GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL EXAMINATION

JUNE 2024

GRADE 9

MATHEMATICS
(PAPER 1)

TIME: 1½ hours

MARKS: 75

12 Pages

NAME OF LEARNER: _____ **CLASS:** _____

NAME OF SCHOOL: _____

P.T.O.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of 7 questions.
2. Answer ALL the questions on the question paper.
3. A non-programmable calculator may be used, unless otherwise stated.
4. Clearly show ALL calculations, diagrams, and graphs that you have used in determining your answers. Answers only will not necessarily be awarded full marks.
5. If necessary, round off your answers to 2 decimal places, unless stated otherwise.
6. Diagrams are not necessarily drawn to scale.
7. Answer QUESTION 1 in Section A by circling the letter next to the correct answer.
8. Answer QUESTIONS 2 to 7 in Section B in the spaces provided on this question paper.
9. Write neatly and legibly.

SECTION A

QUESTION 1

Answer questions 1.1 – 1.5 by choosing the correct answer. Circle the letter next to the correct answer.

1.1 Which of the options below contains rational numbers only?

A $\frac{1}{4}$; $\sqrt{\frac{4}{0}}$; $\frac{22}{7}$

B –2,5401 ; $\sqrt{89}$; 4,3891016

C $\sqrt{-100}$; 0,25 ; 4

D –8 ; $-\sqrt{144}$; $5\frac{7}{8}$ (1)

1.2 To simplify $(100p^a)^b$ …

A add the exponents.
B subtract the exponents.
C multiply the exponents.
D divide the exponents. (1)

1.3 Evaluate: $\frac{4}{5}x-\frac{1}{3}x-\frac{1}{15}x$

A $\frac{2}{15}x$

B $\frac{2}{5}x$

C $\frac{7}{15}x$

D $\frac{2}{3}x$ (1)

1.4 Subtract $\frac{3a}{9}$ from $\frac{a}{9}$.

A $-2a$

B $\frac{-2a}{9}$

C $\frac{2a}{9}$

D $2a$ (1)

1.5 Which equation below shows the correct use of the commutative property?

A $a+b=b+a$

B $a+(b+c)=(a+b)+c$

C $ab-ac=a(b-c)$

D $a+b+c=abc$ (1)

[5]

SECTION B

QUESTION 2

2.1 Consider the following:

Number	Prime Factors
63	$3^2 \times 7$
252	$2^2 \times 3^2 \times 7$
378	$2 \times 3^3 \times 7$

2.1.1 Write down the HCF of 63 and 378.

_____ (1)

2.1.2 Write down the LCM of 252 and 378.

_____ (1)

2.2 Vusi and Themba each bought a pair of jeans from two different shops.

The selling price of the pairs of jeans was R599,99 in both shops. Both shops offered a discount on the selling price as given below:

Vusi bought his for 20% less than the selling price and Themba only paid $\frac{3}{4}$ of the selling price.

Who paid less for his pair of jeans? Support your answer by showing all the calculations.

_____

_____

_____

_____ (3)

2.3 A young couple left the house and drove toward the north at an average speed of 80 km/h.

Their uncle left the same house sometime later, driving in the same direction at an average speed of 88 km/h.

How long did the young couple drive before their uncle caught up with them?

(3)

2.4 Samuel borrowed a certain amount of money at 11,5% per annum compounded annually over a period of 6 years. The total amount that he paid at the end of the 6 years was R670 000.

How much did he initially borrow?

Round your answer off to the nearest 10.

(4)
[12]

QUESTION 3

3.1 Choose the correct word within the brackets to complete the sentence.

The quotient of two numbers with different signs is always (positive; negative).

(1)

3.2 Fill in < ; > ; =

$-(2)^2$ ☐ -4 (1)

3.3 Simplify:

$-1^{2022} + (-1)^{2024}$

(2)

3.4 Calculate the following without using a calculator. Leave answers in the simplest form.

3.4.1 $2-4^3+(-12)+\sqrt{144}$

(2)

3.4.2 $$\frac{\left(-\sqrt{25}\right)^3 \times \left(\sqrt[3]{-8}\right)^2}{-3(-3)^2 + 2\times 2+3}$$

(4)

[10]

QUESTION 4

4.1 Match COLUMN A with the correct answer in COLUMN B. Write only the letter of the correct answer in the ANSWER COLUMN.

COLUMN A	COLUMN B	ANSWER
4.1.1 $3p \times 3p$	A $3^2 p^{-2}$	4.1.1 _____
4.1.2 $\frac{3}{p} \times \frac{3}{p}$	B $\left(p^{-2}\right)^4$	4.1.2 _____
4.1.3 $\frac{1}{p^{-2}} \times \frac{1}{p^{-2}} \times \frac{1}{p^{-2}} \times \frac{1}{p^{-2}}$	C $3^2 p^2$	4.1.3 _____
	D $\left(p^2\right)^4$	
	E $\left(p^8\right)^4$	

(3)

4.2 Prove the following:

$pq = \frac{q}{p^{-1}}$

(2)

4.3 Simplify:

4.3.1 $\frac{r^{-2}\, s^{-5} \times r^4 s^{-2}}{r^2 s^6}$

(3)

4.3.2 $\frac{5p^0p+(5q)^0p}{-(2p)^2}$

(3)

[11]

QUESTION 5

5.1 $T_n = 4n + 3$ is the n^{th} term of a number pattern.

Determine:

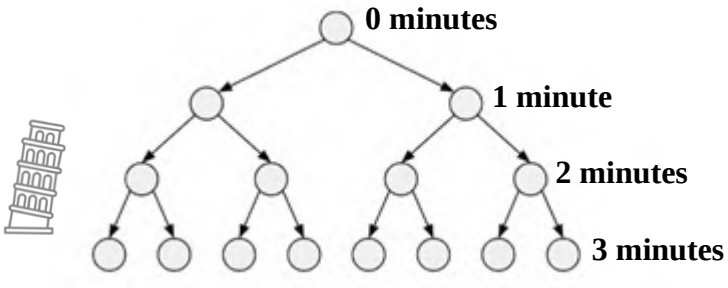
5.1.1 The first two terms of the sequence.

(2)

5.1.2 Which term is equal to 867?

(2)

5.2 Winter is when most flu viruses spread and multiply quickly. The way in which the virus multiplies can be represented by the following sketch:



5.2.1 Complete the table below to show how the virus multiplies.

Minute/Minutes	**0**	**1**	**2**	**3**	**4**	**5**
Number of viruses	1	2	4	8		

(2)

5.2.2 Describe the pattern above in words.

_____

_____

(1)
[7]

QUESTION 6

6.1 Given: $108x^3y + 75xy + 35x^4y - 18$

6.1.1 How many terms are there in the expression above?

_____

(1)

6.1.2 What is the coefficient of x?

_____

(1)

6.1.3 What is the degree of the expression in x?

_____

(1)

6.2 Given the expression $-a + (2b - 2a)^3$, determine the value of the expression; if $a = -1$ *and* $b = 2$.

(2)

6.3 Simplify:

6.3.1 $-3a(a + b)(2a - b^2)$

(3)

6.3.2 $(2x^2)^3 + \sqrt[3]{27x^{12}} - 8x^4$

(3)

6.4 Factorise:

6.4.1 $p^2 - 25$

(2)

6.4.2 $3x^2 - 21x + 30$

(3)

[16]

QUESTION 7

7.1 Write the following statement algebraically.

The sum of three numbers is 123. The second number is five times the first number and the third number is two more than the second number.

(1)

7.2 Solve for the unknown in the equations below.

7.2.1 $4a - 3a(a - 2) + 3a^2 = 10$

(3)

7.2.2 $\frac{2x-3}{2} = \frac{5x}{3}$

(3)

7.2.3 $3^{x-2} = 81$

(2)

7.3 Ryan buys twice as many 5 ℓ bottles of dishwashing liquid than fabric softener.

He paid R120 per 5 ℓ bottle of fabric softener; R150 per 5 ℓ bottle of dishwashing liquid and the total paid was R2 520.

How many 5 ℓ bottles of dishwashing liquid did he buy?

(5)

[14]

TOTAL: 75

END

GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL EXAMINATION

PROVINSIALE EKSAMEN

JUNE/*JUNIE* 2024

GRADE/*GRAAD* 9

MARKING GUIDELINES

NASIENRIGLYNE

MATHEMATICS
WISKUNDE
(PAPER/*VRAESTEL 1*

9 pages/*bladsye*

SECTION/*AFDELING* A

QUESTION/*VRAAG* 1

1.1	1.2	1.3	1.4	1.5
D ✓	C ✓	B ✓	B ✓	A ✓

[5]

SECTION/*AFDELING* B

QUESTION/*VRAAG* 2

2.1	2.1.1	63 ✓**A**	1 mark for the HCF *1 punt vir die GGF*	(1)
	2.1.2	756 ✓**A**	1 mark for the LCM *1 punt vir die KGV*	(1)
2.2	$\frac{20}{100} \times 599{,}79$ **OR/*OF*** $\frac{80}{100} \times 599{,}79$ $= 119{,}96$ $= R479{,}83$ ✓**M** $= 599{,}79 - 119{,}96$ $= \text{R}479{,}83$ ✓**M** **AND/*EN*** $0{,}75 \times 599{,}79$ **OR/*OF*** $= \frac{599{,}79}{4}$ $= \text{R}449{,}84$ $= 149{,}95 \times 3$ $= R449{,}84$ ✓**M** Any other alternative and mathematically correct method. *Enige ander alternatiewe en wiskundig korrekte metode.* Themba paid less./*Themba het minder betaal* ✓**CA**	1 mark for *R*479,83 *1 punt vir R479,83* 1 mark for *R*449.84 *1 punt vir R*449.84 1 mark for the answer *1 punt vir antwoord*	(3)

2.3	Distance = Speed × Time = s × t *Afstand = Spoed × Tyd* = s × t Uncle's distance: $88 \times 5 = 440\ km$ *Oom se afstand* : $88 \times 5 = 440\ km$ ✓**M** Uncle's distance = Young couple's distance *Oom se afstand* : = *Jong paartjie se afstand* $440 = 80\ t$ ✓**M** $\frac{440}{80} = t$ t = 5,5 hours/*uur*. Driving time of young couple/*Rytyd van jong paartjie* 5 + 0,5 = 5,5 hours/*uur* ✓**CA** **OR/*OF*** Young couple's distance: 80 × 5 = 400 ✓**M** *Jong paartjie se afstand*: *80 × 5 = 400* Uncle's distance: 88 × 5 = 440 ✓**M** *Oom se afstand* : *88 × 5 = 440* 440 – 400 = 40 $\frac{40}{80} = 0{,}5hrs$ Driving time of young couple/*Rytyd van jong paartjie* 5 + 0,5 = 5,5 hours/*uur* ✓ **CA** Uncle left 0,5 hrs or 30 min after the young couple left. *Oom verlaat die huis 0,5 uur of 30 min na die jong paartjie.* **OR/*OF*** $80(t + 5) = 440$ ✓**M** $80t + 400 = 440$ $80t = 40$ ✓**M** $t = \frac{40}{80}$ or/*of* $\frac{1}{2}\ h$ or/*of 0,5 h* or/*of 30 minutes* Time taken by young couple:/*Rytyd vir jong paartjie:* 5 + 0,5 = 5,5 hours/*uur* ✓**CA**	1 correct substitution/calculation/ *1 punt vir korrekte vervanging/bewerking* 1 mark for simplification/ *1 punt vir vereenvoudiging* 1 mark for answer/*1 punt vir antwoord.*	(3)

2.4	$A = P(1+i)^n$ ✓**A** $670\,000 = P(1 + 0{,}115)^6$ ✓**M** $\frac{670000}{(1{,}115)^6} = P$ $R348\,678{,}84 = P$ ✓**M** $\approx R348\,680{,}00$ ✓**CA**	1 mark for correct formula/ *1 punt vir korrekte formule* 1 mark correct substitution / *1 punt vir korrekte vervanging* 1 mark for P/*1 punt vir P* 1 mark for answer rounded-off correctly/*1 punt vir antwoord korrek afgerond*	(4)
			[12]

QUESTION/*VRAAG* 3

3.1	negative/*negatief* ✓**A**	1 mark for answer/*1 punt vir antwoord*	(1)
3.2	$-(2)^2 = -4$ ✓**A**	1 mark for the correct answer/*1 punt vir korrekte antwoord* OR/*OF* 1 mark for answer only/ *1 punt vir slegs antwoord*	(1)
3.3	$-1^{2022} + (-1)^{2024}$ $= -1 + 1$ ✓M $= 0$ ✓**CA**	1 mark for $-1+1$/*1 punt vir* $-1+1$ 1 mark for answer/*1 punt vir antwoord* **0 mark for answer only/** ***0 punte vir slegs antwoord***	(2)
3.4	3.4.1 $2 - 4^3 + (-12) + \sqrt{144}$ $= 2 - 64 - 12 + 12$ ✓M $= -62$ ✓**CA**	1 mark for simplifying/ *1 punt vir vereenvoudiging* 1 mark for answer/*1 punt vir antwoord* **0 mark for answer only/** ***0 punte vir slegs antwoord***	(2)

	3.4.2	$\frac{\left(-\sqrt{25}\right)^3 \times \left(\sqrt[3]{-8}\right)^2}{-3(-3)^2 + 2\times 2+3}$ $= \frac{(-5)^3 \times (-2)^2}{-3(9)+4+3}$ ✓✓**M** $= \frac{-125\times 4}{-27+4+3}$ ✓**M** $= \frac{-500}{-20}$ $= 25$ ✓**CA**	1 mark for $(-5)^3$/*1 punt vir* $(-5)^3$ 1 mark for $(-2)^2$/*1 punt vir* $(-2)^2$ 1 mark for simplifying/ *1 punt vir vereenvoudiging* 1 mark for answer/*1 punt vir antwoord*	(4)
				[10]

QUESTION/*VRAAG* 4

4.1	4.1.1	C: $3p \times 3p = 3^2p^2$ ✓**A**	1 mark for answer/*1 punt vir antwoord*	(1)
	4.1.2	A: $\frac{3}{p} \times \frac{3}{p} = 3^2p^{-2}$ ✓**A**	1 mark for answer/*1 punt vir antwoord*	(1)
	4.1.3	D: $\frac{1}{p^{-2}} \times \frac{1}{p^{-2}} \times \frac{1}{p^{-2}} \times \frac{1}{p^{-2}} = (p^2)^4$ ✓**A**	1 mark for answer/*1 punt vir antwoord*	(1)
4.2	$pq = \frac{q}{p^{-1}}$ $= \frac{q}{\frac{1}{p}}$ ✓M $= q \times \frac{p}{1}$ $= pq$ ✓**CA**		1 mark for/*1 punt vir*: $\frac{q}{\frac{1}{p}}$ 1 mark for answer/ *1 punt vir antwoord*	(2)

4.3	4.3.1	$\frac{r^{-2}\,s^{-5}\times r^{4}s^{-2}}{r^{2}s^{6}}$ $=\frac{r^{-2+4}\times s^{-5-2}}{r^{2}s^{6}}$ ✓M $=r^{-2-2}\,s^{-7-6}$ ✓M $=r^{0}s^{-13}$ ✓CA $=s^{-13}$ OR/*OF* $\frac{1}{s^{13}}$ ✓**CA**	1 mark for multiplication (law of exponents) *1 punt vir vemenigvuldiging (eksponensiële wet)* 1 mark for division (law of exponents)/ *1 punt vir deling (eksponensiële wet)* 1 mark for the answer/*1 punt vir antwoord*	(3)
	4.3.2	$\frac{5p^{0}p+(5q)^{0}p}{-(2p)^{2}}$ $=\frac{5p+p}{-4p^{2}}$ ✓**M** $=\frac{6p}{-4p^{2}}$ ✓**M** $=\frac{-3}{2p}$ ✓**CA**	1 mark for applying laws of exponents/ *1 punt vir toepassing van eksponensiële wette* 1 mark for/*1 punt vir* $-4p^{2}$ 1 mark for answer/ *1 punt vir antwoord*	(3)
				[11]

QUESTION/*VRAAG* 5

5.1	5.1.1	7; 11; ✓✓A	1 mark for each term/ *1 punt vir elke term*	(2)
	5.1.2	$T_n = 4n + 3$ $867 = 4n + 3$ ✓M $867 - 3 = 4n$ $n = 216$✓CA	1 mark for substitution/ *1 punt vir korrekte vervanging* 1 mark for answer/*1 punt vir antwoord*	(2)
5.2	5.2.1	16; 32; ✓ ✓A	1 mark for each term/ *1 punt vir elke term*	(2)

	5.2.2	Start with 1 and multiply the previous term by 2 ✓CA. *Begin met 1 en maal die vorige term met 2.* **OR/*OF*** Start with 1 and multiply by 2 repeatedly. ✓CA *Begin met 1 en maal herhaadelik met 2.* **OR/OF** Term value is 2 to the power term number minus/subtract 1. ✓CA. *Term waarde is 2 tot die mag van die term posisie minus 1.* **OR/*OF*** Multiply each term by 2 to get the next term. ✓CA *Maal elke term met 2 om die volgende term te kry.*	1 mark for correct answer/*1 punt vir korrekte antwoord*	(1)
				[7]

QUESTION/*VRAAG* 6

6.1	6.1.1	4✓**A**	1 mark for answer/*1 punt vir antwoord*	(1)
	6.1.2	75y ✓**A**	1 mark for answer/*1 punt vir antwoord*	(1)
	6.1.3	4^{th} degree ✓**A** 4^{de} *graad*	1 mark for answer/*1 punt vir antwoord*	(1)
6.2	$-a+(2b-2a)^3$ $=-(-1)+[2(2)-2(-1)]^3$ ✓**M** $=1+6^3$ $=217$ ✓**CA**		1 mark for correct substitution/ *1 punt vir korrekte vervanging* 1 mark for answer/*1 punt vir antwoord*	(2)
6.3	6.3.1	$-3a(a+b)(2a-b^2)$ $=-3a(2a^2-ab^2+2ab-b^3)$ $=-6a^3+3a^2b^2-6a^2b+3ab^3$ ✓✓✓**CA**	1 mark for/*1 punt vir* $3a^2b^2$ 1 mark for/*1 punt vir* $-6a^2b$ 1 mark for/*1 punt vir* $3ab^3$	(3)
	6.3.2	$(2x^2)^3+\sqrt[3]{27x^{12}}-8x^4$ $=8x^6+3x^4-8x^4$ ✓**A** $=8x^6-5x^4$ ✓✓**A**	1 mark for/*1 punt vir* $3x^4$ 1 mark for/*1 punt vir* $8x^6$ 1 mark for/*1 punt vir* $-5x^4$	(3)
6.4	6.4.1	p^2-25 $=(p-5)(p+5)$✓ ✓**A**	1 mark for each factor./*1 punt vir elke faktoor.*	(2)
	6.4.2	$3x^2-21x+30$ $=3(x^2-7x+10)$ ✓**M** $=3(x-2)(x-5)$ ✓✓**CA**	1 mark for/*1 punt vir* 3 1 mark for/*1 punt vir* $(x-2)$ 1 mark for/*1 punt vir* $(x-5)$	(3)
				[16]

QUESTION/*VRAAG* 7

7.1		$x + 5x + (5x + 2) = 123$ ✓**A** **OR/*OF*** $x + 5x + 5x + 2 = 123$ ✓**A** **OR/*OF*** $11x + 2 = 123$ ✓**A**	1 mark for answer/*1 punt vir antwoord*	(1)
7.2	7.2.1	$4a - 3a(a - 2) + 3a^2 = 10$ $4a - 3a^2 + 6a + 3a^2 = 10$ ✓**M** $10a = 10$ ✓**M** $a = 1$ ✓**CA**	1 mark for removing the brackets/ *1 punt vir verwydering van hakies* 1 mark for adding like terms/ *1 punt vir bymekaartel van gelyksoortige terme* 1 mark for answer/*1 punt vir antwoord*	(3)
	7.2.2	$\frac{2x-3}{2} = \frac{5x}{3}$ $3(2x - 3) = 2(5x)$ ✓**M** $6x - 9 = 10x$ $-4x = 9$ ✓**M** $x = \frac{-9}{4}$ ✓**CA**	1 mark for multiplying all terms by the LCD/ *1 punt vir vermenigvuldiging met die KGV.* 1 mark for simplification/*1 punt vir korrekte vervanging* 1 mark for answer/*1 punt vir antwoord*	(3)
	7.2.3	$3^{x-2} = 81$ $3^{x-2} = 3^4$ ✓**M** $\therefore x - 2 = 4$ $x = 6$ ✓**CA**	1 mark for/*1 punt vir* 3^4 1 mark for answer/*1 punt vir antwoord*	(2)

7.3

Softener/ *Versagter*	1	2	3	4	5	**6 ✓M**
Amount/*Bedrag*	120	240	360	480	600	**720 ✓M**
Dishwashing liquid/*Skottel-goedseep*	2	4	6	8	10	**12 ✓M**
Amount/*Bedrag*	300	600	900	1 200	1 500	**1 800 ✓A**
Total/*Totaal*	420	840	1 260	1 680	2 100	**2 520 ✓M**

OR/*OF*

Let k equal the number of 5 ℓ bought.
Laat k gelyk wees aan die hoeveelheid 5 ℓ gekoop.

$120k + 300k = 2\,520$ ✓**M**

$420k = 2\,520$

$k = 6$ ✓**M**

Softener/*Versagter :* $120 \times 6 = 720$ ✓**M**

Dishwashing liquid/*skottelgoedseep*:

$= 150 \times 2 \times 6 = 1\,800$ ✓**M**

He bought/*Hy koop* 12× 5 ℓ dishwashing liquid/ *skottelgoedseep* ✓C**A**

OR/*OF*

Let/*Laat* $x = 1 \times 5$ ℓ fabric softener/*versagter*.

then/*dan* $2x = 1 \times 5$ ℓ dishwashing liquid/skottelgoed-seep ✓**M**

Cost of softener/ *Koste van versagmiddel* $= 120x$ and/*en*

Dishwashing liquid/*skottelgoedseep* $= 150 \times 2x = 300x$ ✓**M**

$\therefore 120x + 300x = 2\,520$ ✓**M**

$420x = 2520$

$x = 6$ ✓**M**

$\therefore 2x = 12 \times 5l$ dishwashing liquid/ *skottelgoedseep* ✓**CA**

Any other alternative and mathematically correct method.
Enige ander alternatiewe en wiskundig korrekte metode.

1 mark for/*1 punt vir* 6
1 mark for/*1 punt vir* 720
1 mark for/*1 punt vir* 12
1 mark for/*1 punt vir* 1800
1 mark for adding/ *1 punt vir bymekaartel van:* $720 + 1800 = 2520$
1 mark for the equation/*1 punt vir vergelyking*

1 mark for/*1 punt vir* $k = 6$

1 mark for/*1 punt vir* 720

1 mark for/*1 punt vir* 1800

1 mark for/*1 punt vir* 12

(5)

[14]

TOTAL/*TOTAAL*: 75