KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 11

MATHEMATICS

COMMON ASSESSMENT TASK

MARCH 2025

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MARKS: 75

TIME: 1½ hours

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 3 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. that 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. Write neatly and legibly.

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QUESTION 1

1.1 Solve for x:

1.1.1 $x^2 - 3x - 28 = 0$ (3)

1.1.2 $6\left(1+\frac{2}{3}x\right) = 3x^2$ (answer correct to TWO decimal places) (4)

1.1.3 $2x^2 + x - 3 \geq 0$ (4)

1.2 Given: $\sqrt{x-3} = \frac{2}{\sqrt{x}}$

1.2.1 Solve for x. (5)

1.2.2 Hence, or otherwise, solve for k if $\sqrt{k-20} = \frac{2}{\sqrt{k-17}}$. (2)

1.3 Solve simultaneously for x and y:

$2x - y = 3$ and $x^2 - 15 = -5xy - y^2$. (6)

1.4 An equation is given as $\frac{1}{2}x^2 + mx + 18 = 0$

1.4.1 Solve for x in terms of m. (2)

1.4.2 Hence, or otherwise, determine the value(s) of m for which the above equation will have equal roots. (3)

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QUESTION 2

2.1 Evaluate the following expressions, **without using a calculator:**

2.1.1 $\dfrac{\sqrt{121x^2}-\sqrt[3]{27x^3}}{-4^0 x}$ (3)

2.1.2 $\dfrac{8^k.6^{k-3}.9^{1-k}}{16^{k-1}.3^{-k}}$ (4)

2.2 Solve for x, **without using a calculator:**

2.2.1 $2x^{-\frac{1}{3}}=3$ (3)

2.2.2 $(5^x-125)(5^x+1)=0$ (3)

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2.3 It is given that $4^m=6$ and $6^n=8$. Calculate the value of mn. (3)

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QUESTION 3

3.1 Given that $13\cos\beta = 5$ and $\alpha + \beta = 90°$. By making use of a sketch and WITHOUT the use of a calculator, calculate the value of $\dfrac{\tan\beta}{\cos\alpha}$. (5)

3.2 Simplify the following to a single trigonometric term:
$\sin(180° + x).\cos^2(90° - x) + \sin(-x).\cos^2(180° - x)$. (6)

3.3 Evaluate WITHOUT the use of a calculator:
$\dfrac{\cos 100°\cos 315°\tan 210°}{\sin 675°\cos 150°\sin 170°}$. (6)

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3.4 Given: $(1-\cos^2 x)\left(\tan x + \dfrac{\cos x}{\sin x}\right)$.

3.4.1 Prove that $(1-\cos^2 x)\left(\tan x + \dfrac{\cos x}{\sin x}\right) = \tan x$ (4)

3.4.2 For which value(s) of x in the interval $[0°; 360°)$ is the identity in QUESTION 3.4.1 undefined? (3)

3.5 Given that $\sin\theta = \dfrac{-6k}{k^2+9}$ and $\theta \in (90° ; 270°)$. If $0 < k < 3$, determine the value of $\tan\theta + \dfrac{1}{\cos\theta}$ in terms of k. Your answer must be a single fraction in its simplest form. (5)

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