

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

NATIONAL CERTIFICATE

MATHEMATICS N1

TIME: 3 HOURS

MARKS: 100

*AUGUST 2012*

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**INSTRUCTIONS AND INFORMATION**

1. Answer ALL the questions.
  2. Read ALL the questions carefully.
  3. ALL calculations must be approximated to THREE decimals where necessary.
  4. Rough-work calculations may be done at the back of the ANSWER BOOK.
  5. Number the answers correctly according to the numbering system used in this question paper.
  6. Write neatly and legibly.
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**QUESTION 1**

- 1.1 Given:  $7ax^2b - 4x + 4$ . Complete the following sentences:
- 1.1.1 ... is the variable. (1)
- 1.1.2 ... is the highest exponent of  $x$ . (1)
- 1.1.3 ... is the coefficient of  $x^2$ . (1)
- 1.1.4 4 is the ... term. (1)
- 1.1.5 The number of terms are ... . (1)
- 1.2 1.2.1 270 km/h equals ...  $\text{m}\cdot\text{s}^{-1}$ . (2)
- 1.2.2 Express 340 mm as a ratio of 1 340 in percentage. (2)
- 1.2.3 What is the  $y$ -intercept of  $y = \frac{5}{x}$ ? (1)
- [10]**

**QUESTION 2**

- 2.1 Simplify the following:
- 2.1.1  $8(ab)^0 \times \frac{\sqrt[5]{32x^{10}}}{x^5}$  (3)
- 2.1.2  $\sqrt[5]{12x^{10} + 20x^{10}}$  (2)
- 2.2 Simplify the following WITHOUT the use of a calculator.
- 2.2.1  $\frac{\ln e^6 \times \log_2 64}{\log 10000}$  (3)
- 2.2.2  $\log_3 81 - 5 \log_2 8 - \sqrt{3} \log_e e^{\sqrt{3}}$  (4)
- 2.3 Use the natural logarithm to calculate the value of  $x$  in the following expression. Show ALL your calculations.
- $$x = \frac{0,48 \times \sqrt{0,25}}{0,12 \times 1,5}$$
- (5)  
**[17]**

**QUESTION 3**

3.1 Use a calculator to simplify the following:

$$3(-4)^3 \times \sqrt{130x^6y^{-4}} \quad (3)$$

3.2 Remove the brackets.

$$2a - [3 - (2a + 6)] \quad (3)$$

3.3 Divide  $x^3 + x^2 - 10x + 8$  by  $x - 2$  (6)

3.4 Simplify the following:

3.4.1 
$$\frac{14z^5 - 42z^9}{14z^4} \quad (2)$$

3.4.2 
$$\frac{x+2}{2x} + \frac{x-2}{3x} \quad (3)$$

3.4.3 
$$\frac{18t^2 - 9t}{10t} \div \frac{30t - 15}{5t} \quad (3)$$

3.5 Determine the Lowest Common Multiple (LCM) of the following by using prime factors:

$$36x^4y^3z^2$$
$$64x^4y^6z^4$$
$$49x^2y^4z^3 \quad (5)$$

**[25]**

**QUESTION 4**

4.1 Solve for  $y$  if:

$$-3y(-4y) = 32 + (x^0 + y^0)^4 \quad (5)$$

4.2 The sum of three consecutive members is 60. Determine the THREE numbers.  
HINT: Let the first number be  $x$ . (5)

4.3 A motorcar travels at 60 km/h. Calculate the diameter of the motorcar's wheels if they rotate at 800 revolutions per minute. [HINT: radius = velocity  $\div$  2 ( $\pi$ ) (revolutions)] (5)  
**[15]**

**QUESTION 5**

5.1 Given the function  $xy = -5$ , answer the following questions:

5.1.1 Give the name of the graph. (1)

5.1.2 Give the coordinate of one point on the graph. (1)

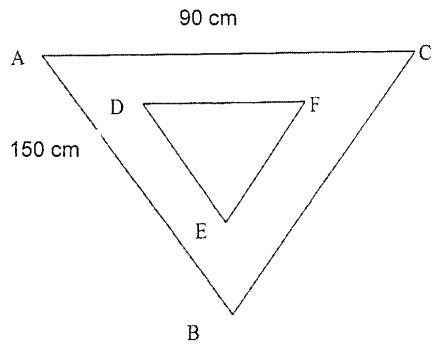
5.1.3 What is the  $y$ -intercept? (1)

5.1.4 In which quadrants will the graph be drawn? (1)

5.2 Draw the graph  $y = 3x + 1$  using the value  $-2 \leq x \leq 2$ .  
Use scale  $1 \text{ cm} = 1 \text{ unit}$ . (6)  
**[10]**

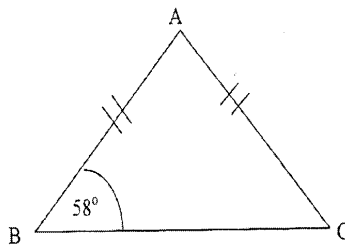
**QUESTION 6**

6.1 Calculate the magnitude of  $DF$  in the figure below.  $DE = 110 \text{ cm}$  and  $EF = 50 \text{ cm}$ .



(3)

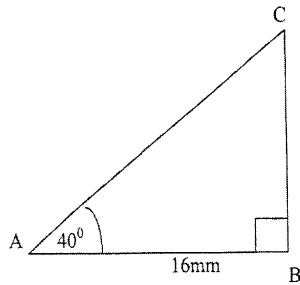
6.2 Calculate the magnitude of angle A in the triangle.



(3)

6.3 State the FOUR conditions for two triangles to be congruent. (4)

6.4 Given:



Make use of the above triangle to calculate the following:

6.4.1 Length of BC (2)

6.4.2 Length of AC (2)

6.4.3 Magnitude of  $\hat{C}$  (2)

[16]

**QUESTION 7**

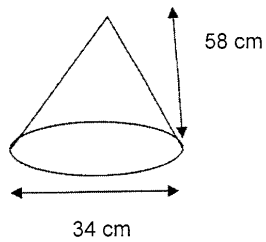
7.1 Calculate the percentage of the following:

7.1.1 36 of 84 (1)

7.1.2 R21, 50% of R145 (1)

7.2 A right cone has a base diameter of 34 mm and a perpendicular height of 58 mm. Calculate the volume of the cone. How many litres can this cone contain?

HINT:  $1\text{l} = 1\,000\text{ cm}^3$



(5)

[7]

**TOTAL: 100**

**Mathematics N1**  
**August 2012 Question Paper**

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