



**GAUTENG PROVINCE**

EDUCATION  
REPUBLIC OF SOUTH AFRICA

**GRADE 9 MATHEMATICS EXAMINATION**

**Time allowed: 2 hours**

**Total: 100 Marks**

**Name:** \_\_\_\_\_

**School:** \_\_\_\_\_

**EMIS Number**

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**District:**

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**Marking Grid:**

Question number	1	2	3	4	5	6	7	Total
Total marks	20	18	16	14	5	4	23	100
Learner Marks								

**INSTRUCTIONS:**

- This paper consists of **14** pages and **SEVEN** questions.
- Answer ALL the questions in the spaces provided.
- Clearly show all calculations where necessary.
- Calculators may be used unless stated otherwise.
- If necessary, answers should be rounded off to TWO decimal places.
- Diagrams are not necessarily drawn to scale.
- It is in your own interest to write legibly and to present your work neatly.
- *Answers only will not necessarily be awarded full marks.*

## **QUESTION 1**

**FOR EACH QUESTION CIRCLE THE LETTER OF THE CORRECT ANSWER.**

**1.1** Which of the following expressions shows how 36 can be expressed as a product of its prime factors?

- A.  $6 \times 6$
- B.  $4 \times 9$
- C.  $4 \times 3 \times 3$
- D.  $2 \times 2 \times 3 \times 3$

**1.2** Which of the numbers written below is a rational number?

- A.  $\sqrt{13}$
- B.  $\sqrt{16}$
- C.  $\sqrt{-9}$
- D.  $\sqrt{5}$

**1.3** Which of the following expressions is equal to  $3p^2 + 2p + 2p^2 + p$  ?

- A.  $5p^4 + 3p^2$
- B.  $8p^2$
- C.  $5p^2 + 3p$
- D.  $8p^6$

**1.4** Siya created this number pattern: 2 ; 8 ; 26 ; 80 ; 242.  
Which of the following rules describes his number pattern?

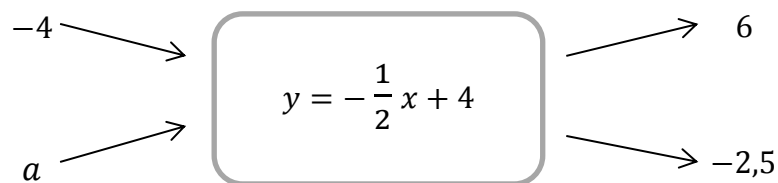
- A. Add 6 to the previous term
- B. Multiply the previous term by 3 and add 2
- C. Multiply the previous term by 4
- D. Multiply the previous term by 3 and add 4

**QUESTION 1 (Continued)**

**1.5** If  $x = 3$  and  $y = -2$ , the value of  $-2xy^4$  is

- A. 10
- B. -48
- C. -96
- D. 40

**1.6** Consider the following flow diagram:



The value of  $a$  is

- A. -3
- B. 5,25
- C. 13
- D. 2,75

**1.7** Which of the statements below is the BEST estimate of  $\frac{7,21 \times 3,86}{10,09}$

- A.  $\frac{7 \times 3}{10}$
- B.  $\frac{7 \times 4}{10}$
- C.  $\frac{7 \times 3}{11}$
- D.  $\frac{7 \times 4}{11}$

**QUESTION 1 (Continued)**

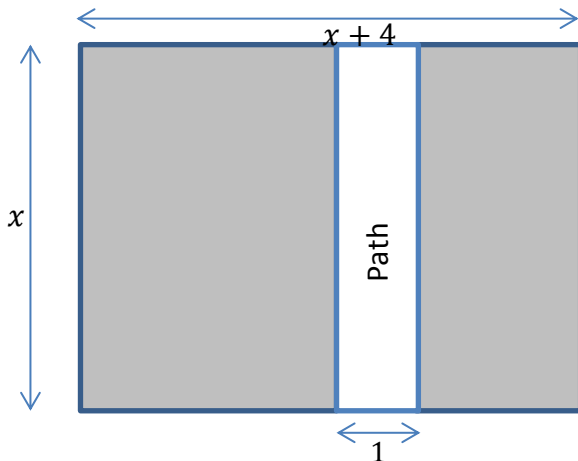
**1.8** There were  $m$  boys and  $n$  girls in a parade. Each person carried 2 balloons. Which of the expressions below represents the total number of balloons that were carried in the parade.

- A.  $2(m + n)$
- B.  $2 + (m + n)$
- C.  $2m + n$
- D.  $m + 2n$

**1.9** Consider the ordered pairs of numbers  $(0 ; -1)$  and  $(1 ; 3)$ . Which of the equations below is satisfied by BOTH of these co-ordinate pairs?

- A.  $x + y = -1$
- B.  $2x + y - 5 = 0$
- C.  $3x - y = 0$
- D.  $4x - y - 1 = 0$

**1.10** Alongside is a diagram of a rectangular garden. The garden has a length of  $(x + 4)$  metres and a width of  $x$  metres. The white area is a rectangular path that is 1 metre wide. Which of the expressions below represents the area of the shaded portion of the garden.



- A.  $x^2 + 3x$
- B.  $x^2 + 4x$
- C.  $x^2 + 4x - 1$
- D.  $x^2 + 3x - 1$

[20 marks]

## **QUESTION 2**

- 2.1** A number between 10 and 20 is both a factor of 60 and a multiple of 6.  
What is this number?

\_\_\_\_\_ (1)

- 2.2** Rewrite 0,0000605 in scientific notation.

\_\_\_\_\_ (1)

- 2.3** Purple paint is mixed from red and blue paint in the ratio of 3 litres red paint to 2 litres blue paint.  
How many litres of red paint is needed when making 30 litres of purple paint?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2)

- 2.4** A fast food outlet needs 9,5 litres of cooking oil to fry 100 kilograms of chips.  
How many kilograms of chips can be fried with 47,5 litres of oil?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2)

- 2.5** Mr Ndlovu drives 720 kilometres from Richards Bay to Magaliesburg in 7 hours.  
Mrs Moyo drives 1540 kilometres from Stellenbosch to Hekpoort in 15 hours.  
Which driver maintained a higher average speed? Show all your working.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2)

**QUESTION 2 (Continued)**

**2.6** Zoey takes out a hire-purchase loan of R35 000 for furniture that she has bought for her new house. She makes monthly repayments over a period of 5 years. The interest rate is 14% per annum simple interest on the full amount of the loan.

2.6.1 Calculate how much Zoey will pay in total for the furniture.

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(3)

2.6.2 What percentage of the loan has been paid off after Zoey has made a payment every month for 3 years and 3 months?

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(2)

**2.7** Sam deposits R7500 into a savings account. Calculate how much money his savings will be worth after 3 years if interest on the savings account is 11% per annum compounded annually.

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(3)

**2.8** Arrange the four digits 3, 5, 7 and 9 into two two-digit numbers, such that they will give the greatest result when the two numbers are multiplied. Show any working.

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(2)

[18 Marks]

### **QUESTION 3**

#### **3.1 Simplify**

3.1.1  $(-4x^3)^2$

\_\_\_\_\_ (2)

3.1.2  $\frac{p^{-3}}{p^{-5}}$

\_\_\_\_\_  
\_\_\_\_\_ (1)

3.1.3  $4p - \frac{12p^3q^0}{6p^2}$

\_\_\_\_\_  
\_\_\_\_\_ (2)

#### **3.2 Multiply out and simplify.**

3.2.1  $3(x^2 + 3) + 2x(x + 1)$

\_\_\_\_\_  
\_\_\_\_\_ (3)

3.2.2  $(a - 2)(3 + 2a)$

\_\_\_\_\_  
\_\_\_\_\_ (3)

**QUESTION 3(Continued)**

3.2.3  $4a^2 + 2a - (a - 2)^2$

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(3)

**3.3** If  $x^2 - ax + 5 = (x - 5)(x + b)$  determine the values of  $a$  and  $b$ .

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(2)

[16 Marks]



#### **QUESTION 4**

Solve for  $x$  in each of the following equations.

**4.1**      $\frac{1}{5}x - 1 = 10$

\_\_\_\_\_

\_\_\_\_\_ (2)

**4.2**      $x^3 = -64$

\_\_\_\_\_ (1)

**4.3**      $\frac{2x-3}{2} + \frac{2x}{3} = 1$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ (4)

**4.4**      $2^{2x} - 1 = 31$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ (3)

**4.5**      $x(x - 3) = (x - 1)(x + 1)$

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ (4)

[14 marks]

### QUESTION 5

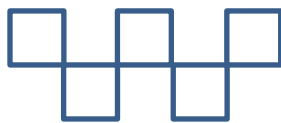
The shapes shown are made of ice cream sticks.



Shape 1



Shape 2



Shape 3



Shape 4

- 5.1** The table represents the number of sticks ( $y$ ) needed to create each shape ( $x$ ).  
Complete the table by filling in the missing numbers.

Shape number ( $x$ )	1	2	3	4	5	6	7
Number of sticks ( $y$ )	4	12	20		36		52

(2)

- 5.2** Write down which one of the following formulas represents the relationship between  $x$  and  $y$ .

$y = 8x - 4$  OR  $y = 3x + 1$

\_\_\_\_\_ (1)

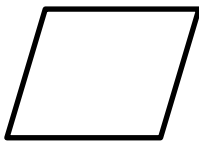
- 5.3** Which shape number consists of 92 ice cream sticks ?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (2)

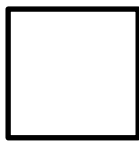
[5 Marks]

## QUESTION 6

6.1 Consider the following shapes and select the correct answer for the questions that follow



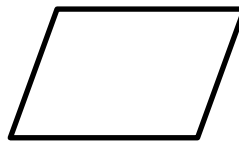
Rhombus



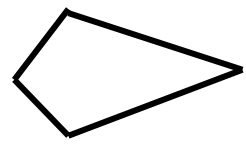
Square



Rectangle



Parallelogram



Kite

6.1.1 Name ONE property that all of the above shapes have in common.

\_\_\_\_\_ (1)

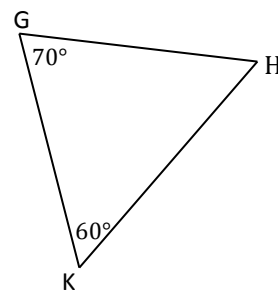
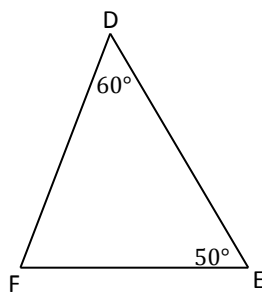
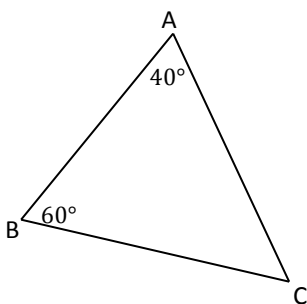
6.1.2 Name ONE of the above shapes whose diagonals do NOT bisect each other.

\_\_\_\_\_ (1)

6.1.3 Name ALL the shapes shown above whose diagonals bisect at  $90^\circ$ .

\_\_\_\_\_ (1)

6.2 The triangles shown below are not drawn to scale.



Name the two triangles that are similar.

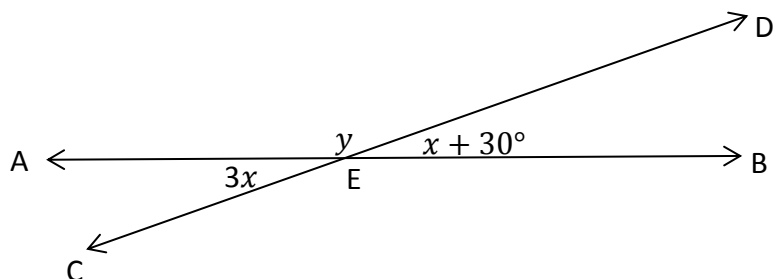
\_\_\_\_\_ (1)

[4 Marks]

### QUESTION 7

**GIVE REASONS FOR EACH OF YOUR STATEMENTS IN THIS QUESTION.**

**7.1** In the figure below straight lines AB and CD intersect at E.



7.1.1 Calculate the value of  $x$ .

<u>Statement</u>	<u>Reason</u>

(3)

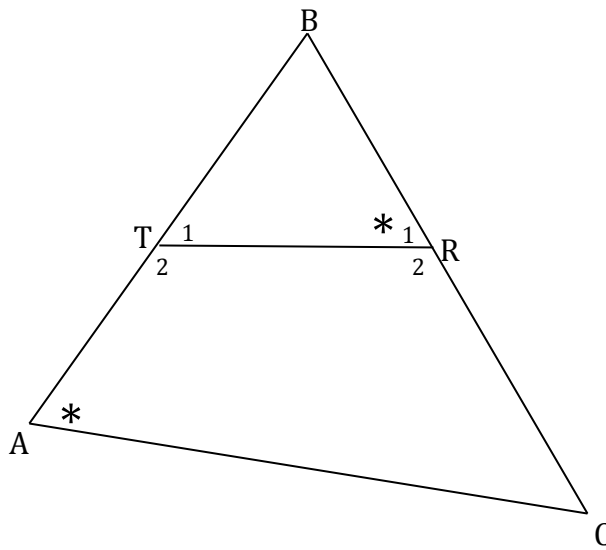
7.1.2 Calculate the value of  $y$ .

<u>Statement</u>	<u>Reason</u>

(3)

**QUESTION 7 (Continued)**

**7.2.**



In the above figure  $\hat{R}_1 = \hat{A}$ .

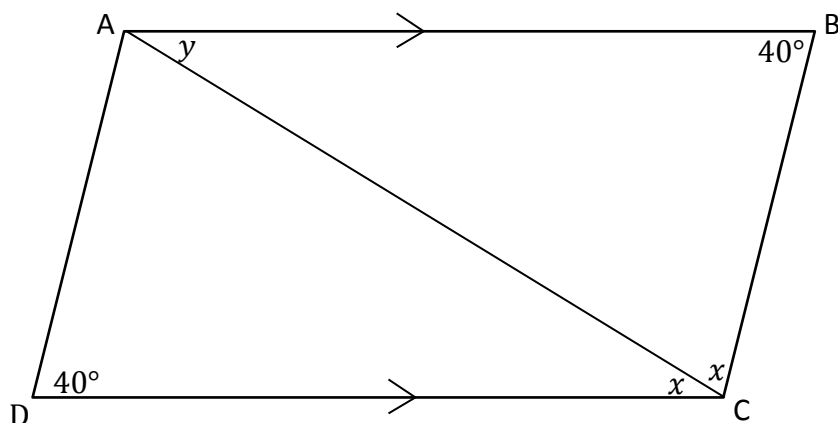
Prove that  $\triangle ABC$  is similar to  $\triangle RBT$ .

<u>Statement</u>	<u>Reason</u>

(4)

**QUESTION 7 (Continued)**

**7.3** In Quadrilateral ABCD,  $AB \parallel DC$  and  $\hat{D} = \hat{B} = 40^\circ$ . Diagonal AC is drawn.



7.3.1 Calculate the value of  $x$ .

<u>Statement</u>	<u>Reason</u>

(3)

7.3.2 Determine the value of  $y$ .

<u>Statement</u>	<u>Reason</u>

(2)

7.3.3 Prove that  $AD \parallel CB$ .

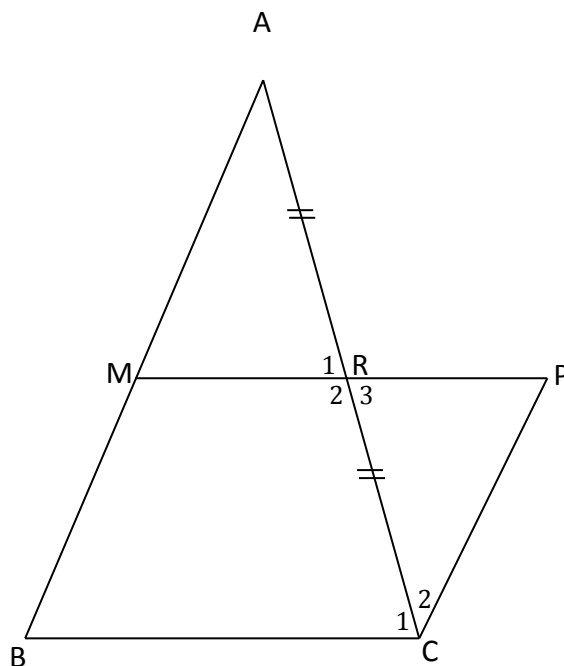
<u>Statement</u>	<u>Reason</u>

(3)

**QUESTION 7 (Continued)**

**7.4** In the figure below BMA and ARC are straight lines.

BMPC is a parallelogram and  $AR = RC$ .



**7.4.1** Name TWO pairs of parallel lines in the figure.

\_\_\_\_\_ (1)

**7.4.2** Prove that  $\triangle AMR \equiv \triangle CPR$ .

<u>Statement</u>	<u>Reason</u>

(4)

[23 Marks]

[Total: 100 Marks]