GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION

PROVINCIAL EXAMINATION

NOVEMBER 2021

GRADE 9

MATHEMATICS
(PAPER 1)

NAME OF LEARNER: _____

GRADE: _____

TIME: 1½ hours

MARKS: 75

14 pages

INSTRUCTIONS AND INFORMATION

1. Read all the instructions carefully.
2. Question 1 consists of 5 multiple choice questions. Circle the letter of the correct answer.
3. Answer questions 2 to 6 in the spaces provided.
4. Clearly show all calculations, diagrams and graphs that have been used in determining your answers. Answers only will not necessarily be awarded full marks.
5. Diagrams are not necessarily drawn to scale. Reasons MUST be given all times when you are doing geometry calculations.
6. The teacher will lead you through the practice question before you start the test.
7. An approved scientific calculator (non-programmable and non-graphical) may be used, unless otherwise stated.
8. Write neatly and legibly.

PRACTICE QUESTION

Circle the letter of the correct answer.

1. Which number is an irrational number?

   A $\frac{1}{3}$

   B $\sqrt{-18}$

   C $\sqrt{12}$

   D -12

You have done it correctly if you circled **C**.

QUESTION 1

Circle the letter next to the correct answer.

1.1 What is the product of 5^4 and 5^{-2}?

A 5^2

B 25^2

C 5^{-4}

D 25^{-4} (1)

1.2 Which of the following is equal to 6×85? Use the distributive property to calculate your answer.

A $6 \times 8 + 6 \times 5$

B $6 \times 80 + 5$

C $6 \times 80 \times 5$

D $6 \times 80 + 6 \times 5$ (1)

1.3 144 as a product of its prime factors is …

A $4^2 \times 2^3$

B $4 \times 2 \times 2 \times 3$

C $2^4 \times 3^2$

D $2 \times 2 \times 2 \times 3 \times 3$ (1)

1.4 Which number is missing?

$$\frac{1}{3};\ \frac{1}{6};\ \frac{1}{12};\ \ldots;\ \frac{1}{48}$$

A 24

B $\frac{1}{24}$

C $\frac{2}{24}$

D $\frac{4}{24}$ (1)

1.5 Calculate the value of $2x^2 + 4x + 3$, if $x = -5$.

A -67

B -37

C 33

D 52 (1)

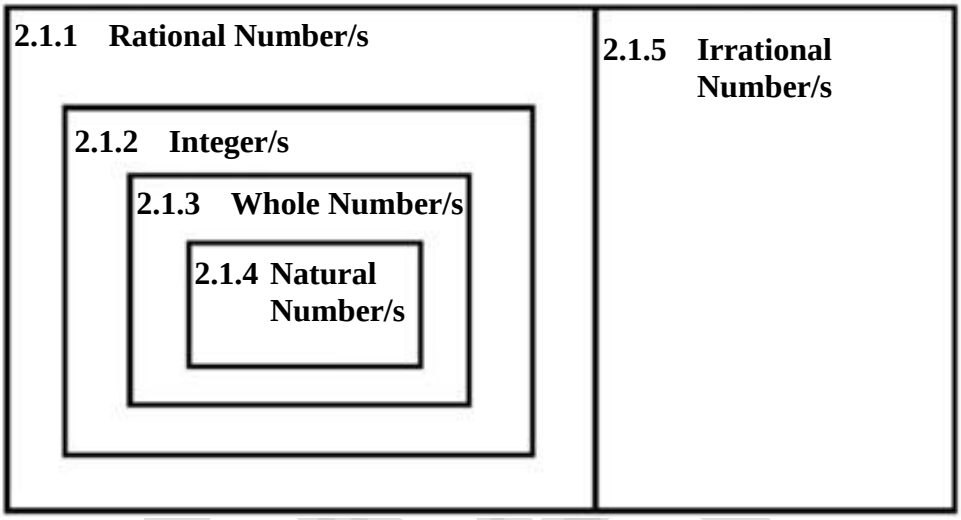
[5]

QUESTION 2

2.1 The diagram below is an exact representation of the real number system. Classify the numbers below in accordance with the area in which they belong.
Some numbers may be repeated.

$$-2\frac{1}{3}\ ;\ 9\pi\ ;\ \sqrt{20}\ ;\ 1,\dot{2}\dot{3}\ ;\ -3\ ;\ \sqrt{16}\ ;\ 2$$

The Real Number System



Write your answers in the spaces provided below.

2.1.1	
2.1.2	
2.1.3	
2.1.4	
2.1.5	

(5)

2.2 Three numbers and the products of their prime factors are given below.
Use the products of prime factors to determine the HCF and LCM.

Number	Product of Prime Factors
924	$2^2 \times 3 \times 7 \times 11$
132	$2^2 \times 3 \times 11$
462	$2 \times 3 \times 7 \times 11$

(2)

2.3 Determine the number that makes the following statement true.

78 – (a certain number) = 92

(The certain number) =

(1)

2.4 Calculate the following without the use of a calculator:

2.4.1 $\dfrac{195 \times 33 + 195 \times 27}{195 \times 16 - 195 \times 4}$

(3)

2.4.2 $-5 - (-3)(4) - (-2)^3$

(3)

2.4.3 $\dfrac{6^2-\left(-\sqrt{9}\right)^2+\sqrt[3]{-27}}{-2^2\times 1^5+1}$

(5)

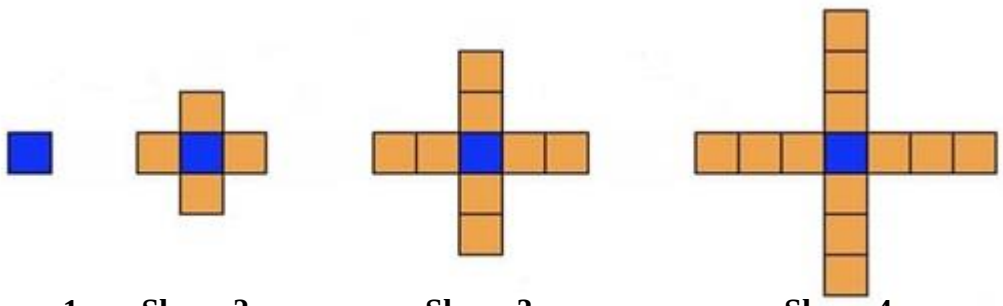
2.5 Simplify and leave the answer with positive exponents.

$$\frac{(3x^2y)^2}{(9x^{-3}y^2)^{-1}}\times 3^{-3}$$

(4)
[23]

QUESTION 3

3.1 In the diagram below, you see the first 4 shapes of a pattern made from squares.



Shape 1 **Shape 2** **Shape 3** **Shape 4**

3.1.1 Write down the number of squares per shape in the form of a sequence.

_____ ; _____ ; _____ ; _____ (1)

3.1.2 Use the above diagram and your answer in QUESTION 3.1.1 to determine the number of squares in the 7^{th} shape.

_____

_____ (1)

3.1.3 Determine the algebraic rule to describe the relationship between the shapes and the number of squares in the form (T_n) =

_____

_____ (2)

3.1.4 Use the above rule to determine the position of the shape that has 201 squares.

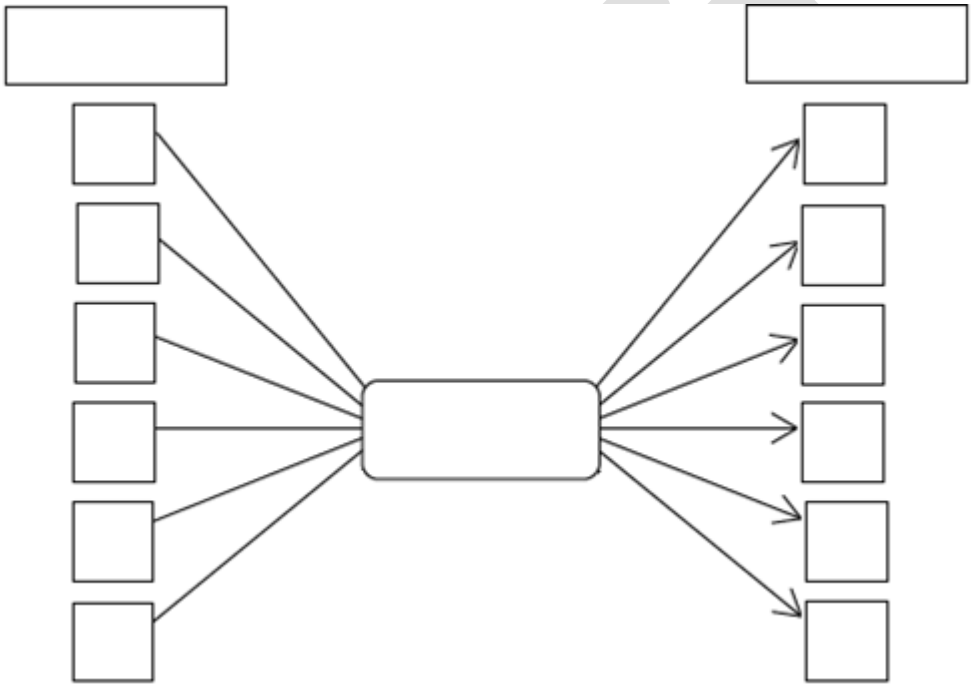
_____

_____ (2)

3.2 The table below was found using the rule: $y = 2x - 3$

x	-5	n	1	4	7	10
y	-13	-9	-1	5	11	m

3.2.1 Use the information provided in the table above to label the flow diagram below.



(1)

3.2.2 Determine the values of n and m.

_____

_____

(2)
[9]

QUESTION 4

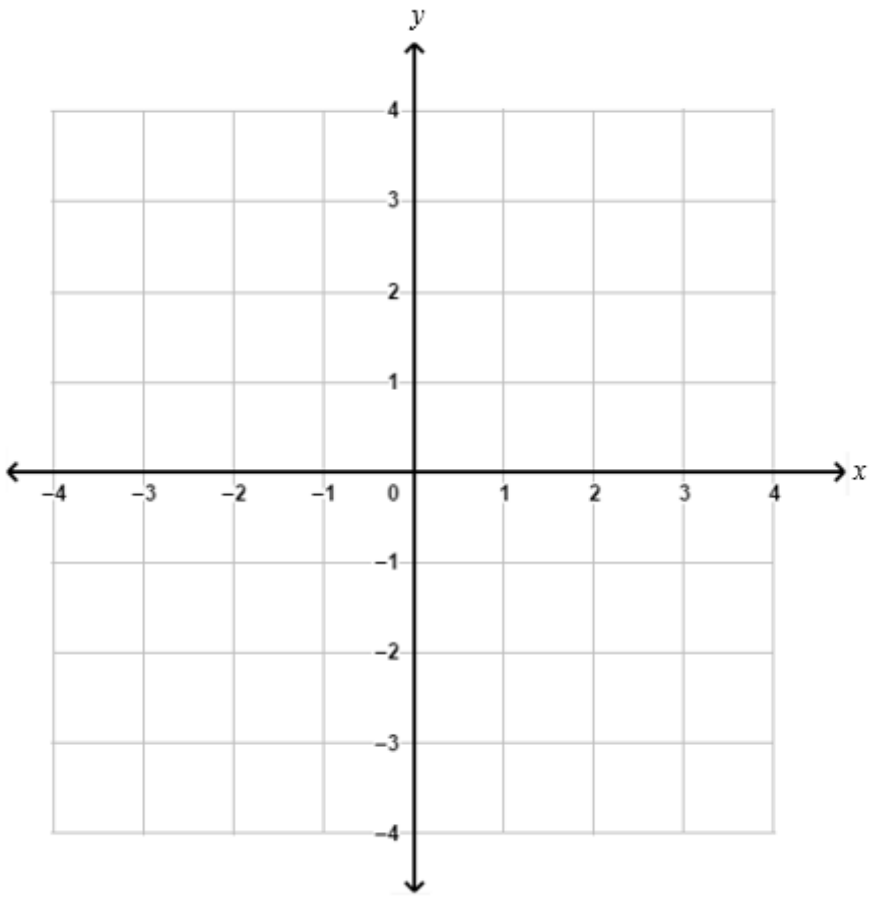
4.1 Given the formula: $y = -2x + 1$

4.1.1 Use the given formula to complete the table for the given values of x.

x	-1	0	$\frac{1}{2}$	1
y				

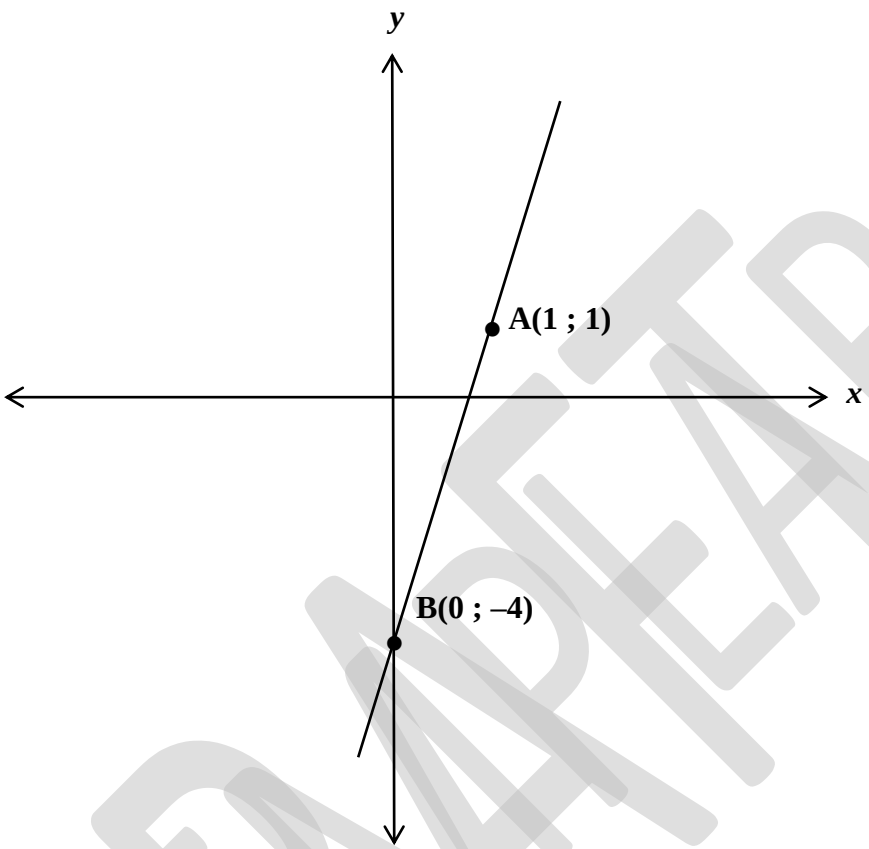
(2)

4.1.2 Plot the points from the table in QUESTION 4.1.1 on the Cartesian plane below and join the points using a ruler to form a straight line graph.



(3)

4.2 Points A $(1\ ;\ 1)$ and B $(0\ ;\ -4)$ are on the straight line graph given below**.** Use the graph and the given points to answer the following questions.



4.2.1 Write down the y-intercept.

_____ (1)

4.2.2 Use the given points to calculate the gradient of the straight line graph.

_____

_____

_____

_____ (3)

4.2.3 Write down the equation of the graph in the form $y = mx + c$

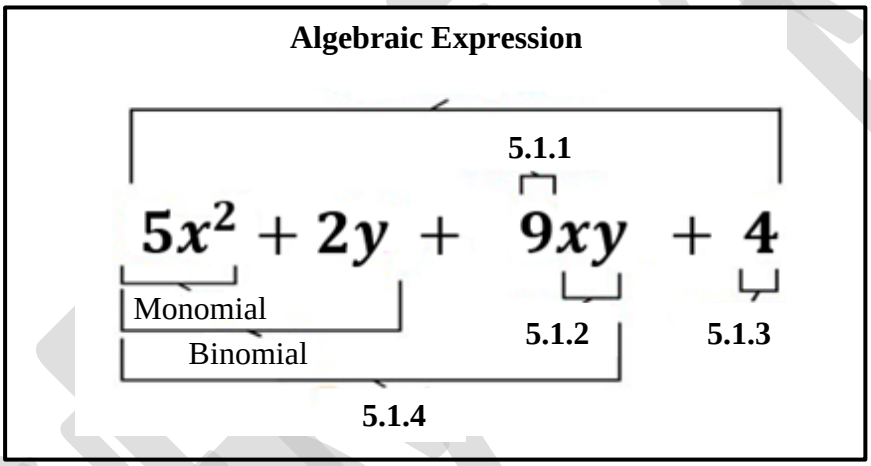
_____ (1)

4.2.4 Is the graph an increasing or a decreasing function?

_____ (1)
[11]

QUESTION 5

5.1 Study the algebraic expression below and label 5.1.1 – 5.1. 4 in the spaces provided.



5.1.1	
5.1.2	
5.1.3	
5.1.4	

(4)

5.2 Simplify the following as far as possible.

5.2.1 $\sqrt{0{,}09c^6}$

(1)

5.2.2 $\dfrac{(p-1)(p-2)(p-3)}{p+3} \times \dfrac{p^2-9}{p^2-3p+2}$

(5)

5.3 Factorise the following expression fully:

$3d^3 - 12d^2 - 15d$

(3)
[13]

QUESTION 6

6.1 Solve the following equations.

6.1.1 $(x-3)(x+4)=0$

(3)

6.1.2 $2^x = 32$

(2)

6.1.3 $\frac{2x-2}{3} - \frac{x+1}{4} = \frac{x-3}{12}$

(4)

6.2 Karabo and John are at the same rest stop alongside a highway. Karabo started driving along the highway at a constant speed of 80 km/h. An hour later, John started driving along the same highway in the same direction as Karabo at the constant speed of 100 km/h. How long will it take John to catch up with Karabo?

(5)
[14]

TOTAL: 75

END