



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T850(E)(A1)T
AUGUST EXAMINATION
NATIONAL CERTIFICATE
MATHEMATICS N1

(16030121)

1 August 2016 (X-Paper)
09:00–12:00

REQUIREMENTS: Graph paper

Scientific calculators may be used.

This question paper consists of 6 pages and 1 formula sheet of 2 pages.

DEPARTMENT OF HIGHER EDUCATION AND TRAINING
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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. Write neatly and legibly.
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QUESTION 1

1.1 Simplify the following without the use of a calculator:

1.1.1 $\frac{2a^4b^3}{4a^2b^3}$ (4)

1.1.2 $\sqrt[4]{\frac{81a^6}{16a^2}}$ (5)

1.1.3 $\log_2 80 - \log_2 5 - \log_2 32$ (4)

1.2 Use logarithms with base 10 to calculate x . Show ALL the calculations.

$\sqrt[6]{0,79}$ (6)

1.3 Divide $x^3 - 8$ by $x - 2$ (6)

[25]

QUESTION 2

2.1 Determine from $70x^3y^4z^5$; $49x^2y^3z^4$ and $98xy^2z^3$

2.1.1 The prime factors of each term (3)

2.1.2 The LCM (2)

2.1.3 The HCF (2)

2.2 Fully factorise the following expressions:

2.2.1 $9x^3y^2 - 18x^2y + 3x^2y^3$

2.2.2 $3x^2 - 12xy + 12y^2$ (2 × 4) (8)

2.3 Simplify the following expressions:

2.3.1 $\frac{8x^2 - 8xy}{20x^2} - \frac{4xy - 4y^2}{30x^2y}$ (4)

2.3.2 $\frac{14x^3 - 21x^2 + 28x}{7x}$ (3)

[22]

QUESTION 3

3.1 Solve for y :

$$\frac{y}{3} y^2 = 6 \quad (4)$$

3.2 Given: $T = \frac{pv^2}{g}$

3.2.1 Manipulate the given formula and make v the subject of the formula (3)

3.2.2 Find the value of v if:
 $p = 12$; $T = 20$; $g = 14$ (2)

3.3 A shaft with a diameter of 38 mm rotates at 50 r/min.

Calculate the velocity (in m/s) of a point on the circumference of the shaft. (3)
[12]

QUESTION 4

Use the table method to draw the graphs of:

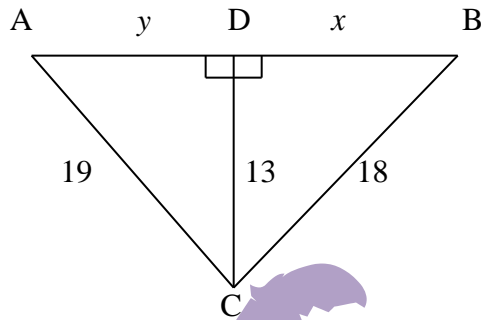
$$y = 2x - 3 \text{ and } xy = 3$$

(-2 ; -1 ; 0 ; 1 ; 2 ; 3)

[12]

QUESTION 5

5.1 Use the following diagram to determine:



5.1.1 The value of y

5.1.2 The value of x

(2 × 3) (6)

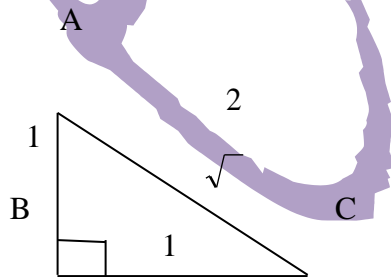
5.2 By means of a line drawing distinguish between the following:

5.2.1 Vertical opposite angle

5.2.2 Reflex angle

(2 × 2) (4)

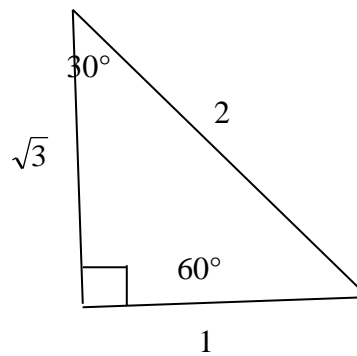
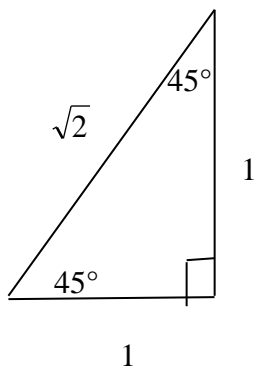
5.3 Determine the value of $\cos C$



(1)

5.4 Simplify the expressions below without the use of a calculator:

$6\sin 45^\circ \quad 2\cos 60^\circ \quad \sin 60^\circ$



(5)
[16]

QUESTION 6

- 6.1 Calculate the volume of a sphere in cm if it has a diameter of 240 mm. (4)
- 6.2 Determine the total surface area of an open cylinder (open at one end) if the diameter of the cylinder is 14 cm and its height is 22 cm. (3)
- 6.3 Joyce receives R925,75 from her agent after R74,25 has been deducted for commission.
Calculate the percentage commission. (2)
- 6.4 A man earns R6 500 per month. He pays 25% of his salary for his house and 15% of the remainder for household expenses.
Calculate the amount he has left over. (4)

[13]**TOTAL 100**

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

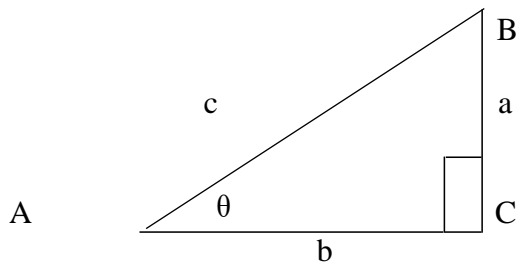
Circle: Circumference = D or $2r$
 Area = $\frac{\pi D^2}{4}$ or r^2

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

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

Annulus: $A = R^2 - r^2$

The right-angled triangle:



The theorem of Pythagoras:

$$c^2 = a^2 + b^2$$

Ratios of angle θ :

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

$$\cos\theta = \frac{b}{c}$$

$$\tan\theta = \frac{a}{b}$$