

**DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA**

NATIONAL CERTIFICATE

MATHEMATICS N1

TIME: 3 HOURS

MARKS: 100

APRIL 2012

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
 2. Read ALL the questions carefully.
 3. Number the answers correctly 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. The answers of 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. Simplify by ONLY making use of exponential laws:

1.1.1 $(5y^0 - 3x^0)^3$ (2)

1.1.2 $\frac{2x^2y^4}{8x^3y^2}$ (3)

1.2 Show ALL calculations and use logarithms to the base e to determine the value of x :

$$x = \frac{(4,81)^3 \cdot \sqrt[3]{454,32}}{0,384} \quad (6)$$

1.3 Simplify the following logarithms WITHOUT the use of a calculator:

$$\log_{10} 20 - \log_3 9 + \log_{10} 5 + \log_2 8 \quad (5)$$

[16]

QUESTION 2

2.1 Divide $4b^3 - 12b^2 + 5b + 6$ by $2b - 3$ (6)

2.2 Subtract $108qr - 115pc + 130bd$ from $35pc - 126qr - 103bd$ (3)

2.3 Fully factorise the following expressions:

2.3.1 $18ab - 54ac - 90ad$ (2)

2.3.2 $3xy - xyc + 12x - 4xc$ (4)

2.4 Remove the brackets and simplify the following:

$$(5y - 7)(17y^2 - 3y + 21) \quad (4)$$

2.5 Given: $120x^6y^3z^2$, $105x^2y^3z^5$ and $45x^3y^4z^3$

Determine the following by using prime factors:

2.5.1 The LCM

2.5.2 The HCF

(6)

2.6 Simplify the following:

$$\frac{16x^2 - 4x}{8x} \div \frac{20x - 5}{12x} \quad (4)$$

[29]

PTO

QUESTION 3

3.1 Solve x :

$$5(x - 3) = 2(x - 4) \tag{3}$$

3.2 A father is twice as old as his son. Twelve years ago the father was four times as old as the son was then. Determine their present ages. (5)

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

$$2(D + b) = p \dots\dots\dots (b) \tag{2}$$

3.4 Calculate the value of 'h' if $v = 89$ and $r = 4$ in : $v = \frac{1}{3} \pi r^2 h$
(Change the formula to 'h' first) (3)

3.5 Calculate the distance covered in metres when a wheel of diameter 700 mm makes 12 revolutions. (3)
[16]

QUESTION 4

4.1 Use the given TABLE below to answer the questions that follow:

x	-3	-2	-1	0	1
y	-2	-1	0	1	2

4.1.1 Use a scale of 1cm = 1unit on both axis. Plot the graph defined by the given co-ordinates on graph paper. (5)

4.1.2 Give the equation of the graph. (2)

4.1.3 Give the name of the graph. (1)

4.1.4 What is the gradient of the graph? (1)

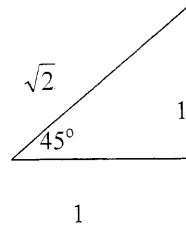
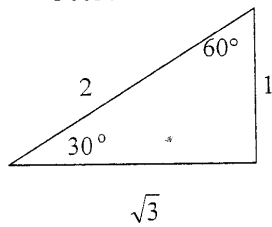
4.1.5 What is the y -intercept of the given function? (1)
[10]

QUESTION 5

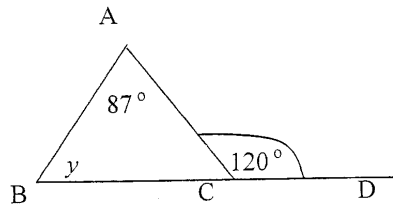
5.1 Evaluate the following if the angle $\alpha = 63^\circ$
 $6 \tan \alpha - 4 \tan \alpha$ (2)

5.2. Simplify the following expressions by making use of special angles.
Do not use a calculator .

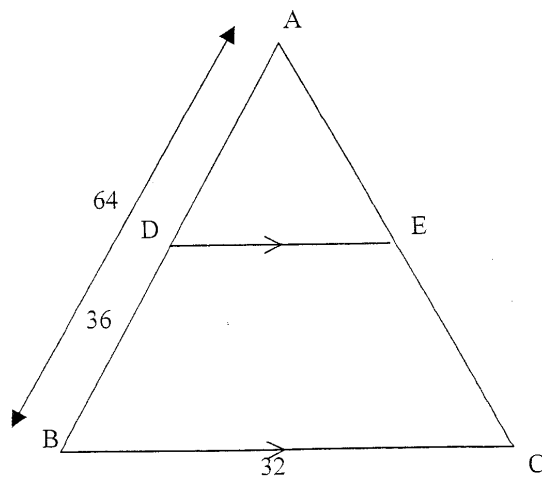
$$\frac{6 \tan 45^\circ \times 4 \sin 30^\circ}{3 \cos 60^\circ}$$



5.3 Determine the size of the interior angle y if the exterior angle C is 120°



5.4 Triangles ABC and ADE are similar. Calculate DE if $BD = 36$ cm, $AB = 64$ cm and $BC = 32$ cm is.



5.5 Determine the value of 'A' in each of the following cases:

5.5.1 $\tan A = \frac{30}{70}$ (2)

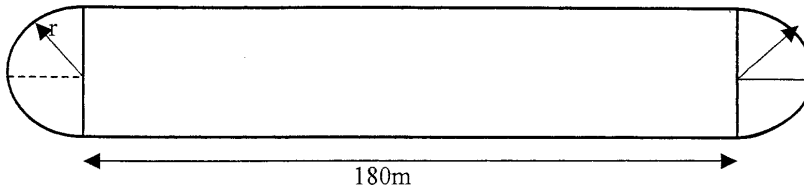
5.5.2 $\sin 69^\circ 21' = A$ (2)
[18]

QUESTION 6

6.1 A prism with a square base of 17 cm, has a height of 29 cm. Calculate the volume of the prism. (3)

6.2 The salary of a general worker is increased from R65,00 to R85,00 per week. Calculate the percentage increase in his/her salary. (3)

6.3 An athletic track consists of two semi-circular bends of diameter 45 metres each and two straight sides of 180 metres each. Calculate the total distance that an athlete will cover on this track.



(5)
[11]

TOTAL: 100

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