GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL EXAMINATION

JUNE 2023

GRADE 10

MATHEMATICS

PAPER 1

TIME: **1 hour**

MARKS: **50**

5 pages

P.T.O.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. This question paper consists of 5 questions.
3. Present your answers according to the instructions of each question.
4. Clearly show ALL calculations, diagrams, graphs, et cetera, which were used in determining the answers.
5. Answers only will NOT necessarily be awarded full marks.
6. Use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
7. Where necessary, answers should be rounded-off to TWO decimal places, unless stated otherwise.
8. Diagrams are NOT necessarily drawn to scale.
9. Number the questions correctly according to the numbering system used in the question paper.
10. Write neatly and legibly.

QUESTION 1

Determine the following **without the use of a calculator**:

1.1 Between which two consecutive integers lies $-\sqrt{69}$ (2)

1.2 Show that $0,\dot{9} = 1$ (3)
[5]

QUESTION 2

2.1 Factorise the following expression:

$3x^2 + 9x - 2xy - 6y$ (2)

2.2 Simplify:

2.2.1 $\frac{m^2 - 64}{m^2 + 8m} \div \frac{m - 8}{m}$ (4)

2.2.2 $\frac{2^{n-1}.8^{n+1}}{16^n}$ (3)
[9]

QUESTION 3

Solve for the unknown variable in each of the following:

3.1 $(a + 1)(a^2 + 2a - 3) = a(a^2 + 3a)$ (3)

3.2 $2x^2 + x - 3 = 0$ (2)

3.3 Solve the inequality:

$3 \leq 2x - 1 < 7$ (2)

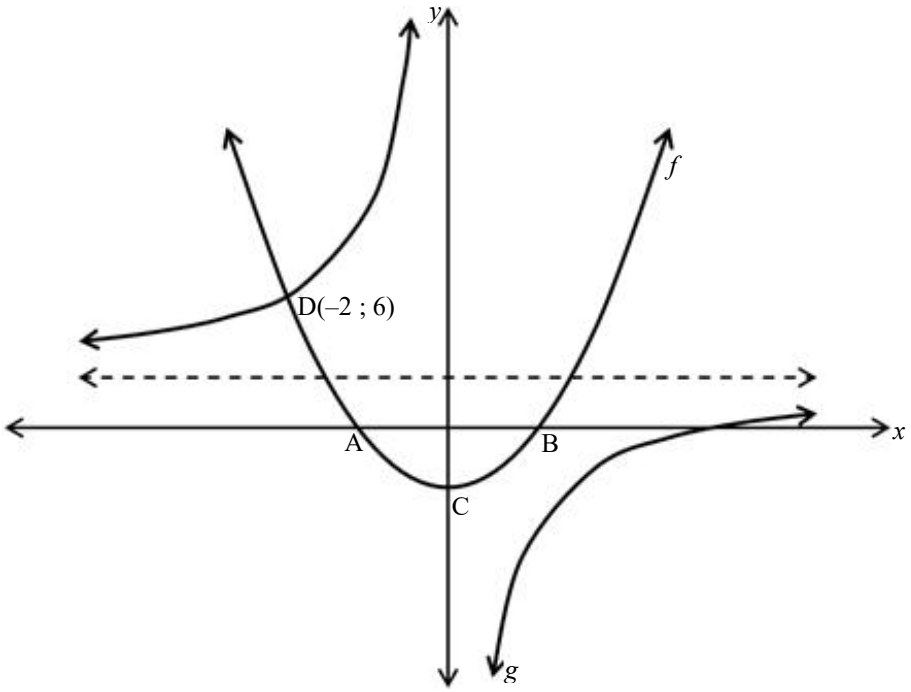
3.4 Solve for x and y simultaneously:

$3^{x+y} = 27^2$
$2^y = 4^{x+1}$ (4)
[11]

QUESTION 4

The graphs of $f(x) = 2x^2 - 2$ and $g(x) = -\frac{k}{x} + 1\frac{1}{2}$ are drawn below.

A and B are the x-intercepts of f and C is the y-intercept. D(–2 ; 6) is a point of intersection between the two graphs.



4.1 Write down the:

4.1.1 Domain of g (2)

4.1.2 Range of f (2)

4.1.3 Equation of the horizontal asymptote of g (1)

4.2 Calculate the length of AB. (3)

4.3 Show that $k = 9$. (2)

4.4 Write down the equation of the line of symmetry of g, with a positive gradient. (2)

4.5 Write down the value(s) of x such that:

4.5.1 $g(x) > f(x)$ (2)

4.5.2 Both f and g increase as x increases (1)

4.6 Describe the transformation of g to h if $h(x) = \frac{9}{x} - 3{,}5$ (2)

[17]

QUESTION 5

Given: $h(x) = 2^x - 4$

5.1 Calculate the x-intercept of h. (2)

5.2 Calculate the y-intercept of h. (1)

5.3 Hence, sketch the graph of h on a system of axes clearly showing the intercepts with the axes and asymptote. (3)

5.4 Write down the point of intersection between $y = 2^x - 4$ and $y = \frac{1}{2^x} - 4$. (2)

[8]

TOTAL: 50

END