LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

MOPANI EAST DISTRICT

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GRADE 11

MATHEMATICS
CONTROLLED TEST 1
15 MARCH 2023

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MARKS: **100**

TIME: **2 HOUR**

This question paper consists of 5 pages (including this cover page).

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INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 5 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 to TWO decimal places, unless stated otherwise.
8. Diagrams are NOT necessarily drawn to scale.
9. An information sheet with formulae is not included at the end of the question paper.
10. Write neatly and legibly.

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QUESTION 1

1.1 Solve for x:

1.1.1 $x^2 - 5x - 6 = 0$ (2)

1.1.2 $(3x - 1)(x - 4) = 16$ (correct to TWO decimal places) (4)

1.1.3 $\sqrt{x-1} + 3 = x - 4$ (6)

1.1.4 $2x^2 - 2 \geq 3x$ (4)

1.2 Given: $F(x) = 5x^2 + 6x - 7 = 0$

1.2.1 Solve for x if f(x) = 0 use completing the square method (4)

1.2.2 Calculate the value of d for which $5x^2 + 6x = d$ has equal roots (3)

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QUESTION 2

2.1 Simplify fully WITHOUT using a calculator

2.1.1 $\frac{2^{n+2} \times 4^{n+1}}{8^{n-1}}$. (3)

2.1.2 $\frac{\sqrt{p^2-q^2} \times (p+q)^{\frac{5}{2}}}{(p-q)^{\frac{1}{2}}}$ $if\ p \neq q.$ (3)

2.1.3 $\sqrt{x + \sqrt{2x-1}} \times \sqrt{x - \sqrt{2x+1}}$ (4)

2.1.4 $\frac{5^{a-2} \times 2^{a+2}}{10^a - 10^{a-1} \times 2}$. (5)

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QUESTION 3

3.1.1 $x^{\frac{-3}{4}} = 8$ (3)

3.1.2. If $f(x) = 0\ has\ root\ x = \frac{-5 \pm \sqrt{3-12k^2}}{4}$, for which value of k will the root be real (3)

3.1.3 $2^{3x+1} + 2^{3x} = 12.$ (5)

3.1.4 Solve for x and y simultaneously $3x + 2 = y\ and\ y = -x^2 + 2x + 8$ (7)

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QUESTION 4

4.1.1 Simplify fully: $\sin(90^\circ - x).\cos(180^\circ + x) + \tan x.\cos x.\sin(x - 180^\circ)$ (6)

4.1.2 Simplify WITHOUT using a calculator

$$\frac{\sin 120^0.cos210^0.tan3150^0.cos27^0}{sin63^0.cos540^0}$$ (7)

4.2 The identity $\frac{(\sin x - \cos x)^2 - 1}{sin^2 x - 1} = 2\,tanx$ is given

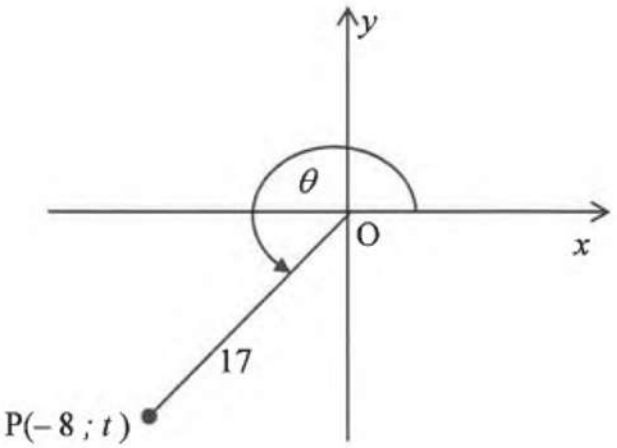
4.2.1 Prove the identity (6)

4.2.2 For which values of x in the interval $0^0 \leq x \leq 360^0$ will the identity in 4.2.1 not be defined? (4)

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QUESTION 5

5.1 In the diagram below, P(–8 ; t) is a point in the Cartesian plane such that OP = 17 units and reflex $\hat{XOP} = \theta$.



5.1.1 Calculate the value of t. (2)

5.1.2 Determine the value of each of the following WITHOUT using a calculator:

(a) $\cos(-\theta)$ (2)

(b) $1 - \sin\theta$ (2)

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QUESTION 6

6.1. If $\sin 17° = a$, WITHOUT using a calculator, express the following in terms of a:

6.1.1 $\tan 17°$ (3)

6.1.2 $\sin 107°$ (2)

6.1.3 $\cos^2 253° + \sin^2 557°$ (4)

6.2. Determine the following general solution of $\sin(x - 30) = Cos2x$ (6)

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TOTAL [100]

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