Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

MATHEMATICS

COMMON TEST

MARCH 2015

NATIONAL
SENIOR CERTIFICATE

GRADE 11

MARKS: 75

TIME: 1½ hours

N.B. This question paper consists of 5 pages including this page.

INSTRUCTIONS AND INFORMATION

Read the following instruction carefully before answering the questions.

1. The question paper consists of 4 questions.

2. Answer **ALL** the questions.

3. Clearly show all calculations and diagrams that you have used in determining your answering.

4. You may use an approved scientific calculator (non-programmable and non-graphical).

5. If necessary round off answers to **TWO** decimal places, unless otherwise stated.

6. Answers only will not be awarded full marks.

7. Diagrams not necessarily drawn to scale.

8. Number the answers correctly according to the numbering system used in this question paper.

9. Write neatly and legibly.

QUESTION ONE

1.1   Simplify fully, **without using a calculator**.

     1.1.1 $\left(\dfrac{1}{729}\right)^{\frac{-2}{3}}$ (2)

     1.1.2 $\dfrac{5^{2-m} \cdot 10^{m}}{2^{m-1}}$ (3)

     1.1.3 $\dfrac{5 \cdot 2^{y+1} - 2^{y}}{2^{y-1}}$ (3)

1.2   Show that: $\dfrac{9 - \sqrt{54}}{6\sqrt{2}} = \dfrac{3\sqrt{2} - 2\sqrt{3}}{4}$ (3)

                                                              [11]

QUESTION TWO

2.1   Solve for x.

     2.1.1 $x(2x - 1) = 0$ (2)

     2.1.2 $5x^2 = 3x + 4$ (correct to two decimal places)   (4)

     2.1.3 $\sqrt{7x + 2} = 2x$ (4)

2.2   Solve the following equations simultaneously.

     $x + y = 6$
     $x^2 + 2xy - 8y^2 = 0$ (6)

2.3   Solve for x.

     $-2x(x - 3) \le 4$ (4)

2.4

     2.4.1   The roots of a quadratic equation are:

            $x = \dfrac{2 \pm \sqrt{m + 6}}{2}$

            For which values of m are the roots unreal ?   (2)

     2.4.2   For which values of p will the roots of $x^2 - 5x = -p$ have real roots?   (3)

                                                              [25]

QUESTION THREE

Given the quadratic equation:

4 ; 7 ; 14 ; 25 ; *m*

3.1 Write down the value of *m*. (2)

3.2 Determine the nth term of the sequence. (4)

3.3 If the first difference between the two consecutive terms in the quadratic sequence is **87**, determine the value of the **two** consecutive terms. (4)

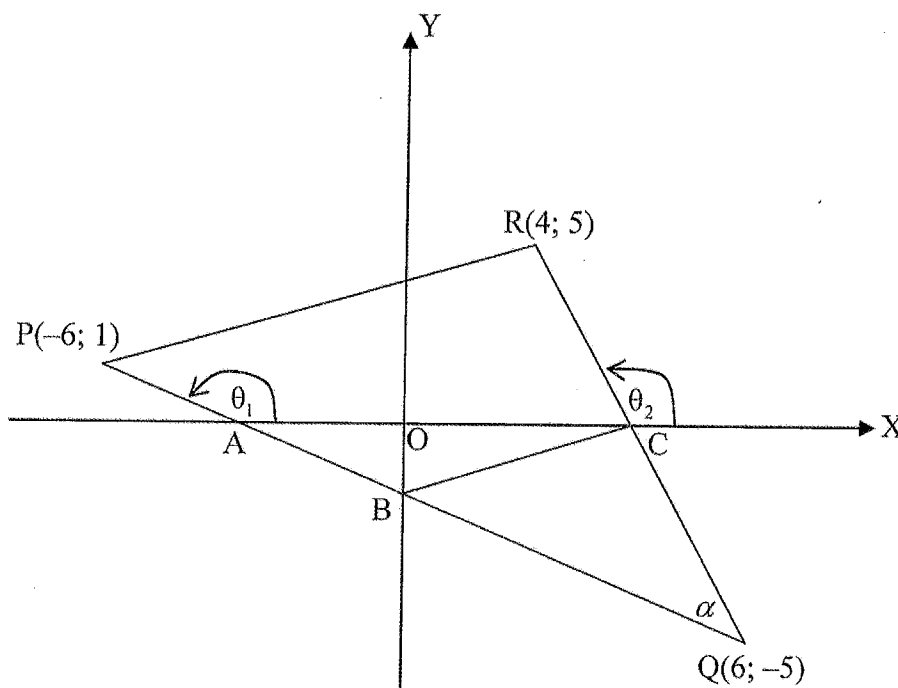3.4 Calculate *n* if the nth term in the sequence is **4855**. (4)

[14]

QUESTION FOUR

P(–6; 1), Q(6; –5) and R(4; 5) are the co-ordinates of $\triangle$ PQR .
C is the midpoint of QR. A, B and C are the intercepts of lines PQ and QR respectively.

$B\hat{Q}C = \alpha$
$P\hat{A}X = \theta_1$ and
$R\hat{C}X = \theta_2$

4.1	Calculate the co-ordinates of C, the midpoint of QR.	(2)
4.2	Determine the gradient of PQ.	(2)
4.3	Determine the equation of PQ.	(3)
4.4	Calculate the distance PR. (leave your answer in simplified surd form).	(3)
4.5	Hence, or otherwise, show that PR = 2.BC.	(3)
4.6	Prove BC // PR.	(3)
4.7	Calculate the size of α.	(5)
4.8	Determine the equation of a line passing through P, and is perpendicular to PQ.	(4)

[25]