KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

# NATIONAL SENIOR CERTIFICATE

## GRADE 10

## MATHEMATICS

## COMMON TEST

## MARCH 2023

**MARKS: 75**

**TIME: 1½ hours**

Stanmorephysics

**This question paper consists of 5 pages.**

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## INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 4 questions.
2. Answer ALL the questions.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Clearly show ALL calculations, diagrams, graphs, etc. which you have used in determining your answers.
5. Answers only will NOT necessarily be awarded full marks.
6. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
7. If necessary, round off answers correct to TWO decimal places, unless stated otherwise.
8. Diagrams are NOT necessarily drawn to scale.
9. Write neatly and legibly.



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## QUESTION 1

1.1 If $x \in \{-2;2;4;5\}$, choose the value of $x$ from the given set that will make the expression of $\sqrt{\frac{18}{4-x}}$ be:

1.1.1 rational (1)

1.1.2 undefined (1)

1.1.3 irrational (1)

1.1.4 non-real (1)

1.2 Between which two consecutive natural numbers does $\sqrt[3]{40}$ lie. Show all your working out and do so without the use of a calculator. (2)

1.3 Factorise the following expressions fully;

1.3.1 $x^4 - 16$ (2)

1.3.2 $6z^2y - 10zy + 15z - 25$ (3)

1.4 Simplify the following expressions fully;

1.4.1 $(m-4n)(m^2+4mn+16n^2)$ (2)

1.4.2 $\left(2x-\frac{3}{x}\right)^2$ (2)

1.4.3 $\frac{x^2-4x}{x^3-1} - \frac{1}{x-1} - \frac{2}{x^2+x+1}$ (5)

1.5 Determine without the use of a calculator: $\frac{2023}{2022^2-1}$ (2)

**[22]**

## QUESTION 2

2.1 Solve for $x$:

2.1.1 $3x^2 = 5x + 12$ (3)

2.1.2 $\left(\frac{1}{2}\right)^{x-1} = 128$ (3)

2.1.3 $3x^{\frac{5}{4}} = 96$ (3)

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2.2 Solve the inequality $-3 < 1 - 2x \leq 7$
Hence, illustrate your answer on a number line if $x$ is a real number. (4)

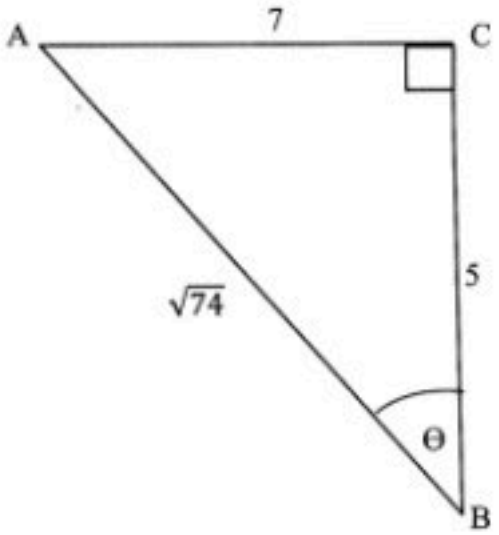
2.3 Solve for $x$ and $y$ simultaneously if:
$x + 3y + 5 = 0$
$3x - 2y = -4$ (5)

2.4 The product of two numbers $x$ and $y$ is 60 and their sum is 15. Show that $\frac{1}{x} + \frac{1}{y} = \frac{1}{4}$. (5)

**[23]**

## QUESTION 3

3.1 In $\Delta ABC$, $\hat{C} = 90^\circ$ and $\hat{B} = \theta$, $AC = 7$ units, $BC = 5$ units and $AB = \sqrt{74}$ units.




Use the diagram above to write down the value of : (Leave your answer in surd form)

3.1.1 $\cos\theta$ (1)

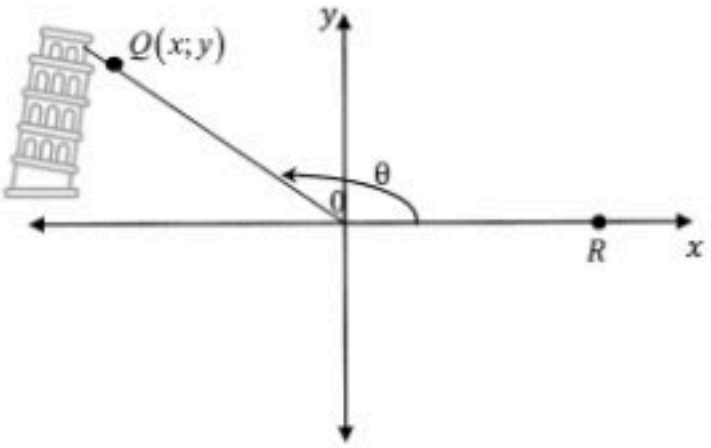
3.1.2 $\cot\theta$ (1)

3.1.3 $\text{cosec}^2\theta$ (2)

3.1.4 Hence or otherwise, determine the size of $\theta$ (correct to TWO decimal places). (2)

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3.2 In the diagram below, $Q(x;y)$ is a point in the second quadrant. $R\hat{O}Q = \theta$ and $13\sin\theta = 12$.




Make use of the diagram above to:

3.2.1 determine the value of $x$. (2)

3.2.2 calculate the value of $\sec\theta$. (1)

3.2.3 calculate the value of $5\tan\theta + 1$ (2)

**[11]**

## QUESTION 4

4.1 Solve for $x$ where $0^\circ \le x \le 90^\circ$, in each of the following equations. Give your answer correct to TWO decimal places.

4.1.1 $\tan 3x = 5,75$ (2)

4.1.2 $\text{cosec}(x - 35^\circ) = 7,814$ (3)

4.1.3 $\dfrac{\cos(2x + 10^\circ)}{3} = 0,159$ (3)

4.2 If $\hat{A} = 70^\circ$ and $\hat{B} = 40^\circ$, use your calculator to evaluate the following(correct to ONE decimal place).

4.2.1 tan(A+B) (2)

4.2.2 $\sin^2 A$ (2)

4.2.3 $\sqrt[3]{2\sec\dfrac{3B}{2}}$ (2)

4.3 Without the use of the calculator, showing all your working, determine the value of:

$$\frac{\cot^2 60^\circ . \tan 45^\circ . \sin 30^\circ}{\cos 60^\circ}$$ (5)

**[19]**

**TOTAL [75]**

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