

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

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**Answer ALL the questions.**

**INSTRUCTIONS AND INFORMATION**

1. Answer ALL the questions fully. Show ALL the calculations and intermediary steps. Simplify where possible.  
1 mark: 1%
  2. ALL graph work must be done on the graph paper provided.
  3. ALL the answers must be approximated accurately to THREE decimal places.
  4. Questions may be answered in any order, but subsections of questions may NOT be separated.
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**QUESTION 1**

- 1.1 Use calculator to solve the following:

$$(32,6)^2 - (18,4 - 2,3^3)$$

- 1.2 Subtract:  
 $(-10a^2b + 7ab^2 - 3ab)$  from  $(-6a^2b + 8ab^2 - 2ab)$

- 1.3 Simplify the following expression by first taking away the brackets:

$$2b - \{3a[-(2a + b) - a]\}$$

Use logarithms and determine the value of B in the following equation:  
(Show ALL the calculations.)

$$B = \sqrt[3]{86,14 \times 2,13}$$

Simplify the following expressions by only using exponent and log laws:

2.2.1  $\log 25 + \log 4 - \log 10 + \log 2 + \log 5$

2.2.2  $\sqrt[4]{81 \times 16}$

2.2.3 
$$\frac{(x^2)^{-3} \cdot (x^{-3})^2 \cdot (x^2)^5}{x^6}$$

### TON 3

Find the prime factors of 300.

First factorise and then find the lowest common multiple (LCM) of:

$4x^2y$  and  $6xy^2$

Factorise fully:

$$20x^2y^3 - 8xp^2 - 6p^2 + 15xy^3$$

Change  $2\frac{3}{4}$  to an improper fraction.

Simplify the following expression by making use of the BODMAS-rule:

$$\left(\frac{2}{5} + \frac{3}{6}\right) \text{ of } 30 \div \frac{9}{2} + 8$$

#### QUESTION 4

4.1 Given:

$$S = \frac{1}{2}gt^2$$

Find the value of 't' by manipulating the formula and then replacing the given values, if  $s = 1\,500$  and  $g = 9,8$ .

(4)

4.2 Convert 45 minutes to hours.

(1)

4.3 Convert 14 km/h to m/s.

(2)

4.4 Five kilograms of screws and six kilograms of nails cost R28,60, while three kilograms of screws and two kilograms of nails cost R13,80. What is the cost per kilogram of each of the items? (HINT: Let the screws cost 'x' rand and the nails 'y' rand per kilogram.)

(6)

4.5 A gear spins at 90 r/min.

Determine:

4.5.1 The rotational frequency in r/s

(1)

4.5.2 The angular velocity in rad/s

(HINT:  $w = 2\pi n$ )

(2)

[16]

#### QUESTION 5

5.1 Given:

$$xy = 2 \qquad y = -\frac{1}{3}x + 3$$

5.1.1 Which ONE of the two functions is the straight line graph?

(1)

5.1.2 What is the gradient of the straight line graph?

(1)

5.1.3 Is the gradient of the straight line positive or negative?

(1)

5.1.4 Give the y-intercept of the straight line graph.

(1)

5.1.5 Give the name of the other graph.

(1)

5.1.6 In which quadrant(s) will the other graph be?

(2)

5.2 Draw the graph of  $8x - 4y = 4$ .

Let  $x = \{-2; -1; 0; 1; 2\}$

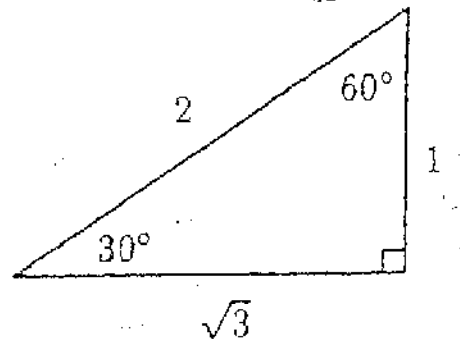
(6)

QUESTION 6

- 6.1 Complete the following statements by filling in only the missing word:
- 6.1.1 Angles on a straight line add up to ... (1)
  - 6.1.2 The symbol ... means triangles are similar to. (1)
  - 6.1.3 When triangles are congruent the one triangle is a ... of the other. (1)
  - 6.1.4 The interior angles of a triangle add up to ... (1)
  - 6.1.5 When two straight lines intersect the vertically opposite angles are ... (1)
  - 6.1.6 If two angles of a triangle are equal, then the triangle is ... (1)
- 6.2 In right-angled  $\triangle KLM$ :  $\angle M = 90^\circ$ ,  $KL = 8$  cm and  $LM = 3$  cm. Use the theorem of Pythagoras to calculate the length of  $KM$ . (3)  
[9]

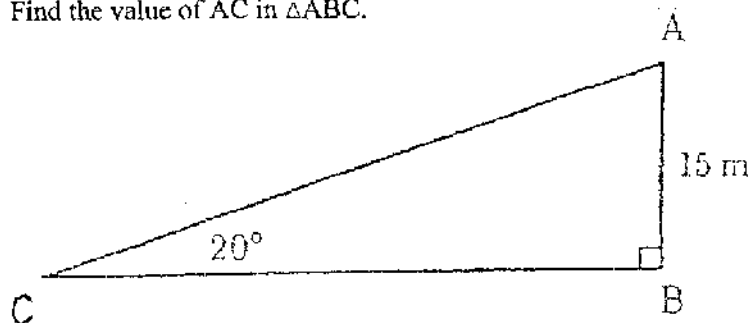
QUESTION 7

- 7.1 Determine the value of the following expressions without the aid of a calculator:



- 7.1.1  $3 \tan^2 60^\circ$  (3)
- 7.1.2  $\frac{6 \sin 60^\circ}{3 \cos 30^\circ}$  (3)

- 7.2 Find the value of  $AC$  in  $\triangle ABC$ .



(2)  
[10]

## QUESTION 8

8.1 Which room has the greater volume and by how much:

Room A: Length = 9 m  
Breadth = 7 m  
Height = 3,5 m

Room B: Length = 12 m  
Breadth = 6 m  
Height = 3 m

(4)

8.2 The average mass of a blue whale is 112 500 kg. Convert this mass to:

8.2.1 Grams (g)

(1)

8.2.2 Tons (t)

(1)

8.3 How many wooden blocks of length 75 mm can be cut from a beam of length 1,125 m?

(3)

8.4 A rectangle measures 600 cm by 2 000 mm.

8.4.1 Calculate the perimeter of the rectangle in metres.

(3)

8.4.2 Find the area of the rectangle in square metres.

(2)

[14]

TOTAL: 100