GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

EKURHULENI NORTH DISTRICT

SUBJECT	MATHEMATICS	
GRADE	9	
PAPER	1	
YEAR	2023	
TASK	NOVEMBER EXAMINATION	
DATE	16 NOVEMBER 2023	
TIME ALLOCATION	$1\frac{1}{2}$ HOURS	
MARKS	75	

NAME OF LEARNER: _____   GRADE 9: ___

Question number	1	2	3	4	5	6	7	Total
Total marks	5	12	10	12	15	11	10	75
Learner marks								
Moderated marks								

This question paper consists of **11** pages and **7** questions.

INSTRUCTIONS:

1. Section A consists of 5 multiple choice questions, answer the questions on the answer sheet provided.

2. Section B and C questions must be answered in the space provided on this paper.

3. Clearly show all calculations.

4. Calculators are allowed.

5. If necessary, round answers off to 2 decimal places, unless stated otherwise.

6. Diagrams are not necessarily drawn to scale.

7. It is in your best interest to write neatly and legibly.

8. Answers only will not necessarily be awarded full marks.
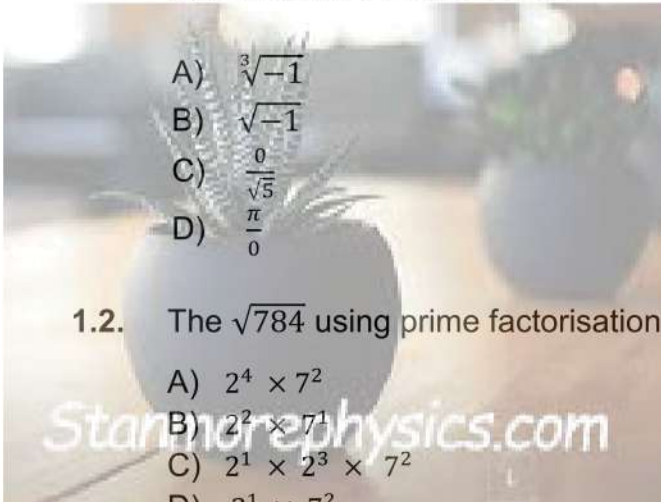
SECTION A: MULTIPLE CHOICE QUESTIONS

QUESTION 1

Choose the correct answer. Circle the letter of the correct answer on the **ANSWER SHEET** provided on **page 4**. If you want to change your choice, put a cross through the wrong letter and circle your new choice.

1.1. The following numbers are provided:

$$\sqrt[3]{-1} \;;\; \sqrt{-1} \;;\; \frac{0}{\sqrt{5}} \;;\; \frac{\pi}{0}$$

Which number is undefined ?

A) $\sqrt[3]{-1}$
B) $\sqrt{-1}$
C) $\frac{0}{\sqrt{5}}$
D) $\frac{\pi}{0}$

(1)

1.2. The $\sqrt{784}$ using prime factorisation is:

A) $2^4 \times 7^2$
B) $2^2 \times 7^1$
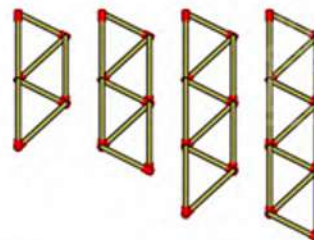C) $2^1 \times 2^3 \times 7^2$
D) $2^1 \times 7^2$

(1)

1.3. Calculate :

$$\sqrt[3]{8^{18}} \times (8^{10})^{-\frac{1}{2}}$$

A) 0
B) 1
C) 8
D) 8^{11}

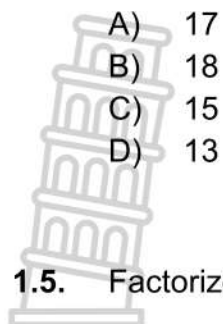(1)

1.4. The following pattern is formed using matchsticks:

Pattern Number : 1   2   3   4

How many matchsticks will be used to make pattern 6 ?

A) 17
B) 18
C) 15
D) 13 (1)

1.5. Factorize:

$$2p^2 - 2$$

A) $(2p + 1)(2p - 1)$
B) $(p + 2)(p - 2)$
C) $2(p + 2)(p - 2)$
D) $2(p + 1)(p - 1)$ (1)

[TOTAL: 5]

ANSWER SHEET

CIRCLE YOUR ANSWERS FROM SECTION A IN THE GRID BELOW AS SHOWN IN THE EXAMPLE:

Example:	A	Ⓑ	C	D
1.1.	A	B	C	D
1.2.	A	B	C	D
1.3.	A	B	C	D
1.4.	A	B	C	D
1.5.	A	B	C	D

Subtotal Question 1= [5×1]

SECTION B: NUMBERS, OPERATIONS AND RELATIONSHIPS

QUESTION 2: WHOLE NUMBERS

2.1 Write $60 \, seconds : 4 \, minutes$ in the simplest form.

2.1	
	(2)

2.2 A motorist covers a distance of $360 \, km$ in exactly $4 \, hours$. If the motorist had to drive at $\frac{2}{3}$ his original speed. How much longer would it take him to complete the same trip?

2.2	
	(4)

2.3 Andrew and Zinzi are arguing about investing money that they received for Christmas.

They each received $R1750$.

- Andrew invests his money at AB Bank for $3 \, years$ at a compound interest rate of $14\% \, per \, annum$.
- Zinzi invests her money at BC Bank, earning 15% simple interest per annum over a period of $2 \, years$.

Using calculations to support your answer, indicate why Andrew's investment is the better option.

2.3	
	(6)

[TOTAL: 12]

QUESTION 3: INTEGERS AND EXPONENTS

3.1 State whether each of the following statements is true or false.

3.1.1	$-8^0 + \sqrt[3]{1} = 0$		(1)
3.1.2	$(2)^{-2} = \dfrac{1}{-4}$		(1)

3.2 Simplify the following. Show all your calculations.

3.2.1 $(-11) + 3(-1)$

3.2.1		
		(2)

3.2.2 $\sqrt{4 \times 9 + 8^2}$

3.2.2		
		(2)

3.2.3 $\sqrt[3]{-8} - \sqrt{(-\frac{1}{6})^2} - (2)^{-3}$
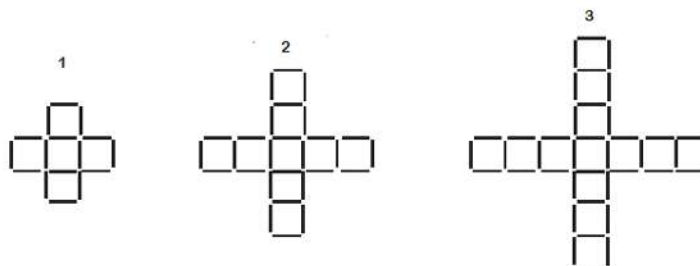
3.2.3	
	(4)

[TOTAL:10]

SECTION C: PATTERNS, FUNCTIONS AND ALGEBRA

QUESTION 4: NUMERIC AND GEOMETRIC PATTERNS AND FUNCTIONS AND RELATIONSHIPS

4.1 The pattern below is made using squares. Study the pattern and then answer the questions that follow.

4. Determine the general term or rule to calculate the number of squares in each figure.

4.1.1	
	(2)

4.1.2 How many squares will figure 14 have?

4.1.2	
	(2)

4.1.3 Which figure will be made up of 129 squares?

4.1.3	
	(3)

4.2 The following equation is provided:

$$y = -8x + 6$$

Determine the output values corresponding to the input values of x in the set $\{-3; 0; 3\}$.

4.2.	
	(3)

4.3 The table below shows the relationship of the number of hours worked by Sam and Andrew.

Hours worked by Sam	5	18	21	33	36	55
Hours worked by Andrew	$6\frac{1}{2}$	13	$14\frac{1}{2}$	$20\frac{1}{2}$	22	$31\frac{1}{2}$

Represent the relationship in the table as an algebraic equation.

4.3		(2)

[TOTAL: 12]

QUESTION 5 : ALGEBRAIC EXPRESSIONS

5.1 The following algebraic expression is provided:

$$\frac{x-1}{4} - 2y^2 + 3$$

State whether each of the following statements is true or false.

5.1.1	The expression consists of 3 terms.	
5.1.2	The coefficient of y^2 is 2.	

(2)

5.2 Simplify the following expressions:

5.2.1 $2(3q - 5q) + 4(-3p)$

5.2.1		
		(3)

5.2.2 $\dfrac{15x^2y^3 + 9x^2y^3 - 6x^2y^3}{\frac{1}{3}x^{-2}y^{-3}}$

5.2.2		
		(3)

5.3 Fully factorize the following expressions:

5.3.1 $3ax - 6bx + 6ay - 12by$

5.3.1		
		(2)

5.3.2 $x^2 + 6x = m$

5.3.2	
	(2)

5.4   Determine the value of $(x + 8)^2 - x^2$ if $x = -2$

5.4	
	(3)

[TOTAL:15]

QUESTION 6: ALGEBRAIC EQUATIONS

6.1   Solve for x in the given equations:

6.1.1 $2^{x+1} = 16$

6.1.1	
	(2)

6.1.2 $(x - 4)(x + 8) = 0$

6.1.2	
	(2)

6.1.3 $4(x - 3) = 9(3 - x)$

6.1.3	
	(3)

6.1.4 $\quad 3x + \dfrac{2x-5}{3} = 1$

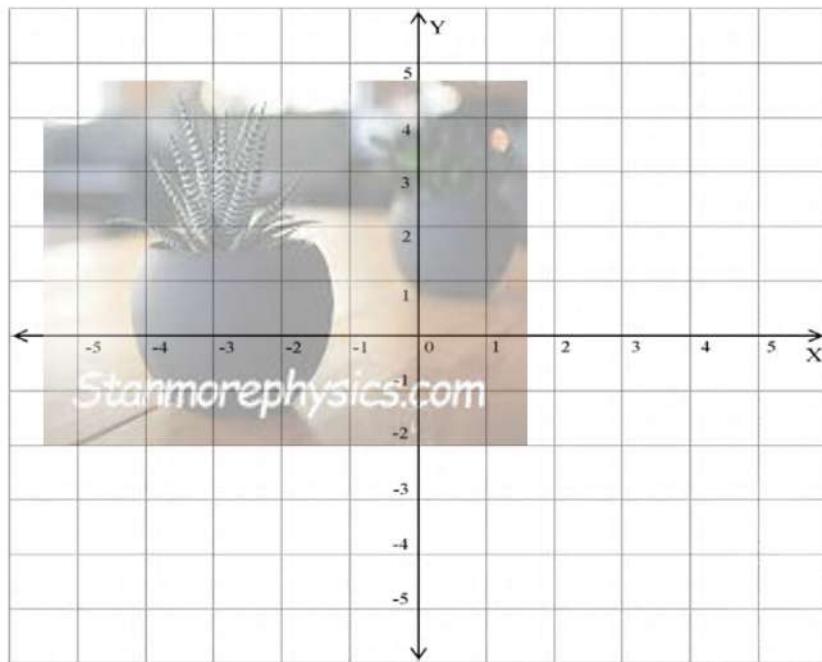| 6.1.4	
	(4)

[TOTAL:11]

QUESTION 7: GRAPHS

7.1 The points $A(-2\,;\,3), B(0\,;\,2)$ and $C(4\,;\,0)$ are given.

    7.1.1   Plot the points A, B and C on the grid provided. Draw a straight line through the points A, B and C.

(3)

    7.1.2   Calculate the gradient of the straight line through points A, B and C.

7.1.2	
	(3)

7.1.3   Determine the equation of the straight line in the form: $y = mx + c$.

7.1.3		
		(2)

7.1.4   Write down the equation of the straight line that is drawn parallel

to the straight line in question 7.1.3 and is translated 4 units down.

7.1.4		
		(2)

[TOTAL:10]

GRAND TOTAL: 75

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MEMORANDUM

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MARKS	75
EXAMINER	EN CLUSTER TEACHERS
MODERATOR	PLC LEAD TEACHERS

SECTION A

QUESTION 1:

1.1. D ✓
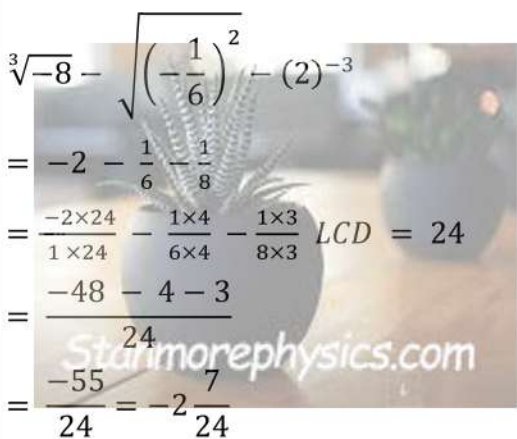
1.2. B ✓

1.3. C ✓

1.4. A ✓

1.5. D ✓

[5]

SECTION B

QUESTION 2:

QUESTION	ANSWER	ALLOCATION OF MARKS	MARKS
2.1	$60\ seconds : 4\ minutes$ $1 : 4$	✓ **A** 1 ✓**A** 4	(2)
2.2	$speed = \dfrac{distance}{time} = \dfrac{360\ km}{4\ hrs} = 90\ km/h$ $new\ speed = \dfrac{2}{3} \times 90\ \dfrac{km}{h} = 60\ km/h$ $60\ km/h = \dfrac{360\ km}{time}$ $time = \dfrac{360\ km}{60km/h}$ $time = 6\ hrs$ $extra\ time = 6\ hrs - 4\ hrs = 2\ hrs$	✓ **A** $90\ km/h$ ✓ **CA** $60\ km/h$ ✓ **CA** $6\ hrs$ ✓ **CA** $2\ hrs$	(4)
2.3	Andrew's investment: $A = P(1+i)^n$ $A = R1\ 750(1 + \dfrac{14}{100})^3$ $= R2\ 592,70$ Zinzi's investment: $A = P(1 + in)$ $A = R1\ 750\left(1 + \dfrac{15}{100} \times 2\right)$ $= R2\ 275,00$ Andrew's investment is the better option because he receives ($R2\ 592,70$ - $R2\ 275,00 = R317,70$) $R317,70$ more than Zinzi.	✓**Substitution** subs into compound interest formula ✓**CA** Andrew's answer ✓**substitution** subs into simple interest formula ✓**CA** Zinzi's answer ✓**M** ✓**CA** $R320,70$	(6)
			[12]

QUESTION 3:

3.1.1	True	✓ **A**	(1)
3.1.2	False	✓ **A**	(1)
3.2.1	$(-11) + (-3)$ $= (-11) - 3$ $= -14$	✓ **M** ✓ **A** -14	(2)
3.2.2	$\sqrt{4 \times 9 + 8^2}$ $= \sqrt{36 + 64}$ $= \sqrt{100}$ $= 10$	✓ **M** ✓ **A** 10	(2)
3.2.3	$\sqrt[3]{-8} - \sqrt{\left(-\dfrac{1}{6}\right)^2} - (2)^{-3}$ $= -2 - \dfrac{1}{6} - \dfrac{1}{8}$ $= \dfrac{-2 \times 24}{1 \times 24} - \dfrac{1 \times 4}{6 \times 4} - \dfrac{1 \times 3}{8 \times 3}$ $LCD = 24$ $= \dfrac{-48 - 4 - 3}{24}$ $= \dfrac{-55}{24} = -2\dfrac{7}{24}$	✓ *Simplifying* ✓ $LCD = 24$ ✓ **M** ✓ **CA** $\dfrac{-55}{24} = -2\dfrac{7}{24}$	(4)

[10]

QUESTION 4:

4.1.1	$Tn = 4n + 1$	✓✓ **A**	(2)
4.1.2	$Tn = 4n + 1$ $T_{14} = 4(14) + 1$ $\quad\quad = 57$	✓ *substitution* ✓ **CA** 57	(2)
4.1.3	$Tn = 4n + 1$ $129 = 4n + 1$ $\dfrac{129 - 1}{4} = n$ $\quad\quad n = 32$	✓ *substitution* ✓ **M** $\dfrac{129 - 1}{4} = n$ ✓ **CA** $n = 32$	(3)
4.2	$y = -8(-3) + 6 = 30$ $y = -8(0) + 6 = 6$ $y = -8(3) + 6 = -18$	✓ **A** 30 ✓ **A** 6 ✓ **A** -18	(3)

| 4.3 | $y = \frac{1}{2}x + 4$ | ✓ **A** $\frac{1}{2}x$ | |
| | | ✓ **A** $+4$ | (2) |

[12]

QUESTION 5:

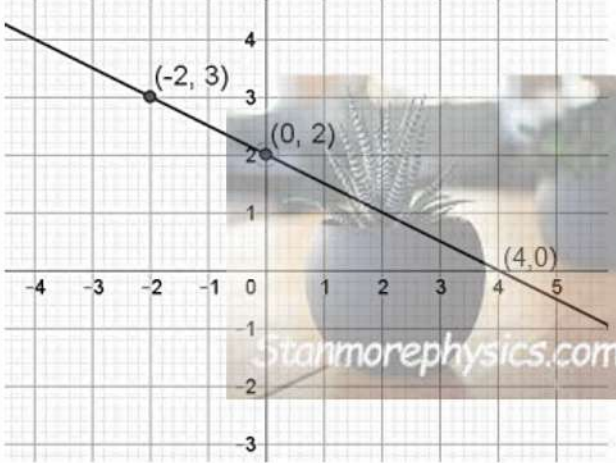| 5.1.1	True	✓ **A**	(1)
5.1.2	False	✓ **A**	(1)
5.2.1	$2(3q - 5q) + 4(-3p)$ $= 2(-2q) - 12p$ $= -4q - 12p$	✓ **M** ✓ **A** $-4q$ ✓ **A** $-12p$	(3)
5.2.2	$\dfrac{15x^2y^3 + 9x^2y^3 - 6x^2y^3}{\frac{1}{3}x^{-2}y^{-3}}$ $= \dfrac{18x^2y^3}{\frac{1}{3}x^{-2}y^{-3}}$ $= \dfrac{18}{\frac{1}{3}}x^{2-(-2)}y^{3-(-3)}$ $= (18 \times 3)x^4y^6$ $= 54x^4y^6$	✓ **M** $\dfrac{18x^2y^3}{\frac{1}{3}x^{-2}y^{-3}}$ ✓ **M** $(18 \times 3)x^4y^6$ ✓ **CA** $54x^4y^6$	(3)
5.3.1	$3ax - 6bx + 6ay - 12by$ $= 3x(a - 2b) + 6y(a - 2b)$ $= (a - 2b)(3x + 6y)$ $= 3(a - 2b)(x + 2y)$	✓ **M** ✓ **CA** $\quad 3(a - 2b)(x + 2y)$	(2)
5.3.2	$x^2 + 6x - 7$ $= (x - 1)(x + 7)$	✓ **A** $(x - 1)$ ✓ **A** $(x + 7)$	(2)
5.4	$(x + 8)^2 - x^2$ if $x = -2$ $= ((-2) + 8)^2 - (-2)^2$ $= (6)^2 - (-2)^2$ $= 36 - 4$ $= 32$	✓ substitution ✓ **M** ✓ **CA** 32	(3)

[15]

QUESTION 6:

6.1.1	$2^{x+1} = 16$ $2^{x+1} = 2^4$ $x + 1 = 4$ $x = 3$	✓ **M** ✓ **A** 3	(2)

6.1.2	$(x - 4)(x + 8) = 0$ $(x - 4) = 0 \ or \ (x + 8) = 0$ $x = 4 \ or \ x = -8$	✓**A** $x = 4$ ✓**A** $x = -8$	(2)
6.1.3	$4(x - 3) = 9(3 - x)$ $4x - 12 = 27 - 9x$ $4x + 9x = 12 + 27$ $13x = 39$ $x = \dfrac{39}{13}$ $x = 3$	✓**M** $4x - 12 = 27 - 9x$ ✓**M** $13x = 39$ ✓**CA** $x = 3$	(3)
6.1.4	$3x + \dfrac{2x - 5}{3} = 1$ $\dfrac{3x \times 3}{3} + \dfrac{2x - 5}{3} = 1$ $\dfrac{9x + 2x - 5}{3} = 1$ $\dfrac{11x - 5}{3} = 1$ $11x - 5 = 3$ $11x = 8$ $x = \dfrac{8}{11}$	✓**M** $\dfrac{3x \times 3}{3} + \dfrac{2x-5}{3}$ ✓**M** $\dfrac{11x-5}{3} = 1$ ✓**M** $11x - 5 = 3$ ✓**CA** $x = \dfrac{8}{11}$	(4)

[11]

QUESTION 7:

7.1.1		✓ *all points plotted* *correctly* ✓ *straight line drawn* *through points* ✓*correct slope*	(3)
7.1.2	$gradient = \dfrac{(y_2 - y_1)}{x_2 - x_1} = \dfrac{2 - 3}{0 - (-2)} = \dfrac{-1}{2}$ or	✓*correct x values* ✓*correct y values*	(3)

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	$= \dfrac{0-2}{4-0} = \dfrac{-2}{4} = \dfrac{-1}{2}$ or $= \dfrac{0-3}{4-(-2)} = \dfrac{-3}{6} = \dfrac{-1}{2}$	✓CA $\dfrac{-1}{2}$		
7.1.3	$m = \dfrac{-1}{2}$ $y = \dfrac{-1}{2}x + c$ *Substitute any point* $(-2,3)$ *or* $(0,2)$ *or* $(4,0)$ *into the equation.* $3 = \dfrac{-1}{2}(-2) + c$ $3 = 1 + c$ $c = 2$ $y = \dfrac{-1}{2}x + 2$	✓M $c = 2$ ✓CA $y = \dfrac{-1}{2}x + 2$		(2)
7.1.4	$y = \dfrac{-1}{2}x - 2$	✓ A $-\dfrac{1}{2}$ ✓ A -2		(2)

[10]

Total : 75