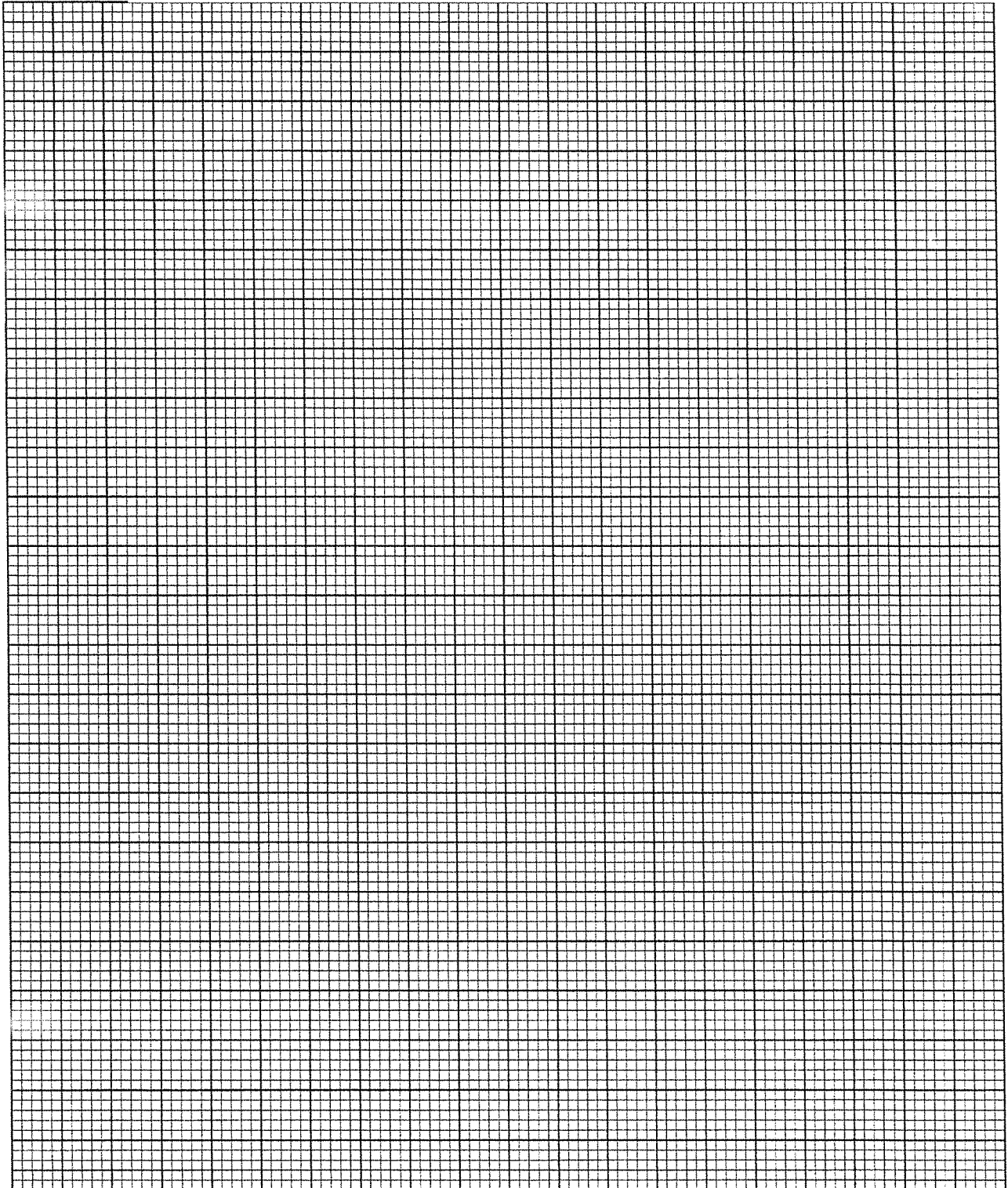
(4)

6.5 Calculate the area of the figure below:

6 cm

10 cm

(4)

[25]

TOTAL: 100

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
DEPARTEMENT VAN HOËR ONDERWYS EN OPLEIDING
GRAPH PAPER/GRAFIEKPAPIER
(Return this sheet with the other answers)
(Lewer hierdie blad saam met die antwoordboek in)

EXAMINATION NUMBER:
EKSAMENNOMMER:

MATHEMATICS N1

FORMULA SHEET

This sheet must accompany the question paper.

Rectangle: Perimeter $= 2(l + b)$
Area $= l \times b$

Square: Perimeter $= 4a$
Area $= a^2$

Triangle: Perimeter $= a + b + c$
Area $= \frac{1}{2}b \times h$

Rectangular prism:
Volume $= l \times b \times h$

Right triangular prism:
Volume $= \frac{1}{2}b \times h \times l$

Cube: Volume $= a^3$

Right pyramid:
Volume $= \frac{1}{3}(\text{base area} \times h)$

Ellipse:
Area $= \frac{\pi}{4}(\text{major axis} \times \text{minor axis})$

Circle: Circumference $= \pi D$ or $2\pi r$
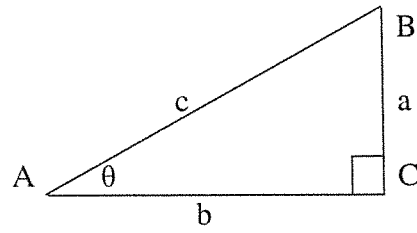Area $= \frac{\pi D^2}{4}$ or πr^2

Cylinder: Volume $= \frac{\pi D^2}{4} \times h$ or $\pi r^2 h$

Cone: Volume $= \frac{\pi D^2}{4} \times \frac{h}{3}$ or $\frac{\pi r^2 h}{3}$

Annulus: $A = \pi\left(R^2 - r^2\right)$

The right-angled triangle:

The theorem of Pythagoras:
$$c^2 = a^2 + b^2$$

Ratios of angle θ:

$$\sin\theta = \frac{a}{c}$$