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higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T1000(E)(M22)T

APRIL EXAMINATION

NATIONAL CERTIFICATE

MATHEMATICS N1

(16030121)

22 March 2013 (X-Paper)
09:00–12:00

Calculators may be used.

This question paper consists of 6 pages and a 2-page formula sheet.

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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. Start each question on a NEW page.
5. Use a pencil for drawings.
6. ALL calculations must be approximated to THREE decimals.
7. Rough calculations may be done at the back of the ANSWER BOOK.
8. Write neatly and legibly.

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QUESTION 1

1.1 1.1.1 300 km/h equals … $m.s^{-1}$ (2)

1.1.2 The reciprocal of 20 is … (1)

1.1.3 Express 380 mm as a percentage of 1 226 mm (1)

1.2 Given: $9x^3 - 6x^2 - 3x - 7$

1.2.1 … are the exponents of x (2)

1.2.2 9 is the … of x (1)

1.2.3 … is the variable. (1)

1.2.4 … is the constant term. (1)

1.2.5 The number of terms is … (1)

[10]

QUESTION 2

2.1 Simplify by only making use of exponential laws:

$$-(6b^3)^0 \times \sqrt[4]{\frac{81a^6b}{256a^{-2}b^9}}$$ (5)

2.2 Subtract $-10x + 12y + 20x^2$ from $14x^2 - 10y + 16x$ (3)

2.3 Remove the brackets:

$$(a-2)(a^3 + 3a^2 - 5a - 6)$$ (5)

2.4 Simplify the following logarithms without the use of a calculator:

$$\log_2 64 - 3\log_{10} 100 - 1log_3\ 9 + \log_e\ e^6$$ (5)

[18]

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QUESTION 3

3.1 Divide $2+4x^2-6x+5x^3$ by $x+2$ (7)

3.2 Find the factors to the following expressions:

3.2.1 $63ab-56ac+7ad$ (2)

3.2.2 $3xy-xyd+12x-4xd$ (6)

3.3 Simplify: $\frac{xy-x^2y^2}{xy} \div \frac{2-2xy}{20}$ (4)

3.4 Given: $54x^4y^5z^2$, $48x^2y^4z^5$ and $63x^5y^2z^3$

Determine the following:

3.4.1 Prime factors (3)

3.4.2 The LCM (2)

3.4.3 The HCF (2)

[26]

QUESTION 4

4.1 Solve for x:

$4(x-2)-(7x-9)+6=2$ (4)

4.1 Solve for x:

$4(x-2)-(7x-9)+6=2$ (4)

4.2 The sum of three consecutive numbers is 135. Find the largest number of the three. (4)

4.3 Change the subject of the formula so that the symbol in brackets becomes the new subject:

$A=4\pi r^2 \ldots\ldots\ldots(r)$ (2)

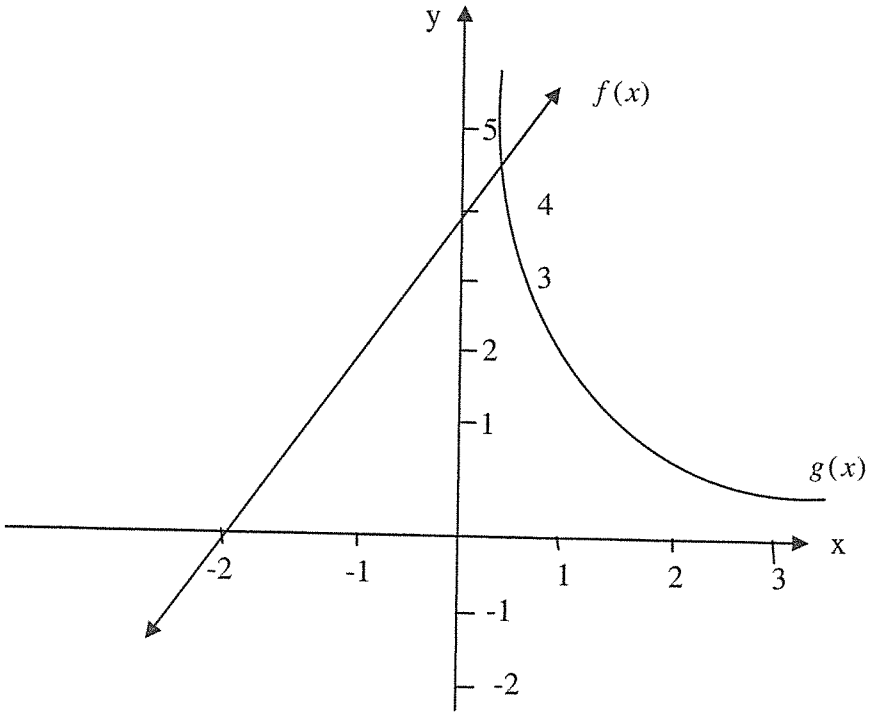
4.4 Calculate the value of r in QUESTION 4.3 if A = 10 mm (2)

[12]

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QUESTION 5

5.1 Refer to the graph below to answer the following questions. The graph is not drawn to scale.



5.1.1 Find the gradient of f(x). (2)

5.1.2 Write down the y-intercept of function f(x). (1)

5.1.3 Find the x-intercept of function f(x). (1)

5.1.4 Write the equation of the graph of f(x). (3)

5.1.5 Name the graph of f(x). (1)

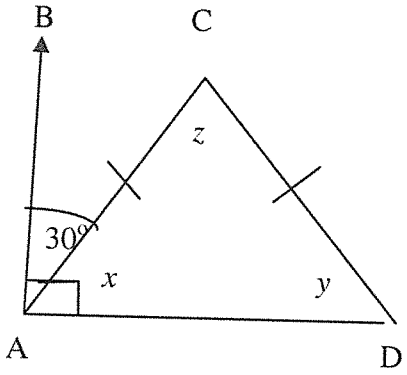
5.1.6 What is the name of the graph of the function g(x)? (1)

5.1.7 In which quadrant is the graph of the function g(x) drawn? (1)
[10]

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QUESTION 6

6.1 GIVEN :



Make use of the above triangle to calculate the following:

6.1.1 The magnitude of x (3)

6.1.2 The magnitude of y and give ONE reason (2)

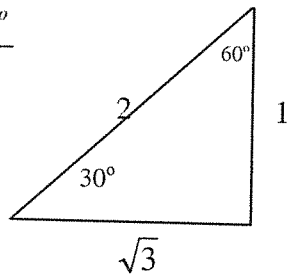
6.1.3 The magnitude of z (3)

6.2 Determine the area of a semicircle (half-circle) if its diameter is 36 cm. (4)

6.3 Determine the perimeter of a rectangular farm 4 km long and 3 km wide. (3)

6.4 Simplify the following expressions by making use of the special angles. Do NOT use a calculator.

$$\frac{3Sin30^o.\tan^2 60^o}{Sin^2 30^o}$$



(5)

6.5 In the right-angled triangle the hypotenuse is 250 cm and the other side is 153 cm. Determine the third side. (4)

[24]

TOTAL: 100

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MATHEMATICS N1

FORMULA SHEET

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 = $\frac{1}{3}$(base area × h)

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

Circle: Circumference = πD 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:

Reghoek: Omtrek = $2(l + b)$
Area = $l \times b$

Vierkant: Omtrek = $4a$
Area = a^2

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

Reghoekige prisma:
Volume = $l \times b \times h$

Regte driehoekige prisma:
Volume = $\frac{1}{2}b \times h \times l$

Kubus: Volume = a^3

Regte piramide:
Volume = $\frac{1}{3}$(basisarea × h)

Ellips:
Area = $\frac{\pi}{4}$(hoofas × neweas)

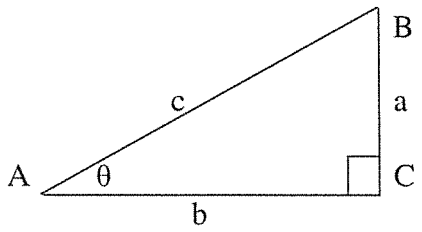
Sirkel: Omtrek = πD of $2\pi r$
Area = $\frac{\pi D^2}{4}$ of πr^2

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

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

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

Die reghoekige driehoek:



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

Die stelling van Pythagoras:
$c^2 = a^2 + b^2$

Ratios of angle θ:

Verhoudings vir hoek θ:

$$\sin\theta = \frac{a}{c} \qquad \cos\theta = \frac{b}{c} \qquad \tan\theta = \frac{a}{b}$$

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