GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL EXAMINATION

JUNE 2023

GRADE 10

MATHEMATICS

PAPER 1

TIME: 1 hour

MARKS: 50

5 pages

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:

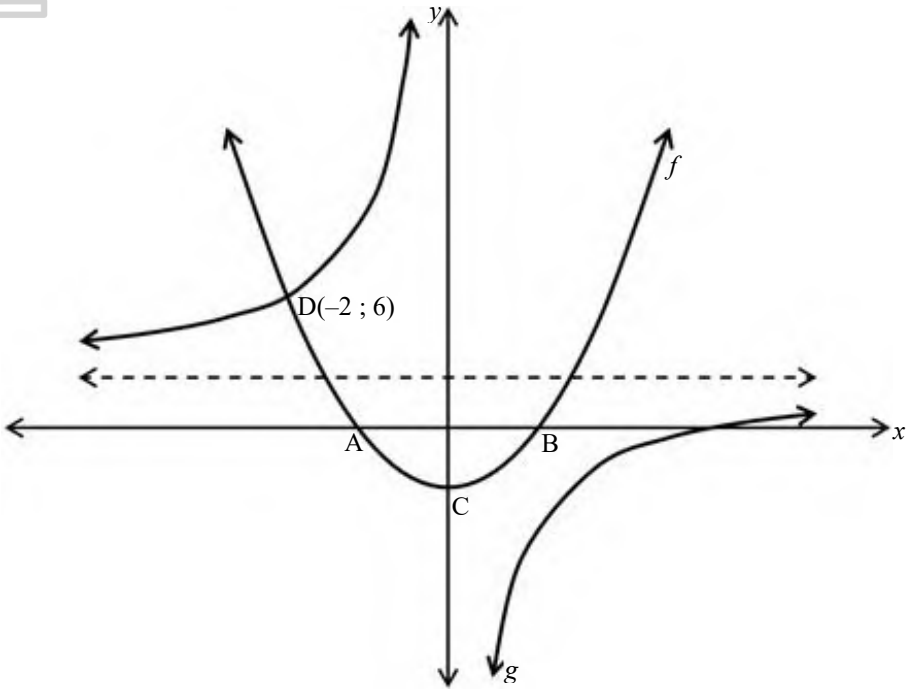
$3^{x+y} = 27^2$
$2^y = 4^{x+1}$ (4)

[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]

P.T.O.

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

GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL EXAMINATION

PROVINSIALE EKSAMEN

JUNE/*JUNIE* 2023

GRADE/*GRAAD* 10

MARKING GUIDELINES/ *NASIENRIGLYNE*

MATHEMATICS/*WISKUNDE* (PAPER/*VRAESTEL* 1)

6 pages/*bladsye*

NOTE/*LET WEL*:

- If a candidate answers a question TWICE, mark only the FIRST attempt.
  As 'n kandidaat 'n vraag TWEE keer beantwoord, merk slegs die EERSTE poging.
- If a candidate crossed out an answer and did not redo it, mark the crossed-out
  'n kandidaat 'n antwoord deurgehaal het en dit nie oorgedoen het nie, merk die deurgehaalde antwoord.
- Consistent accuracy (CA) applies to ALL aspects of the marking guidelines.
  Konsekwente akkuraatheid (CA) is van toepassing op ALLE aspekte van die nasienriglyne.
- Assuming values/answers in order to solve a problem is unacceptable.
  Om waardes/antwoorde te neem om 'n probleem op te los is onaanvaarbaar.

QUESTION/*VRAAG* 1

1.1	$-\sqrt{81} < -\sqrt{69} < -\sqrt{64}$ ✓ $-9 < \sqrt{69} < -8$ ✓	✓ $-\sqrt{81}$ and $-\sqrt{69}$ in correct order/ $-\sqrt{81}$ en $-\sqrt{69}$ *in korrekte volgorde* ✓ between –9 and –8/*tussen –9 en –8* **NO MARK for answer only/** ***GEEN PUNT vir slegs antwoord nie***	(2)
1.2	Let/*Stel* $0,\dot{9} = x$ ✓ $10x = 9,\dot{9}$ $10x - x = 9,\dot{9} - 0,\dot{9}$ ✓ $9x = 9$ ✓ $x = 1$	✓ Let/*Stel* $0,\dot{9} = x$ ✓ correct subtraction/*korrekte aftrek* ✓ Simplification/*Vereenvoudiging* **NO MARK for answer/** ***GEEN PUNT vir antwoord nie***	(3)
			[5]

QUESTION/*VRAAG* 2

2.1	$3x^2 + 9x - 2xy - 6y$ $= 3x(x + 3) - 2y(x + 3)$ ✓ $= (3x - 2y)(x + 3)$ ✓		✓ grouping and factorising/*groepering en faktorisering* ✓ common factors/*gemeenskaplike faktore*	(2)
2.2	2.2.1	$\frac{m^2 - 64}{m^2 + 8m} \div \frac{m - 8}{m}$ $= \frac{(m-8)(m+8)}{m(m+8)}$ ✓✓ $\times \frac{m}{(m-8)}$ ✓ $= 1$ ✓	✓ $(m - 8)(m + 8)$ factorising numerator/*faktoriseer teller* ✓ $m(m + 8)$ factorising denominator/*faktoriseer noemer* ✓ inverting/*resiprook* $\frac{m}{(m-8)}$ ✓ answer = 1/*antwoord = 1*	(4)

	2.2.2 $\frac{2^{n-1}.8^{n+1}}{16^n}$ $= \frac{2^{n-1}.2^{3n+3}}{2^{4n}}$ ✓✓ $= 2^{n-1+3n+3-4n}$ $= 2^2$ $= 4$ ✓	✓ 2^{3n+3} ✓ 2^{4n} ✓ answer/*antwoord*	(3)
			[9]

QUESTION/*VRAAG* 3

3.1	$(a+1)(a^2+2a-3) = a(a^2+3a)$ $a^3+3a^2-a-3 = a^3+3a^2$ ✓✓ $-a-3=0$ $a=-3$✓	✓ a^3+3a^2-a-3 (correct multiplication of LHS/*korrekte vermenigvuldiging van LK)* ✓ a^3+3a^2 (correct multiplication of RHS/ *korrekte vermenigvuldiging van RK)* ✓ answer/*answer*	(3)
3.2	$2x^2+x-3=0$ $(2x+3)(x-1)$ ✓ $x=-\frac{3}{2}$ or/*of* $x=1$ ✓	✓ factors/*faktore* ✓ both answers/*beide antwoorde*	(2)
3.3	$3 \le 2x-1 < 7$ $4 \le 2x < 8$ ✓ $2 \le x < 4$ ✓	✓ Add 1 to each side/*Tel 1 beide kante op* ✓ CA Divide by 2/*Deel deur 2*	(2)

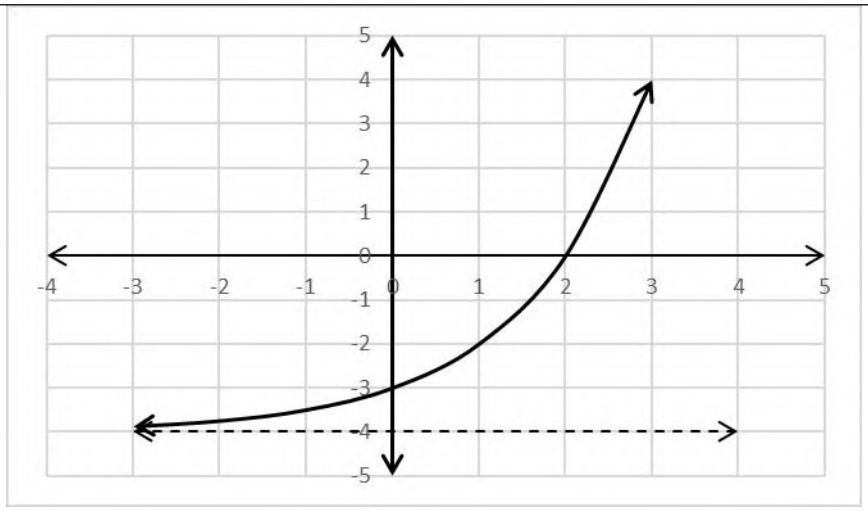
3.4	$3^{x+y} = 27^2$ $2^y = 4^{x+1}$ $x + y = 6$ ✓ $y = 2x + 2$ ✓ $x + 2x + 2 = 6$ $x = \frac{4}{3}$ ✓ $y = 2\left(\frac{4}{3}\right) + 2$ $y = \frac{14}{3}$ ✓	✓ equation 1/*vergelyking 1* ✓ equation 2/*vergelyking 2* ✓ $x = \frac{4}{3}$ ✓ $y = \frac{14}{3}$ **OR/*OF*** $4\frac{2}{3}$	(4)
			[11]

QUESTION/*VRAAG* 4

4.1	4.1.1	$x \in \mathbb{R}$; $x \neq 0$	✓ $x \in \mathbb{R}$ ✓ $x \neq 0$	(2)
	4.1.2	$y \in [-2 ; \infty)$ **OR/*OF*** $y \geq -2$	✓ values/*waardes* ✓ notation ONLY if values are correct/*notasie SLEGS as waardes korrek is*	(2)
	4.1.3	$y = 1\frac{1}{2}$	✓ Answer/*Antwoord*	(1)
4.2	*x*-int, let $y = 0$/*x-afsnit, stel* $y = 0$ $2x^2 - 2 = 0$ $2x^2 = 2$ $x = \pm 1$ AB = 2 units		✓ $y = 0$ ✓ BOTH *x*-values /*BEIDE x-waardes* ✓ AB = 2	(3)

4.3	Subst/*Vervang* (–2 ; 6) $6 = -\frac{k}{-2} + \frac{3}{2}$ $12 = k + 3$ $k = 9$ $g(x) = \frac{9}{x} + 1\frac{1}{2}$	✓ substitute/*vervang* (–2;6) ✓ simplify/v*ereenvoudig* ***NO MARK FOR k = 9/ GEEN PUNT VIR k = 9***	(2)
4.4	$y = x + 1\frac{1}{2}$	✓ x ✓ + 1,5	(2)
4.5	4.5.1 $-2 < x < 0$ **OR/*OF*** $x \in (-2 ; 0)$	✓ values/*waardes* ✓ notation ONLY if values are correct/*notasie SLEGS as waardes korrek is*	(2)
	4.5.2 $x > 0$	✓ Answer/*Antwoord*	(1)
4.6	Reflection about the *y*-axis and translated 5 units down *Refleksie oor die y-as en transleer 5 eenhede afwaarts* **OR/*OF*** Reflection about the *x*-axis and translate 2 units down *Refleksie oor die x-as en transleer 2 eenhede afwaarts*	✓ reflection about the *y*-axis/ *Refleksie oor die y-as* ✓ translate 5 units down/ *transleer 5 eenhede afwaarts* **OR/*OF*** ✓ reflection about the *x*-axis/ *Refleksie oor die x-as* ✓ translate 2 units down/ *transleer 2 eenhede afwaarts*	(2)
			[17]

QUESTION/*VRAAG* 5

5.1	*x*-int let $y = 0$ / *x-afsnit, stel* $y = 0$ $2^x - 4 = 0$ $2^x = 4$ $2^x = 2^2$ $x = 2$	✓ $y = 0$ ✓ $x = 2$	(2)
5.2	*y*-int let $x = 0$ / *y-afsnit , stel* $x = 0$ $y = 2^0 - 4$ $y = 1 - 4$ $y = -3$	✓ $y = -3$	(1)
5.3		✓ *x* and *y*-intercepts/ *x en y-afsnitte* ✓ asymptote/ *asimptoot* ✓ ordered pair (1;–2) OR (3;4) *getallepaar* (1;–2) *OF* (3;4)	(3)
5.4	(0 ; –3)	✓ *x*-coordinate/ *x-koördinaat* ✓ *y*-coordinate/ *y-koördinaat*	(2)
			[8]
		TOTAL/*TOTAAL*:	**[50]**