GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL EXAMINATION

NOVEMBER 2023

GRADE 9

MATHEMATICS

PAPER 1

TIME: 1½ hours

MARKS: 75

13 pages

NAME OF LEARNER:

GRADE/CLASS:

INSTRUCTIONS AND INFORMATION

1. This question paper consists of 8 questions.

2. Answer ALL the questions.

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 otherwise stated.

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 8 in Section B in the spaces provided on this question paper.

9.   Write neatly and legibly.

SECTION A

QUESTION 1

Answer the following questions by choosing the correct answer. Circle the letter next to the correct answer.

1.1 A car travels at an average speed of 762 km/h. Which formula represents the distance in kilometres, d, that the car travels in t hours?

A $d = 762 \times t$

B $d = 762 - t$

C $d = \dfrac{t}{762}$

D $d = \dfrac{762}{t}$ (1)

1.2 Which of the following is NOT a polynomial?

A   3

B $3x^2 + \sqrt{5x}$

C $x^2 + \dfrac{1}{x^2} - 4$

D $x^7 - 3x^2 + 4$ (1)

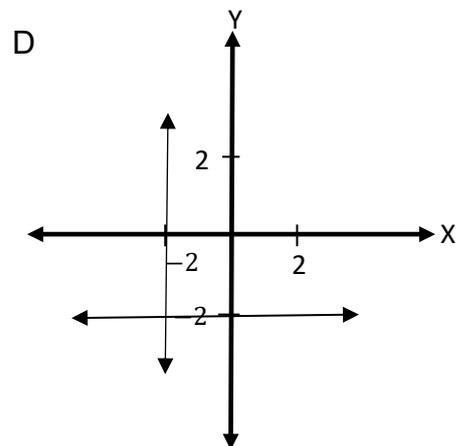1.3 Simplify: $(-2p^5 q)^2 =$

A $2p^{10}q^2$

B $-2p^{10}q^2$
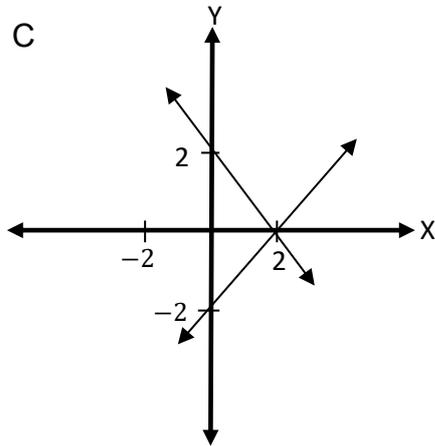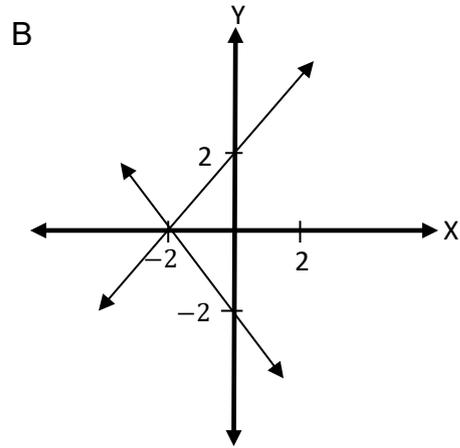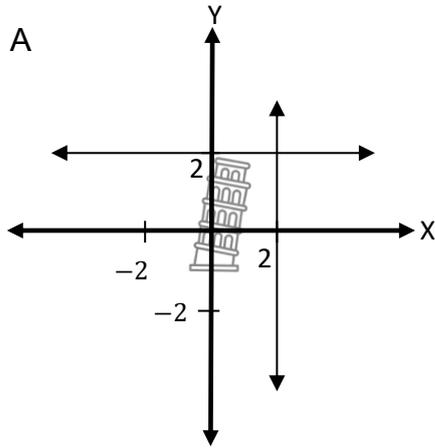
C $-4p^{10}q^2$

D $4p^{10}q^2$ (1)
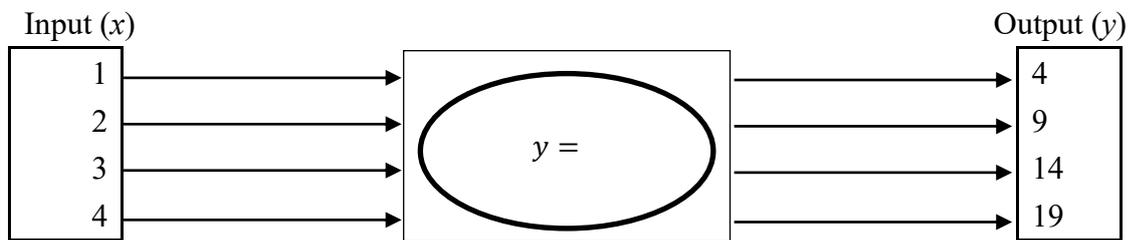
1.4   Which of the following graphs represents the lines $y = -x + 2$ and $y = x - 2$?

A

B

C

D

(1)

1.5   Determine the rule in the following diagram:

Input (x)   Output (y)

A	$y = 5x + 1$	
B	$y = 5x - 1$	
C	$y = 4x + 1$	
D	$y = 4x - 1$	

(1)
[5]

SECTION B

QUESTION 2

2.1   Given: $8m^2$, 16mn and 16n. Write down the:

2.1.1   HCF

_____   (1)

2.1.2   LCM

_____   (1)

2.2   Mary, Thando and John each had R3 000 to spend on a trip to Durban. They use different companies to book their accommodation.

Company A offers 20% discount. Company B offers to pay $\frac{3}{4}$ of the total price if you pay cash and Company C had no special offers. Complete the table below by filling in the amount after discount, in the last column.

Name	Amount before discount	Amount after discount
Company A	R3 000	After 20% discount: 2.2.1 _____ _____ (2)
Company B	R3 000	Pay $\frac{3}{4}$ of total price: 2.2.2 _____ _____ (2)
Company C	R3 000	R3 000

2.3   The current exchange rate of the Polish Zloty to the South African Rand is 1: 4,47.

Convert R18 356,26 to Polish Zloty. Show ALL your calculations.

_____

_____   (2)

2.4 Kgabo buys furniture worth R33 100,00. She pays 10% deposit and takes out a hire purchase loan to pay off the balance over a period of 36 months at a simple interest rate of 11% per annum.

    2.4.1   How much will Kgabo pay in total?

(3)

    2.4.2   How much interest will be paid?

(2)

2.5 You deposit R2 500 into a savings account which earns compound interest at a rate of 7,5% per annum. Determine how much money will be in your savings account after 5 years.

Use: $A = P \left(1 + \frac{r}{100}\right)^n$ or $A = P(1 + i)^n$
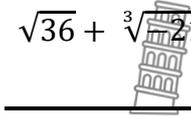
(2)

[15]

QUESTION 3

3.1 What is the multiplicative inverse of -24?

(1)

3.2 Simplify the following without the use of a calculator.

3.2.1 $\sqrt{36} + \sqrt[3]{-216} + (-1)(-2)$

(3)

3.2.2 $-5 + (-8) - (4)(-3)$

(2)

3.3 Rethabile works part-time at a nearby food outlet. She earns R1 312,00 fortnightly, which was deposited in her bank account. She withdraws R1 200,00 and then deposits R400,00 after a week.

How much money does Rethabile have in her bank account now?

(2)

[8]

QUESTION 4

4.1 Choose the correct word from those given in brackets.

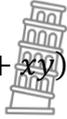(Exponents/Expressions) are a shorter way of writing a repeated multiplication of the same number by itself.

(1)

4.2   Each of the statements below has an error. Write the correct statement next to each one.

	Statement	**Correct Statement**

4.2.1 $pq \times pq = pq^2$

_____

4.2.2 $(xy + xy) = (xy)^2$

_____

4.2.3 $5^4 \times \dfrac{1}{5^{-3}} = 5^1$

_____   (3)

4.3   Simplify: $\dfrac{8r^3 \cdot 2(r^2)^4}{2^4 \cdot (r^2)^5}$

_____

_____

_____

_____

_____   (3)
                                          [7]

QUESTION 5

5.1   Given: 3; 6; 11; 18; ...

Write down the next TWO terms of the sequence.

_____   (1)

5.2   In a school hall, the chairs are stacked on top of each other. One chair is 55cm high.
       When 2 chairs are stacked together, the chairs are 61cm high.

    5.2.1   Determine the height, in cm, if 3 chairs are stacked on top of each other.

_____

_____   (1)

    5.2.2   If the stack of chairs is 145 cm high, how many chairs are in the stack?

_____

_____

_____

_____   (3)

5.3   Use the information provided in the table below to answer the questions which follow:

Input (n)	-2	-1	0	...	n
Output (T_n)	-17	-12	-7	...	13

    5.3.1   Describe the relationship in the form $T_n = \ldots$

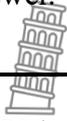_____

_____   (2)

    5.3.2   Calculate the missing input value n.

_____

_____   (2)

[9]

QUESTION 6

6.1 Choose the correct property from those given in brackets:

The (associative/commutative) property says that the sequence/order of the numbers that you add or multiply does not matter. You can change the order of the numbers and still get the same answer.

_____ (1)

6.2 Write 547 286 380 in words.

_____ (1)

6.3 Given $12a^2 + 8a^5$

$4a^2$ is one factor of the above expression. Determine the other factor.

_____

_____ (1)

6.4 Determine the value of the expression: $2r^2 - 8rs - 9s^2 + 7$ if $r = 1$ and $s = -2$

_____

_____

_____

_____

_____ (3)

6.5 Simplify the following:

6.5.1 $(15xy^2 - 27xyz - 3x^2yz^3) \div -3xy$

_____

_____

_____ (3)

6.5.2 $\sqrt[3]{27y^6}$

_____

_____ (2)

[11]

QUESTION 7

7.1 Write the following statement algebraically.

Four times the sum of twice a number and six equals thirty-two.

_____

_____ (1)

7.2 During the class discussion, 4 learners disagree on the correct step in solving the following equation: $4x - 3 = 2x - 7$.

Learner 1: $4x - 2x = 3 - 7$
Learner 2: $4x + 2x = 3 - 7$
Learner 3: $4x - 2x = 7 - 3$
Learner 4: $4x + 2x = 7 - 3$

Which learner is correct? Write down the correct step.

_____

_____

_____ (1)

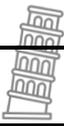7.3 Solve the following equations:

7.3.1 $x^2 - 2x - 3 = 0$

_____

_____

_____

_____ (2)

7.3.2 $\frac{p-3}{4} - \frac{p-1}{3} = \frac{p}{2} - 1$

_____

_____

_____

_____

_____ (3)

7.4 Roy left the house and drove south at an average speed of 40 km/h. Rose left some time later, driving in the same direction as Roy at an average speed of 48 km/h. After driving for five (5) hours Rose caught up with Roy.
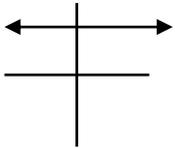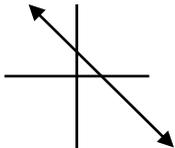
How long did Roy drive before Rose caught up with him?

_____

_____

_____

_____
(4)

[11]

QUESTION 8

8.1 Match the description in COLUMN A with the graph in COLUMN B.

	COLUMN A		COLUMN B	ANSWER
8.1.1	The gradient is negative.	A		_____
8.1.2	The gradient is positive.	B		_____
8.1.3	The gradient is undefined.	C		_____
8.1.4	The gradient is zero.	D		_____
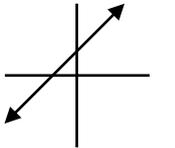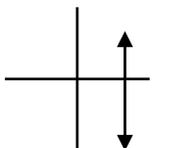
(4)

8.2 The figure below is a straight line graph. Study the graph and answer the questions that follow.
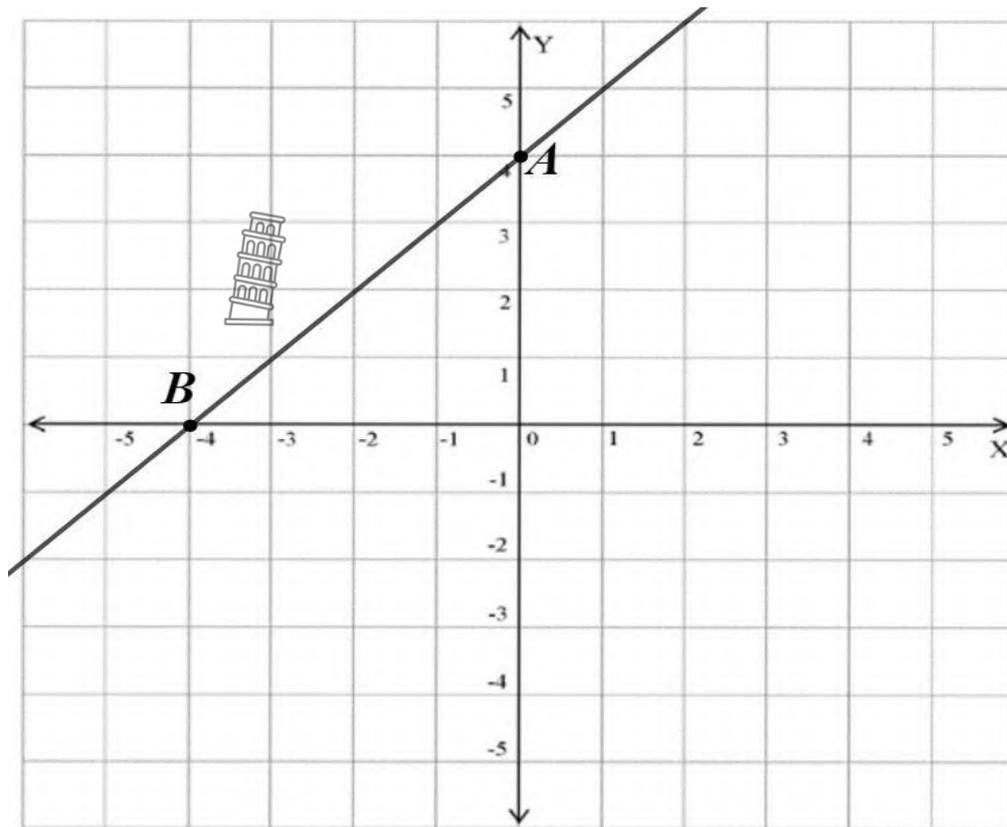
8.2.1 The coordinates of A are (0; 4). Determine the coordinates of B.

_____

_____ (1)

8.2.2 Determine the gradient of the line AB. Use $m = \dfrac{y_2 - y_1}{x_2 - x_1}$.

_____

_____ (2)

8.2.3 Write the equation of the line AB in the form $y = mx + c$.

_____

_____ (1)

8.2.4 On the Cartesian plane above, draw the graph $x = -2$. (1)

[9]

TOTAL: 75

GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL EXAMINATION

PROVINSIALE EKSAMEN

NOVEMBER 2023

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
A ✓	C ✓	D ✓	C ✓	B ✓

[5]

SECTION/*AFDELING* B

QUESTION/*VRAAG* 2

2.1	2.1.1	8 ✓**A**	1 mark for the HCF *1 punt vir GGF*	(1)
	2.1.2	$16m^2n$ ✓**A**	1 mark for the LCM *1 punt vir KGV*	(1)
2.2	2.2.1	20% $\times$ 3 000 ✓**M** = 600 = 3 000 $-$ 600 = R2 400 ✓ **CA** **OR/*OF*** R2 400 ✓✓**A** **OR/*OF*** 80% $\times$ 3 000 ✓**M** = R2 400 ✓**CA**	1 mark for multiplying with 20% *1 punt vir vermenigvuldig met 20%* 1 mark for the answer *1 punt vir antwoord* Answer ONLY, full marks *SLEGS antwoord, volpunte*	(2)
	2.2.2	$\frac{3}{4}$ $\times$ 3 000 ✓**M** = R2 250 ✓**CA** **OR/*OF*** 75% $\times$ 3 000 ✓**M** = R2 250 ✓**CA**	1 mark for multiplying with $\frac{3}{4}$ *1 punt vir vermenigvuldig met $\frac{3}{4}$* 1 mark for the answer *1 punt vir antwoord* Answer ONLY full marks *SLEGS antwoord, volpunte*	(2)

2.3	$1 : 4,47$ $= \frac{18356,26}{4,47}$ ✓M $= 4\ 106,55$ ✓CA **OR/OF** $4,47x = 18\ 356,26$ ✓M $x = \frac{18\ 356,26}{4,47}$ $x = 4\ 106,55$ ✓CA		1 mark for division *1 punt vir deling* 1 mark for the final answer *1 punt vir finale antwoord* **OR/OF** 2 marks if a table or number line is used to get answer *2 punte as tabel of getallyn gebruik is om antwoord te verkry* **OR/OF** **Consider alternative mathematically correct responses which lead to the correct answer./*Oorweeg alternatiewe wiskundig korrekte response wat tot die korrekte antwoord lei.***	(2)
2.4	2.4.1	Deposit/*Deposito* = 10% of R33 100 = R3 310 Balance/*Balans* = R33 100 – R3 310 = R29 790 ✓M A = P(1 + in) = 29 790(1 + 0,11 × 3) ✓M = R39 620,70 Kgabo will pay:/*Kgabo sal betaal:* 39 620,70 + 3 310 = R42 930,70✓CA	1 mark for R29 790 *1 punt vir R29 790* 1 mark for substitution *1 punt vir vervanging* 1 mark for answer A = *1 punt vir antwoord A =*	(3)
	2.4.2	39 620,70 − 29 790 ✓M = R9 830,70✓CA	1 mark for 39 620,70 − 29 790 *1 punt vir 39 620,70 − 29 790* 1 mark for answer *1 punt vir antwoord* **Answer ONLY, full marks** *SLEGS antwoord, volpunte*	(2)
2.5	$A = P\left(1 + \frac{r}{100}\right)^{n}$ $A = 2\ 500\left(1 + \frac{7,5}{100}\right)^{5}$ ✓M $A = 2\ 500(1 + 0,075)^{5}$ $A = R3\ 589,07$✓CA **OR/OF** $i = \frac{7,5}{100} = 0,075$ $A = P(1 + i)^{n}$ $A = 2\ 500(1 + 0,075)^{5}$✓M $A = R3\ 589,07$✓CA		1 mark for substitution in formula *1 punt vir vervanging in formule* 1 mark for answer *1 punt vir antwoord*	(2)
				[15]

QUESTION/*VRAAG* 3

3.1	$-\frac{1}{24}$ ✓**A**		1 mark for answer *1 punt vir antwoord*	(1)
3.2	3.2.1	$\sqrt{36} + \sqrt[3]{-216} + (-1)(-2)$ $= 6 - 6 + 2$ ✓✓**M** $= 2$ ✓**A**	1 mark for -6 *1 punt vir -6* 1 mark for $6 - 6 + 2$ *1 punt vir $6 - 6 + 2$* 1 mark for the correct answer *1 punt vir die korrekte antwoord* **Answer ONLY, no marks** *SLEGS antwoord, geen punte nie*	(3)
	3.2.2	$-5 + (-8) - (4)(-3)$ $= -5 - 8 + 12$ ✓**M** $= -1$✓**A**	1 mark for 12 *1 punt vir 12* 1 mark for the correct answer *1 punt vir die korrekte antwoord* **Answer ONLY, no marks** *SLEGS antwoord, geen punte nie*	(2)
3.3	$1\,312 - 1\,200 + 400$ ✓**M** $= 512$ ✓**A** **OR/*OF*** She has/*Sy het* R512 ✓✓**A**		1 mark for method *1 punt vir metode* 1 mark for answer *1 punt vir antwoord* **Answer ONLY, full marks** *SLEGS antwoord, volpunte*	(2)
				[8]

QUESTION/*VRAAG* 4

4.1	Exponents/*Eksponente* ✓**A**		1 mark for answer *1 punt vir antwoord*	(1)
4.2	4.2.1	$pq \times pq = pq^2$ ✓**A**	$= p^2q^2$ ✓**A**	1 mark for each correct answer *1 punt vir elke korrekte antwoord*	
	4.2.2	$(xy + xy)$ $= (xy)^2$	$= 2xy$ ✓**A**		
	4.2.3	$5^4 \times \dfrac{1}{5^{-3}} = 5^1$	$= 5^4 \times 5^3$ $= 5^7$ ✓**A**		(3)
4.3	$\dfrac{8r^3 \cdot 2(r^2)^4}{2^4 \cdot (r^2)^5}$ $\dfrac{16r^3 \cdot r^8}{16r^{10}}$ ✓**M** $= r^{11-10}$ ✓**CA** $= r$ ✓**A** **OR/*OF*** $\dfrac{8r^3 \cdot 2(r^2)^4}{2^4 \cdot (r^2)^5}$ $= \dfrac{2^3 r^3 \cdot 2r^8}{2^4 r^{10}}$ ✓**M** $= 2^{4-4} r^{11-10}$ $= 2^0 r^1$ ✓**CA** $= r$ ✓**A**		1 mark for removing the brackets *1 punt vir verwydering van die hakies* 1 mark for applying laws of exponents *1 punt vir toepassing van eksponensiële wette* 1 mark for answer *1 punt vir antwoord*	(3)
				[7]

QUESTION/*VRAAG* 5

5.1		$27; 38$ ✓**A**	1 mark for both terms *1 punt vir albei terme.*	(1)
5.2	5.2.1	67 cm ✓**A**	1 mark for the answer *1 punt vir die antwoord*	(1)
	5.2.2	55; 61; 67; 73; 79; 85; 91; 97;103; 109; 115; 121; 127; 133; 139; 145 ✓✓**A** There are 16 chairs. *Daar is 16 stoele.* ✓**A** **OR/*OF*** $d = 6$ $n = 1:\ T_1 = 6(1) + 49 = 55$ $n = 2:\ T_2 = 6(2) + 49 = 61$ $T_n = 6n + 49$ ✓**M** $145 = 6n + 49$ ✓**M** $6n = 96$ $n = 16$ ✓**A**	1 mark for the 1st 8 correct terms *1 punt vir 1ste 8 korrekte terme* 1 mark for the 2nd 8 correct terms *1 punt vir 2de 8 korrekte terme* 1 mark for answer *1 punt vir antwoord*	(3)

5.3	5.3.1	T_n = (common difference/*algemene verskil*) (Input/*Insette*) $- 7$ **M** ✓**CA** **OR/*OF*** $T_n = 5n - 7$ ✓**M** ✓**CA**	2 marks for formula and answer *2 punte vir formule en antwoord*	(2)
	5.3.2	$T_n = 5n - 7$ $13 = 5n - 7$ ✓**M** $13 + 7 = 5n$ $20 = 5n$ $4 = n$ ✓**A** **OR/*OF***	1 mark for correct substitution *1 punt vir regte vervanging* 1 mark for answer *1 punt vir antwoord* **OR/*OF*** 2 marks for the right answer *2 punte vir die regte antwoord*	(2)

Input/*Insette*	−2	−1	0	4✓ ✓**A**
Output/*Uitset*	−17	−12	−7	13

				[9]

QUESTION/*VRAAG* 6

6.1	Commutative *Kommutatiewe* ✓**A**	1 mark for answer *1 punt vir antwoord*	(1)
6.2	Five hundred and forty-seven million, two hundred and eighty-six thousand, three hundred and eighty/*Vyfhonderd sewe en veertig miljoen, tweehonderd ses en tagtig duisend drie honderd en tagtig*	1 mark for answer *1 punt vir antwoord*	(1)
6.3.	$3 + 2a^3$✓**A** **OR/*OF*** $12a^2 + 8a^5$ $= 4a^2(3 + 2a^3)$ ✓**A**	1 mark for $3 + 2a^3$ *1 punt vir $3 + 2a^3$*	(1)
6.4	$2r^2 - 8rs - 9s^2 + 7$ $2(1)^2 - 8(1)(-2) - 9(-2)^2 + 7$✓**M** $= 2(1) + 8(2) - 9(4) + 7$ $= 2 + 16 - 36 + 7$✓**CA** $= -11$ ✓**A**	1 mark for correct substitution *1 punt vir regte vervanging* 1 mark for removing the brackets *1 punt vir verwydering van hakies* 1 mark for the answer *1 punt vir antwoord*	(3)
6.5	6.5.1	$(15xy^2 - 27xyz - 3x^2yz^3) \div -3xy$ $= \dfrac{15xy^2}{-3xy} - \dfrac{27xyz}{-3xy} - \dfrac{3x^2yz^3}{-3xy}$ $= -5y + 9z + xz^3$ ✓✓✓ **CA**	1 mark for $-5y$ *1 punt vir $-5y$* 1 mark for 9z *1 punt vir 9z* 1 mark for $+xz^3$ *1 punt vir $+xz^3$*	(3)

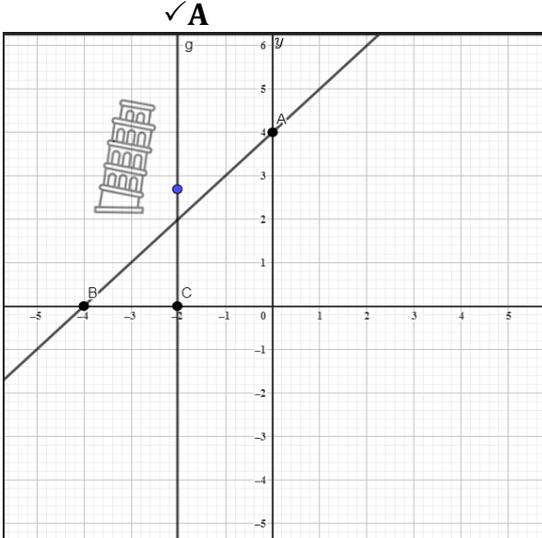|				
	6.5.2	$\sqrt[3]{27y^6}$ $= 3y^2\ \checkmark\checkmark\mathbf{A}$	1 mark for 3 *1 punt vir* 3 1 mark for y^2 *1 punt vir* y^2	(2)
				[11]

QUESTION/*VRAAG* 7

7.1	$4(2d\ +\ 6)\ =\ 32\ \checkmark\mathbf{A}$	1 mark for answer *1 punt vir antwoord*	(1)
7.2	Learner 1: $4x - 2x = 3 - 7$, is correct *Leerder 1: $4x - 2x = 3 - 7$, is korrek* $\checkmark\mathbf{A}$	1 mark for answer *1 punt vir antwoord*	(1)
7.3	7.3.1 $\quad x^2 - 2x - 3 = 0$ $\qquad (x - 3)(x + 1) = 0$ $\qquad (x - 3) = 0\ or/of\ (x + 1) = 0\ \checkmark\mathbf{M}$ $\qquad\qquad x = 3\ \ or/of\ x = -1\ \checkmark\ \mathbf{A}$	1 mark for factorisation *1 punt vir faktorisering* 1 mark for both factors *1 punt vir beide faktore*	(2)
	7.3.2 $\quad \frac{p-3}{4} - \frac{p-1}{3} = \frac{p}{2} - 1\quad$ LCD/*KGD* =12 $\quad 3(p - 3) - 4(p - 1) = 6p - 12\ \checkmark\mathbf{M}$ $\qquad 3p - 9 - 4p + 4 = 6p - 12$ $\qquad\qquad\qquad -p - 5 = 6p - 12\ \checkmark\ \mathbf{CA}$ $\qquad\qquad\quad -p - 6p\ =\ -12 + 5$ $\qquad\qquad\qquad\quad -7p\ =\ -7$ $\qquad\qquad\qquad\qquad p = 1\ \checkmark\ \mathbf{A}$	1 mark for LCD *1 punt vir KGD* 1 mark for removing brackets *1 punt vir verwydering van hakies* 1 mark for answer *1 punt vir antwoord*	(3)
7.4	Let Roy's travel time be x hours. Rose catches up with Roy after 5 hours. Rose's distance: $d = \frac{48\ km}{h} \times 5h$ $\qquad\qquad\qquad = 240\ km.\ \checkmark\mathbf{M}$ They travel the same distance. Roy's travelling time $\ \frac{240}{40}\ \checkmark\checkmark\mathbf{M}$ $\qquad\qquad\qquad = 6\ hours.\ \checkmark\mathbf{A}$ Roy travelled for 6 hours. *Laat Roy se ry-tyd x uur wees.* *Rose ry vir 5 uur om Roy in the haal.* *Rose se afstand: $d = \frac{48\ km}{h} \times 5h$* $\qquad\qquad\qquad = 240\ km\ \checkmark\mathbf{M}$ *Hulle ry dieselfde afstand.* *Roy se reistyd:* $t = \frac{240}{40}\ \checkmark\checkmark\mathbf{M}$ $\qquad\qquad = 6\ uur\ \checkmark\mathbf{A}$ *Roy het 6 uur lank gery.*	1 mark for formula *1 punt vir formule* 1 mark for substitution *1 punt vir vervanging* 1 mark for solving the equation *1 punt vir oplos van die vergelyking* 1 for answer *1 punt vir antwoord*	

	OR/*OF* Distance/*Afstand* $= 40 \times$ time/*tyd* ✓**M** $Rose = 48 \times 5$ ✓**M** $\quad = 240\ km$ $\quad 40x = 240$ ✓**M** $\quad\ \ x = 6\ h$ Roy travelled for 6 hours. *Roy ry vir 6 uur.* ✓**A** **OR/***OF* Let d = Rose's distance = Roy's distance *Laat d = Rose se afstand = Roy se afstand* They travelled the same distance. *Hulle ry dieselfde afstand.* ✓**M** Rose: $d = 40km/h \times 5h$ Let $x =$ Roy's travelling time *Laat x = Roy se reistyd* Roy: $d = 48\ km/h \times x$ ✓**M** $\dfrac{40\ km}{h} \times 5h = \dfrac{48\ km}{h} \times x$✓**M** $\quad 240\ km = 48x$ $\qquad\quad x = 6h$ ✓**CA**	**Accept any correct reasoning or method to solve the problem.** *Aanvaar enige logiese redenasie en korrekte metode om die probleem op te los.*	(4)
		[11]

QUESTION/*VRAAG* 8

8.1	COLUMN A/ *KOLOM A*	COLUMN B/ *KOLOM B*	1 mark for each answer *1 punt vir elke antwoord*	
	8.1.1	B ✓**A**		
	8.1.2	C ✓**A**		
	8.1.3	D ✓**A**		
	8.1.4	A ✓**A**		(4)

8.2	8.2.1	B $(-4; 0)$ ✓**A**	1 mark for coordinates of B *1 punt vir koördinate van B*	(1)
	8.2.2	$m = \dfrac{y_2 - y_1}{x_2 - x_1}$ ✓**M** $\quad = \dfrac{4}{4}$ $\quad = 1$ ✓**CA**	1 mark for the formula and substitution *1 punt vir formule en vervanging* 1 mark for answer *1 punt vir antwoord*	(2)
	8.2.3	$y = x + 4$ ✓**A**	1 mark for correct equation *1 punt vir korrekte vergelyking*	(1)

	8.2.4	See the graph below./*Kyk na die grafiek hieronder.* 	1 mark for the correct graph *1 punt vir korrekte grafiek*	(1)
				[9]
				TOTAL: 75 ***TOTAAL: 75***