GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION

PROVINCIAL EXAMINATION

JUNE 2016

GRADE 9

MATHEMATICS

TIME: 120 minutes

MARKS: 100

12 pages

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INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 9 questions and 12 pages.
2. Answer ALL questions.
3. A non-programmable calculator may be used unless stated otherwise.
4. Clearly show ALL calculations, diagrams and graphs, etc. that you have used in determining the answers. Answers only will NOT necessarily be awarded full marks.
5. If necessary, round-off answers to TWO decimal places, unless stated otherwise.
6. Diagrams are NOT necessarily drawn to scale.
7. Number the answers correctly according to the numbering system used in this question paper.
8. Use ANSWER SHEETS A and B to answer Questions 1 and 4. Detach these ANSWER SHEETS and submit them together with your ANSWER BOOK.
9. Write neatly and legibly.

QUESTION 1

MULTIPLE-CHOICE QUESTIONS

Answer this question on ANSWER SHEET A. Circle the letter of the correct answer from the 4 possible answers given.

1.1 The prime factors of 30 are …

A 1; 2; 3; 5; 12.
B 3; 5; 6.
C 2; 3; 5.
D None of the above. (1)

1.2 The number 0,000147560 in scientific notation is …

A $0{,}14756 \times 10^{-3}$
B $1{,}4756 \times 10^{-4}$
C $1{,}4756 \times 10^{4}$
D $0{,}14756 \times 10^{-5}$ (1)

1.3 $1\frac{3}{4}+1\frac{4}{5}=$

A $3\frac{11}{20}$.

B $2\frac{7}{9}$.

C $2\frac{7}{20}$.

D $3\frac{7}{9}$. (1)

1.4 0, 034297 correctly rounded-off to 4 decimals is …

A 0,0342.
B 0,3430.
C 0,0343.
D 0,034. (1)

1.5 Which number is both a square **and** a cube?

A 64
B 16
C 8
D 4 (1)

1.6 Which number is missing in the sequence: $1; \frac{1}{2}; \frac{1}{4}; \ldots; \frac{1}{16}$?

A $\frac{1}{8}$

B $\frac{1}{10}$

C $\frac{1}{12}$

D $\frac{1}{14}$ (1)

1.7 $(x-2)^2 =$

A $x^2 - 4.$

B $x^2 - 4x + 4.$

C $x^2 + 4.$

D $x^2 + 4x + 4.$ (1)

1.8 If $3(x-1)(x+2) = 0$; then $x =$

A -1 or $2.$

B 1 or $-2.$

C 3 or 1 or $2.$

D 2 or $1.$ (1)

1.9 The factors of $x^2 + 5x - 6$ are …

A $(x-3)(x-2).$

B $(x+2)(x+3).$

C $(x+6)(x-1).$

D $(x-3)(x-2).$ (1)

1.10 The area of a rectangular figure is 200 m². If the length is doubled, the new area will be …

A 300 m².

B 400 m².

C 200 m².

D 600 m². (1)

[10]

QUESTION 2

2.1 Calculate the value of $3x^3 - 2x^2 - 9x + 2$ if $x = -2$. (2)

2.2 Simplify the following expressions. (Leave your answer in its positive exponential form.)

2.2.1 $3xy^2 - 5x^2y - 9xy^2 + 8x^2y - 3x^2$ (2)

2.2.2 $2^{x+y}.2^{x-y}$ (1)

2.2.3 $\dfrac{-2pq \times (2p^2q^3)^2}{32p^6q^7}$ (3)

2.2.4 $(2x-4)(2x+4)$ (2)

2.2.5 $\dfrac{2m+4}{m-3} \times \dfrac{m^2-3m+2}{m^2-4}$ (4)

2.3 Simplify the following without using a calculator. (Leave your answer in scientific notation.)

$3{,}4 \times 10^{-3} + 5{,}8 \times 10^{-5}$ (2)

2.4 Solve for x.

2.4.1 $8x + 3 = 3x - 22$ (2)

2.4.2 $x - \dfrac{x-1}{2} = 3$ (3)

2.4.3 $2^x = 16$ (2)

2.5 Factorise fully.

2.5.1 $3a^3 - 9a^2 + 6a$ (4)

2.5.2 $9x^2 - y^2$ (2)

2.5.3 $t^2(x-y) - w^2(y-x)$ (2)

[31]

QUESTION 3

Nomvula and Sam decided to apply for motor vehicle finance to buy a car for the amount of R 150 000, 00. The loan is payable over 5 years at 9 % compound interest per annum.

3.1 Use the formula on ANNEXURE A to calculate the total amount payable at the end of the 5 years. (3)

3.2 Calculate the monthly instalments that will be paid. (3)

3.3 The previous owner bought the car for R 120 000,00 and sold it for R 150 000,00. Calculate the percentage profit made by the owner. (3)

[9]

QUESTION 4

It takes the Gautrain 2 hours to travel a certain distance at an average speed of 150 km/h. The following table shows other options as well:

Average speed (km/h)	***a***	150	300	***c***
Time travelled in hours	4	2	***b***	$2\frac{1}{2}$

4.1 Determine **a, b** and **c** by showing all calculations. (6)

4.2 Plot the graph using the table and answers from Question 4.1. Use ANSWER SHEET B to answer this question. (4)

4.3 By using the graph that you have drawn for Question 4.2, determine how long it will take to cover the distance at an average speed of 100 km/h. (2)

[12]

QUESTION 5

The following patterns are constructed by laying out matches in a patter. Study the diagram below to answer the questions that follow.

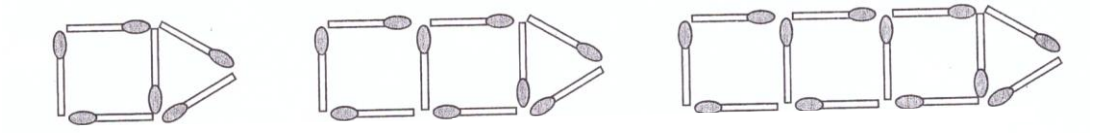


Figure 1 **Figure 2** **Figure 3**

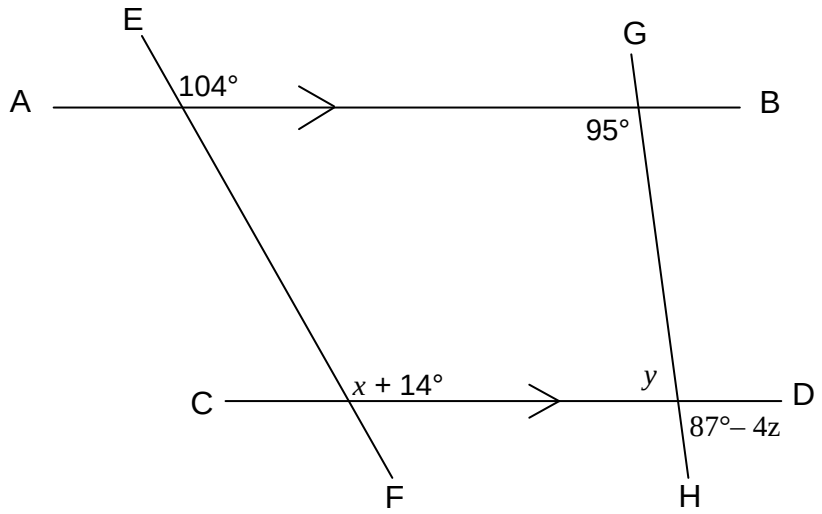
5.1 Determine the number of matchsticks in the next figure if the pattern is continued. (1)

5.2 Describe the pattern rule in your own words. (1)

5.3 Write the general term of the pattern in the form $T_n =$. (2)

5.4 Use your answer to Question 5.3 to determine the number of matchsticks in the 20^{th} figure. (2)
[6]

QUESTION 6

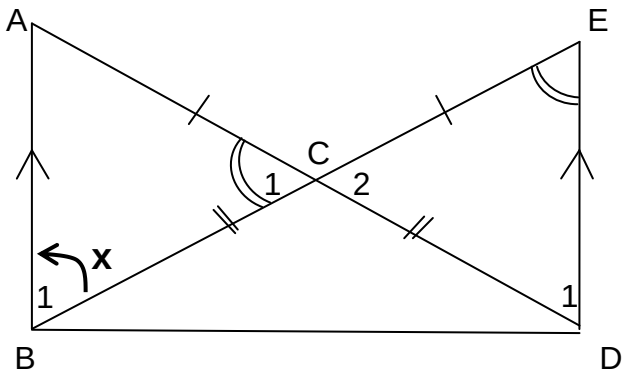


6.1 Calculate y. (3)

6.2 Calculate x. (3)

6.3 Construct a special angle of 30° without using a protractor. (3)
[9]

QUESTION 7



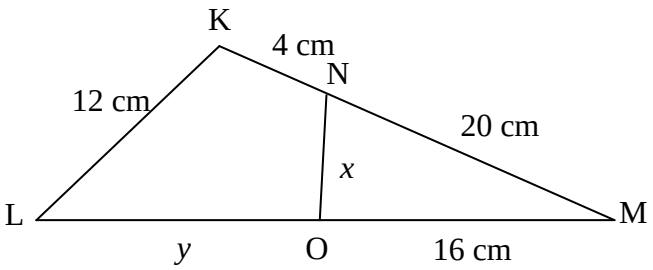
In the given figure AB| | ED, AC = CE, BC = CD , $\hat{C}_1 = 60°$ and $\hat{C}_1 = \hat{E}$.

7.1 Prove, with reasons, that $\Delta ABC \equiv \Delta EDC$. (4)

7.2 Calculate *x*. (3)
[7]

QUESTION 8

In the diagram below it is proven that $\Delta KLM \text{ | | | } \Delta ONM$.

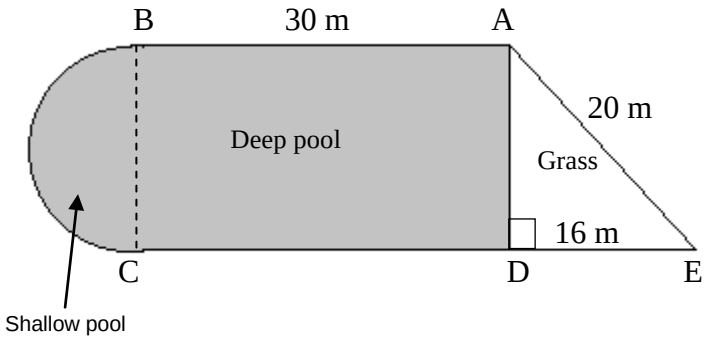


8.1 Calculate the length of NO (x). (2)

8.2 Calculate the length of LO (y). (3)
[5]

QUESTION 9

Refer to ANNEXURE A for formulae to answer this question.



Study the diagram above of the entertainment area at a family resort. The grey area is made up of a shallow children's pool and a deep adults' pool. There is a triangular-shaped grass area, where visitors can relax. The dimensions of the space are as follows:

AB is 30 m, AE is 20 m, EC is 46 m and AD is perpendicular to EC.

9.1 Calculate the width of the entire swimming pool (AD). (2)

9.2 Determine the area of the entire pool if the width is given as 12 m. (4)

9.3 Determine the perimeter of the entire entertainment area.
(Make use of the width as stated in Question 9.2.) (5)
[11]

TOTAL: 100

END

ANNEXURE A

QUESTION 3.1

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

QUESTION 9

Full circle:

Area = πr^2

Perimeter = $2\pi r$

л = 3,14

Rectangle:

Area = $l \text{ x } b$

Perimeter = $2(l+b)$

Triangle:

$\text{Area} = \frac{1}{2} b \text{ x } h$

Perimeter = $\text{Side}_1 + \text{Side}_2 + \text{Side}_3$

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ANSWER SHEET A

QUESTION 1

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**
1.6.	**A**	**B**	**C**	**D**
1.7.	**A**	**B**	**C**	**D**
1.8.	**A**	**B**	**C**	**D**
1.9.	**A**	**B**	**C**	**D**
1.10.	**A**	**B**	**C**	**D**

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ANSWER SHEET B

QUESTION 4