ANNUAL NATIONAL ASSESSMENT 2015
GRADE 8 MATHEMATICS TEST

MARKS: 125

TIME: 2 hours

PROVINCE ____________________________________________________________

DISTRICT ____________________________________________________________

CIRCUIT _____________________________________________________________

SCHOOL _____________________________________________________________

EMIS NUMBER (9 digits) __________________________

CLASS (e.g. 8A) __________________________

SURNAME __________________________________________________________

NAME _____________________________________________________________

GENDER (✓) BOY [ ] GIRL [ ]

DATE OF BIRTH C C Y Y M M D D

This test consists of 20 pages, excluding the cover page.
Instructions to the learner
1. Read all the instructions carefully.
2. Question 1 consists of 10 multiple-choice questions. You must circle the letter of the correct answer.
3. Answer questions 2 to 11 in the spaces provided.
4. All working must be shown.
5. The diagrams are not drawn to scale.
6. Give a reason for each of your statements in questions 7.2 to 7.6, when required.
7. The test is out of 125 marks.
8. The test duration is 2 hours.
9. The teacher will lead you through the practice question before you start the test.
10. Approved scientific calculators (non-programmable and non-graphical) may be used.

Practice question

Circle the letter of the correct answer.

1. The next number in the number sequence 1 ; 3 ; 5 ; 7 ; ... is ...
   A  8
   B  12
   C  16
   D  9

Your answer is correct if you circled D.

The test starts on the next page.
QUESTION 1

1.1  \( x + x + x = \)
A  \( x^3 \)
B  \( 3x \)
C  \( 3x^3 \)
D  \( 4x \)  (1)

1.2  Complete: \((12 \div 2) + (6 \times 3) - 3 = \)
A  105
B  27
C  21
D  33  (1)

1.3  What is the value of \( x \) if \( \frac{2}{7} = \frac{x}{21} \)?
A  6
B  7
C  11
D  14  (1)

1.4  The next term in the sequence 1; 3; 9; ___ is …
A  24
B  12
C  18
D  27  (1)
1.5  The value of $\sqrt[3]{125}$ =
   A  5
   B  −5
   C  25
   D  15  (1)

1.6  How many terms are there in the expression $−6x^4 + 4x^3$?
   A  1
   B  2
   C  3
   D  4  (1)

1.7  The surface area of a cube is 750 cm². The surface area measured in m² is
   A  0,075 m²
   B  7,50 m²
   C  75,0 m²
   D  0,75 m²  (1)
1.8 In the right-angled triangle ABC below, AB = BC. The size of \( \hat{C} \) is ...

A  15°  
B  30°  
C  45°  
D  60°  

1.9 \( 0,15 \times 0,3 = \)

A  4,5  
B  0,45  
C  0,0045  
D  0,045  

1.10 Which number is missing in the number sequence below?

1 ; 1 ; 2 ; 3 ; ___ ; 8 ; 13

A  3  
B  2  
C  5  
D  7  

[10]
QUESTION 2

2.1 Complete:

2.1.1 \[ \frac{0}{7} = \text{______} \]  

(1)

2.1.2 \[ \left( \frac{1}{2} \right)^3 = \text{______} \]  

(1)

2.2 Write 12 000 in scientific notation.

_____________________________________________________________  

(1)

2.3 Answer the following questions.

2.3.1 Write down the LCM of 12 and 48.

_____________________________________________________________  

(1)

2.3.2 Write down all the factors of 28.

Then, write down the prime factors of 28.

_____________________________________________________________  

_____________________________________________________________  

(2)

2.4 Calculate the average speed of a car that travelled 720 kilometres in 6 hours.

________________________________________________________________  

________________________________________________________________  

________________________________________________________________  

(2)

2.5 Fill in the missing number in the number sequence below.

\[-1; -4; -7; \___; -13; -16\]  

(1)
QUESTION 3

3.1 Calculate each of the following:

3.1.1 \(-4 - (-2) + (-3 - 4)\)

\[\frac{1}{2}\]

(3)

3.1.2 \(3\frac{2}{3} - \frac{7}{12}\) (Write the answer as a mixed number.)

\[\frac{23}{12}\]

(4)

3.1.3 \(1\frac{2}{3} \times \frac{5}{6}\) (Write the answer as a mixed number.)

\[\frac{11}{6}\]

(3)

3.1.4 \(\frac{2}{5} \div \frac{1}{2}\)

\[\frac{4}{5}\]

(3)
3.1.5 4% of 500

3.2 Currently my bank balance is R2 000. What will the new balance be if I withdraw R600 from the account in each of the next 3 months?

3.3 Peter ate \( \frac{1}{5} \) of his 250 Smarties. How many Smarties were left?

3.4 Calculate how much interest Mr Jones owed if he borrowed R10 000 at 15% per annum, simple interest, for a period of 3 years.
QUESTION 4

4.1 Study the pattern in the figures below and then answer the questions that follow.

![Figure 1](triangle.png)  
**Figure 1**

![Figure 2](triangle2.png)  
**Figure 2**

![Figure 3](triangle3.png)  
**Figure 3**

4.1.1 Fill in the missing numbers in the table below:

<table>
<thead>
<tr>
<th>Figure</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of small triangles</td>
<td>1</td>
<td>4</td>
<td>9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(2)

4.1.2 Write down the general term, $T_n$, of the number sequence formed by the number of small triangles in the above pattern.

$T_n =$ ________________________________

(1)
QUESTION 5

5.1 Consider the expression $7x^2 + 5x + 4$ and then answer the questions that follow.

5.1.1 Write down the constant term.


(1)

5.1.2 What is the degree of the expression?


(1)

5.1.3 Write down the coefficient of the second term.


(1)

5.1.4 Calculate the value of the expression $7x^2 + 5x + 4$ if $x = -1$.


(3)

5.2 Simplify the expression: $2x - 3y + 4 - 3x - y - 2$


(3)
5.3 Calculate:

5.3.1 \[ 4x + 3 - (3x - 2) \]

\[ \hline \]

\[ \hline \]

(4)

5.3.2 \[ \frac{18x^2 - 12x - 6}{6} \]

\[ \hline \]

\[ \hline \]

(3)

5.4 Complete the simplification steps below:

\[ 2y \times 3y^2 - 14y \times y^2 \]

\[ = _____ - _____ \]

\[ = _____ \]

(3)

[19]

QUESTION 6

6.1 Solve for \( x \) in each of the following equations.

6.1.1 \[ x - 10 = 2 \]

\[ \hline \]

\[ \hline \]

(2)
6.1.2  \(2x + 1 = 203\)

\[x = \frac{203 - 1}{2} = 101\]

\[y = -2(101) + 3 = -200 + 3 = -197\]

(3)

6.1.3 \(x^3 = 64\)

\[x = \sqrt[3]{64} = 4\]

\(y = -2(4) + 3 = -8 + 3 = -5\)

(2)

6.2 Fill in the missing values for Question 6.2.1 and 6.2.2 in the flow diagram below.

\[x = \begin{cases} -3 & 6.2.1 \\ 0 & 6.2.2 \end{cases}\]

\[y = \begin{cases} 3 & 6.2.1 \\ 5 & 6.2.2 \end{cases}\]

(1)
QUESTION 7

7.1 Choose the correct angle size from the list below only once to complete each statement.

| 60° | 90° | 180° | 360° |

7.1.1 The sum of the interior angles of a triangle = _______ (1)

7.1.2 Each interior angle in an equilateral triangle = _______ (1)

7.1.3 The largest angle in a right-angled triangle = _______ (1)

7.1.4 The sum of the interior angles of any quadrilateral = _______ (1)

7.2 In \( \triangle ABC \), \( \hat{B} = 70° \) and \( \hat{C} = 30° \). Calculate the size of \( \hat{A} \).

\[
\text{A} \quad \text{B} \quad 70° \quad \text{C} \quad 30°
\]
7.3 In the diagram, $\hat{A} = 40^\circ$ and $\hat{B} = 80^\circ$. Calculate the size of $\hat{A}\hat{C}\hat{D}$.

![Diagram of triangle ABD with angles 40° and 80°]

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A\hat{C}\hat{D} = 40^\circ + ________$</td>
<td></td>
</tr>
<tr>
<td>$\therefore A\hat{C}\hat{D} = _______$</td>
<td>(3)</td>
</tr>
</tbody>
</table>

7.4 In the diagram below, $\triangle ABC$ is a straight line. $\hat{B}_2 = 75^\circ$ and $\hat{B}_3 = 55^\circ$. Determine the size of $\hat{B}_1$.

![Diagram of straight line with angles 75° and 55°]

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\hat{B}_1 + 75^\circ + 55^\circ = _______$</td>
<td>sum of $\angle$s on a straight line</td>
</tr>
<tr>
<td>$\therefore \hat{B}_1 = _______$</td>
<td>(2)</td>
</tr>
</tbody>
</table>
7.5 In the diagram below, AB \parallel CD and \angle BPT = 118^\circ.

Calculate the value of \(x\) and \(y\).

\[
\begin{array}{c}
\text{Statement} \\
7.5.1 \quad x = \\
7.5.2 \quad y = \\
\end{array}
\]

\[
\begin{array}{|c|c|}
\hline
\text{Statement} & \text{Reason} \\
\hline
x = & \text{co-interior \(\angle\)s and } AB \parallel CD \quad (1) \\
y = & \text{} \quad (2) \\
\hline
\end{array}
\]
7.6 In the diagram, \( DE = DH \), \( EH \parallel FG \) and \( \angle DHE = 75^\circ \).

7.6.1 Calculate the size of \( \angle 1 \).

7.6.2 Give a reason why \( \angle G = \angle 1 \).

<table>
<thead>
<tr>
<th>Statement</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.6.1 ( \angle 1 = )</td>
<td>( \angle s ) opp. equal sides of ( \triangle )</td>
</tr>
<tr>
<td>7.6.2 ( \angle G = \angle 1 )</td>
<td></td>
</tr>
</tbody>
</table>

[18]
QUESTION 8

8.1 Two right-angled triangles are given below. The dimensions are in cm.

Use the above triangles to complete the following statements:

8.1.1 \( \Delta ABC \equiv \Delta \) ______ with the vertices written in the correct order. (1)

8.1.2 \( AB = \) ______ (1)

8.1.3 \( \hat{C} = \) ______ (1)

8.2 The acute-angled triangles ABC and DEF are given below.

Use the information given in the triangles to complete the following statements:

8.2.1 \( \hat{C} = \) ____ (1)

8.2.2 \( \hat{D} = \) ____ (1)

8.2.3 Then \( \Delta ABC \) ____ \( \Delta DFE \) (\( \angle \angle \angle \)) (1)
QUESTION 9

9.1 In $\triangle DEF$, $\angle E = 90^\circ$, $DE = 7\ m$ and $EF = 24\ m$. Use the Theorem of Pythagoras to calculate the length of $DF$. 

9.2 In $\triangle PQR$, $\angle Q = 90^\circ$, $PQ = 6\ cm$, $QR = 8\ cm$ and $PR = 10\ cm$. Calculate the area of $\triangle PQR$. 

9.3  AC, the diameter of the given semi-circle ABC, is 20 cm.

Use \( \pi = 3,14 \) to calculate the perimeter of the figure correct to two decimal places. The formula for the circumference of a circle is \( C = \pi d \) or \( C = 2\pi r \).

\[ \text{Perimeter} = \pi \times 20 \]

\[ \text{Perimeter} = 3,14 \times 20 \]

\[ \text{Perimeter} = 62,8 \]

9.4 Calculate the volume of a rectangular prism with length 2 m, breadth 1,5 m and height 0,5 m.

\[ \text{Volume} = \text{length} \times \text{breadth} \times \text{height} \]

\[ \text{Volume} = 2 \times 1,5 \times 0,5 \]

\[ \text{Volume} = 1,5 \]

[14]
QUESTION 10

The Mathematics test marks of a group of Grade 8 learners are given below.

54  66  92  70  50  81  84  36  78  58  58

10.1 Determine the median of the marks.

_______________________________________________________________

(2)

10.2 Write down the range.

_______________________________________________________________

(1)

10.3 What is the modal mark?

_______________________________________________________________

(1)

10.4 Calculate the mean of the marks, correct to two decimal places.

_______________________________________________________________

(2)

[6]
QUESTION 11

The difference between two natural numbers is 12 and their sum is 54.

Calculate the value of the larger number.