The Department of Basic Education has pleasure in releasing a subject exemplar booklet for School Based Assessment (SBA) to assist and guide teachers with the setting and development of standardised SBA tasks and assessment tools. The SBA booklets have been written by teams of subject specialists to assist teachers to adapt teaching and learning methods to improve learner performance and the quality and management of SBA.

The primary purpose of this SBA exemplar booklet is to improve the quality of teaching and assessment (both formal and informal) as well as the learner’s process of learning and understanding of the subject content. Assessment of and for learning is an ongoing process that develops from the interaction of teaching, learning and assessment. To improve learner performance, assessment needs to support and drive focused, effective teaching.

School Based Assessment forms an integral part of teaching and learning, its value as a yardstick of effective quality learning and teaching is firmly recognised. Through assessment, the needs of the learner are not only diagnosed for remediation, but it also assists to improve the quality of teaching and learning. The information provided through quality assessment is therefore valuable for teacher planning as part of improving learning outcomes.

Assessment tasks should be designed with care to cover the prescribed content and skills of the subject as well as include the correct range of cognitive demand and levels of difficulty. For fair assessment practice, the teacher must ensure that the learner understands the content and has been exposed to extensive informal assessment opportunities before doing a formal assessment activity.

The exemplar tasks contained in this booklet, developed to the best standard in the subject, is aimed to illustrate best practices in terms of setting formal and informal assessment. Teachers are encouraged to use the exemplar tasks as models to set their own formal and informal assessment activities.

MR HM MWELI
DIRECTOR-GENERAL
DATE: 13/09/2012
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1. INTRODUCTION

Assessment in the National Curriculum Statement Grades R – 12 comprises School-Based Assessment (SBA) for subjects offered in the General Education and Training band (GET) and a final end-of-year examination.

School-Based Assessment is designed to address the content competencies, skills, values and attitudes of the subject, and to provide learners, parents and teachers with results that are meaningful indications of what the learners know, understand and can do at the time of the assessment.

School-Based Assessment allows for learners to be assessed on a regular basis during the school year. This assessment is a compulsory component for progression and promotion in all the different school phases and includes a variety of forms of assessment as contemplated in Chapter 4 of the Curriculum and Assessment Policy Statements. Moderation should ensure that the quality and standard of the School-Based Assessment, as contemplated in Chapter 4 of the Curriculum and Assessment Policy Statements, have been met.

2. AIMS AND OBJECTIVES

When the Department of Basic Education (DBE) engaged with the provinces and districts to strengthen the SBA, it was revealed that many schools across the country grapple to understand and develop good quality examinations, investigations and projects.

The purpose of this document is to provide both teachers and learners with a set of quality-assured SBA tasks. This document was also developed with an intention to engage Provincial Education Departments (PEDs) on aspects to be considered when capacitating their teachers on the setting of quality SBA tasks.

This document provides exemplar tasks that reflect the depth of Mathematics curriculum content appropriate for Grades 4, 5 and 6. Every effort has been taken to ensure that the distribution of marks in the tasks is in accordance with the cognitive levels of the taxonomy used in the Mathematics CAPS document.

3. EXEMPLAR ASSESSMENT TASKS

The exemplar assessment tasks in this booklet are presented according to the forms of assessment that include Assignments, Examinations, Investigations and Projects for the Intermediate Phase. Exemplars of each of these forms of assessment are meant to demonstrate to subject advisors and teachers how they should be developed. Detailed descriptions of these forms of assessment and issues to consider when developing them are presented prior to the actual exemplars. It is anticipated that PEDs will continue to mediate the exemplars and ensure that teachers acquire the skills of developing the SBA tasks for their learners.
4. COGNITIVE LEVELS IN MATHEMATICS

Effort was taken to ensure that the assessment tasks, especially examinations, comply with the following distribution of marks according to the cognitive levels as contemplated in Chapter 4 of CAPS for Mathematics:

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Routine procedures</th>
<th>Complex procedures</th>
<th>Problem solving</th>
</tr>
</thead>
<tbody>
<tr>
<td>25%</td>
<td>45%</td>
<td>20%</td>
<td>10%</td>
</tr>
</tbody>
</table>

In determining the level of complexity and cognitive demand of a task, consideration should be given to the extent to which the task requires the use of integrated content and skills drawn from different topics, the complexity of the context in which the problem is posed, the influence of non-mathematical considerations on the problem, and the extent to which the learner is required to make sense of the problem without guidance or assistance.
5. ASSIGNMENTS

(a) Purpose of a mathematics assignment

A mathematics assignment, as is the case with tests and examinations, is mainly an individualised task. It can be a collection of past questions, but should focus on more demanding work as any resource material can be used, which is not the case in a task that is done in class under supervision. An assignment could provide learners with the opportunity to consolidate a topic or section that has been covered in class, or to apply an approach or method studied in class to a new context, or to revise for tests and/or examinations. Both the content and contexts of the assignment are likely to be familiar to the learner.

(b) Developing a mathematics assignment

Since an assignment is primarily meant to consolidate the mathematics topics learnt and to prepare learners adequately for the test/examination, the questions constituting an assignment could be selected from the appropriate questions in the previous question papers. However, this does not preclude teachers from developing their own questions that are pitched at different cognitive levels as it is done when developing the examination questions.

(c) Administering a mathematics assignment

To ensure that the assignment serves its intended purpose of preparing learners for an examination, the timing of administering it should be opportune. In other words, an assignment should be administered just before an examination is administered.
5.1. Grade 4 assignment exemplar

Assignment                     Total: 40 Marks
Name: ………………………   Date: ……………………..                   Time: 1 hour

Instructions:
   a) Write your name and date in the spaces provided.
   b) No calculators are allowed.
   c) Show calculations as requested on the question paper.
   d) The marks allocated are an indication of the number of steps per calculation.
   e) Check your answers.

Question 1: Circle the letter of the correct answer.

1.1 Eight hundred and forty-three can also be presented as:

   A  483       B  384       C  834       D  843

1.2 What must be added to 78 to make 90?

   A  12       B  22       C  14       D  2

1.3 The number 423 rounded off to the nearest 10 will be:

   A  430       B  420       C  400       D  300

[3 x 1 = 3]

Question 2: Answer all the questions below:

2.1 Write 386 in words:

Answer: ____________________________________________

2.2 Which number could be represented by the letter X on the number line?

   ![Number line with X marked]

Answer: _____________    [2 x 1 = 2]
**Question 3:** Make the sides equal:

3.1 \[368 - \square = 368 + 0\]
Answer: ________________________

3.2 \[140 + 6 = 251 - \square\]
Answer: ________________________

\[2 \times 1 = 2\]

**Question 4:**
Four starfish have 20 arms. How many starfish have 35 arms?

Answer: ________________________ [1]

**Question 5:**

5.1. What is the value of the underlined digit? \(893\)

_________________________________________________________________________ [1]

5.2. Calculate the difference in value of the digits in the hundreds and tens place values in \(893\).

_________________________________________________________________________ [2]

5.3. What is the next even number after 144? ________________________________ [1]

5.4. What is the next odd number after 671? ________________________________ [1]

5.5. In this table:

5.5.1. List all the multiples of 5.

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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<tr>
<td>41</td>
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<td>43</td>
<td>44</td>
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<td>48</td>
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<td>50</td>
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</tbody>
</table>

5.5.2. List all the multiples of 7.

<p>| | | | | | | | |</p>
<table>
<thead>
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</thead>
<tbody>
<tr>
<td>51</td>
<td>52</td>
<td>53</td>
<td>54</td>
<td>55</td>
<td>56</td>
<td>57</td>
<td>58</td>
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<td>59</td>
<td>60</td>
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<td>61</td>
<td>62</td>
<td>63</td>
<td>64</td>
<td>65</td>
<td>66</td>
<td>67</td>
<td>68</td>
</tr>
<tr>
<td>69</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.5.1.

_________________________________________________________________________

5.5.2.

_________________________________________________________________________

[2]
Question 6: Complete:
6.1
20
25
26
28

6.2
60
56
54
64

Question 7: State whether the following is true or false
7.1 51 + 14 = 14 + 51
Answer:_______________

7.2 51 – 14 = 14 – 51
Answer:_______________ [2]

Question 8:
A chessboard consists of squares arranged in two alternating colours (light and dark).
How many dark squares are there?

______________________________ [1]
**Question 9: Number sentences:**
Write a number sentence to represent the following word sum:

Zukie has 8 dolls. She gave 3 to her cousin. On her birthday she received three more dolls as presents. She now has eight dolls.

Answer: ___________________________________________________  [1]

**Question 10:**
Calculate the number at the top of the number pyramid. (Hint: Add the two numbers next to each other to get the number above it.) Complete:  [1]

![Number Pyramid](image)

**Question 11:**

11.1 Use “multiplying by 100” and “halving” strategies to calculate: Show your workings

\[ 8 \times 50 = \_\_\_\_\_\_\_ \]

\[ 50 \times 11 = \_\_\_\_\_\_\_\_\_ \]  [2]

11.2 Calculate

\[ 321 + 564 = \]  [3]

11.3 Calculate:

\[ 987 - 514 = \]  [3]
Question 12: Problem solving

12.1 Study the flow diagram. How many pineapples are needed to produce 6 glasses of juice?

____________________________________________________________________________ [2]

12.2 There are 245 men, 167 women and 189 children at a cricket game. How many people are there at the cricket game?

____________________________________________________________________________ [2]

____________________________________________________________________________

12.3 Mr Pretorius has 156 cupcakes. He sells the same number to Ben and Adam. After selling the cupcakes he has 28 left. How many cupcakes did Adam get?

____________________________________________________________________________ [2]

____________________________________________________________________________

12.4 Mrs Adams makes school uniforms. She buys 520 metres of blue material, 264 metres of grey material and 86 metres of yellow material. How many metres of material did she buy altogether?

____________________________________________________________________________ [2]

____________________________________________________________________________

Bonus question: [2]
A rugby field is 100 metres long and 50 metres wide. How far will it be if you ran six times around the rugby field?
Assignment
Time: 1 hour

Memorandum

a) Give full marks for answers only, unless otherwise stated.
b) Accept any alternative mathematically correct solutions that are not included in the memorandum.
c) CA refers to consistent accuracy.

<table>
<thead>
<tr>
<th>Question</th>
<th>Expected answer</th>
<th>Explanation</th>
<th>Mark allocation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>D✓</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1.2</td>
<td>A✓</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1.3</td>
<td>B✓</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2.1</td>
<td>Three hundred and eighty six✓</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2.2</td>
<td>777✓</td>
<td>Accept answers between 775 - 779</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>3.1</td>
<td>0✓</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3.2</td>
<td>105✓</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>7✓</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5.1</td>
<td>90; 9T; 9 tens✓</td>
<td>Accept any one of these options</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5.2</td>
<td>800 – 90 ✓ = 710✓</td>
<td>No marks if wrong digits were chosen</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>5.3</td>
<td>146✓</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5.4</td>
<td>673✓</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5.5.1</td>
<td>45; 50; 55; 60; 65; 70✓</td>
<td>1 mark for all 6 numbers correct</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5.5.2</td>
<td>42, 49; 56; 63; 70✓</td>
<td>1 mark for all 4 numbers correct</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>6.1</td>
<td>40; 50; 52; 56✓</td>
<td>1 mark for all 4 numbers correct</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
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<td>---</td>
</tr>
<tr>
<td>6.2</td>
<td>30; 28; 27; 32✓</td>
<td>1 mark for all 4 numbers correct</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>7.1 True✓</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.2 False✓</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>32✓</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>8 – 3 + 3 = 8✓</td>
<td>Accept if brackets were added in correct place</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>92✓</td>
<td>Mark with possible errors</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
| 11 | 11.1 8 x 50 = 8 x 100 ÷ 2 = 400✓  
50 x 11 = 100 x 11 ÷ 2 = 550✓ | 1 | 1 | 2 |
|   | 11.2 321 + 564 = 300+500+20+60+1+4✓  
= 800+80+5✓  
= 885✓ | Apply CA | 3 | 3 |
|   | 11.3 987 – 514 = 900 – 500 + 80 – 10 + 7 – 4✓  
= 400+70+3 ✓  
= 473✓ | Apply CA | 3 | 3 |
| 12 | 12.1 2 x 2 = 4✓✓ | Consider other mathematically correct method | 2 | 2 |
|   | 12.2 245 + 167 + 189 = 601✓✓ | Full marks for correct answer | 2 | 2 |
|   | 12.3 (156 – 28) = 128✓  
128 ÷ 2 = 64  
Adam gets 64✓ | Full marks for correct answer | 2 | 2 |
|   | 12.4 520 + 264 + 86 ✓ = 870✓ | Full marks for correct answer | 2 | 2 |
| Bonus | 1 800 metres✓✓ | Full marks for correct answer | 2 | 2 |
| **Total** | **40** |   |   |   |
Mathematics      Term 1

Assignment     Activity 1.1         Total: 40 Marks

Name: ………………………   Date: ……………………..       Time: 1 hour

Instructions:

a) Write your name and date in the spaces provided.

b) No calculators are allowed.

c) Show calculations as requested on the question paper.

d) The marks allocated are an indication of the number of steps per calculation.

e) Check your answers.

Question 1: Circle the letter of the correct answer.

1.1. A girl can play 66 notes every minute. How many notes can she play in 6 minutes?

A. About 360 notes    B. About 400 notes     C  About 500 notes        D. About 380 notes

1.2. What do you get if you increase 316 by 500?

A. 800    B. 816    C. 316500    D. 516

1.3. What would result in the largest number?

A. 7210 + 1345    B. 1345 + 7245    C.1345 + 7210    D. 1310 + 7245

1.4. What is the missing number?  587 + ? = 630

A. 33    B. 43    C. 50    D. 53
1.5. Anna bought 28 jellybeans. Which statement is **INCORRECT**?

A. She can divide the beans equally into three groups
B. She can divide the beans equally into groups of 7
C. She can divide the beans equally into groups of 4
D. She can divide the beans equally into two groups

[5 x 1 = 5]

**Question 2: Answers the following questions:**

2.1. Which number is represented by

\[(3 \times 10000) + (7 \times 1000) + (9 \times 100) + (8 \times 10) + (5 \times 1)\]

___________________________________________________________________ (1)

2.2. Write the following number in digits.
Six thousand one hundred and four.

___________________________________________________________________ (1)

[2]

**Question 3: Complete.**

3.1. Which number is represented by the A on the following number line?

___________________________________________________________________ (1)

3.2. Calculate: \[24367 \times 0 = \]

___________________________________________________________________ (1)

3.3. Round off 963 to the nearest 10.

___________________________________________________________________ (1)

3.4. Complete the missing numbers

___________________________________________________________________ (2)

[4]
Question 4: Calculate

4.1 What is the next even number after 5 144? _________________________  (1)

4.2 What is the next odd number after 9 671? __________________________  (1)

4.3 Calculate the difference in value of the digits in the thousands and tens place values in the number 9 876.

__________________________________________________________________  (3)

4.4 Subtract 600 from 3 000

_______________________________________________________________  (1)

4.5 Replace the □ to make the sentence true: 135 - 7 + 7 = □

__________________________________________________________________  (1)

5
5
6
9
6

Question 5: Arrange in ascending order.

_______________________________________________________________________     (1)

Question 6: Answer the following:

6.1 What is the place value of the underlined digit? 5 603

_______________________________________________________________________ (1)

6.2 State if the following number sentences are true or false. 302 – 123 = 123 – 302

_______________________________________________________________________ (1)

6.3 Solve the number sentence. Show how you get the answer. 57 + 8 = □ + 5

_______________________________________________________________________ (1)
6.4 Use one pair of brackets to make the number sentence true.

\[9 \times 10 - 8 = 18\]  

(1)

6.5 Write a number sentence for the following problem.

Alan scored 34 in the first test, 40 in the second and 16 in the third. What is the total he scored for the three tests?

___________________________________________________________________________(1)

Question 7: Complete:

7.1 Multiples of 15: 15 ; 30 ; 45 ; _____ ; _____ ; _____

7.2 Multiples of 22: 22 ; 44 ; _____ ; 88 ; _____ ; _____

7.3 Factors of 99: 1 ; _____ ; 9 ; _____ ; _____ ; 99  

[3 \times 1 = 3]

Question 8: Calculate and show your workings.

8.1 653 + 68 + 3 912  

(4)

8.2 4 506 – 3 605  

(3)

8.3 Check the answers by doing the inverse operation  

(2)

Question 9: Calculate

Thandi’s mom travelled 4 456 km in 2012 and in 2013 she travelled 5 655 km.

9.1 In which year did she travel the furthest?

______________________________________________________________________________  

(1)

9.2 What is the total distance she travelled in 2012 and 2013?

______________________________________________________________________________  

(2)

9.3 How much further did she travel in 2013 compared to 2012?

______________________________________________________________________________  

(1)
Question 10: Calculate

There were 8 450 spectators at the drumming finals. If 2 715 of the spectators were children, how many were adults.

_______________________________________________________________________ (1)

[5]

Total: 40 Marks
# Grade 5 Assignment Exemplar: Memorandum

## Mathematics
### Term 1
### Assignment
#### Time: 1 hour

### Memorandum

**General marking note:**

a) Give full marks for answers only, unless otherwise stated.

b) Accept alternative mathematically correct solutions that are not included in the memorandum.

c) CA refers to consistent accuracy.

<table>
<thead>
<tr>
<th>Question</th>
<th>Expected answer</th>
<th>Explanation</th>
<th>Mark allocation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.1 B✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.2 B✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.3 B✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.4 B✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.5 A✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2.1 37 985✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.2 6 104✓</td>
<td></td>
<td>1</td>
<td></td>
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<tr>
<td>3</td>
<td>3.1 355✓</td>
<td></td>
<td>1</td>
<td></td>
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<tr>
<td></td>
<td>3.2 0✓</td>
<td></td>
<td>1</td>
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<td></td>
<td>3.3 960✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.4 10 012; √9 952; 9 932; 9892✓</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4.1 5 146✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.2 9 673✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.3 9 000✓ - 70✓ = 8 930✓</td>
<td>No marks if wrong digits were chosen</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.4 3 000 − 600 = 2 400✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4.5 135✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5596; 5966; 5969; 6596; 6696; 9965✓</td>
<td>1 mark for all 6 numbers correct</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>6.1</td>
<td>Hundreds ✓</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>-----</td>
<td>-------------</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>6.2</td>
<td>False ✓</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.3</td>
<td>60 ✓</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4</td>
<td>9 \times (10 – 8) = 18 ✓</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.5</td>
<td>34 + 40 + 16 = 0 ✓</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>7.1</td>
<td>60; 75; 90 ✓</td>
<td>All 3 answers correct for 1 mark</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.2</td>
<td>66; 110; 132 ✓</td>
<td>All 3 answers correct for 1 mark</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.3</td>
<td>3; 11; 33 ✓</td>
<td>All 3 answers correct for 1 mark: any order</td>
<td></td>
</tr>
</tbody>
</table>
| 8 | 8.1 | \[
\begin{align*}
600 + 50 + 3 & ✓ \\
60 + 8 & ✓ \\
+ 3000 + 900 + 10 + 2 & ✓ \\
3000 + 1500 + 120 + 13 & ✓ \\
= 4000 + 600 + 30 + 3 & ✓ \\
= 4633 & ✓ \\
\end{align*}
\] | Apply CA |
|   | 8.2 and 8.3 | 4506 ✓, -3605 ✓, 901 ✓ | Apply CA |
|   | 9 | 9.1 | 2013 ✓ | 1 |
|   | 9.2 | 10 111 km ✓ | Any method Unit must be indicated for full marks |

<table>
<thead>
<tr>
<th></th>
<th>6.2 False ✓</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.3</td>
<td>60 ✓</td>
<td>1</td>
</tr>
<tr>
<td>6.4</td>
<td>9 \times (10 – 8) = 18 ✓</td>
<td>1</td>
</tr>
<tr>
<td>6.5</td>
<td>34 + 40 + 16 = 0 ✓</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>7.1</td>
<td>60; 75; 90 ✓</td>
</tr>
<tr>
<td></td>
<td>7.2</td>
<td>66; 110; 132 ✓</td>
</tr>
<tr>
<td></td>
<td>7.3</td>
<td>3; 11; 33 ✓</td>
</tr>
</tbody>
</table>
| 8 | 8.1 | \[
\begin{align*}
600 + 50 + 3 & ✓ \\
60 + 8 & ✓ \\
+ 3000 + 900 + 10 + 2 & ✓ \\
3000 + 1500 + 120 + 13 & ✓ \\
= 4000 + 600 + 30 + 3 & ✓ \\
= 4633 & ✓ \\
\end{align*}
\] | Apply CA |
<p>|   | 8.2 and 8.3 | 4506 ✓, -3605 ✓, 901 ✓ | Apply CA |
|   | 9.1 | 2013 ✓ | 1 |
|   | 9.2 | 10 111 km ✓ | Any method Unit must be indicated for full marks |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>9.3</strong></td>
<td>1 199 km ✓</td>
<td>Any method Unit must be indicated for full marks</td>
</tr>
<tr>
<td><strong>10</strong></td>
<td>5 735 ✓</td>
<td>Any method</td>
</tr>
<tr>
<td><strong>Bonus</strong></td>
<td>7 ✓ ✓</td>
<td>If I move 7 coins from the fourth pile to the first pile, then the first pile includes $5 + 7 = 12$ coins. This is the largest number.</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Instructions:

a) Write your name and date in the spaces provided.

b) No calculators are allowed.

c) Show calculations as requested on the question paper.

d) The marks allocated are an indication of the number of steps per calculation.

Question 1: Circle the letter of the correct answer

1.1 What is the sum of 200, 300, 150 and 250?

A. 900  B. 1000  C. 850  D. 950

1.2 Mike bought 57 jellybeans. Which statement is CORRECT?

A. He can divide the beans equally into 5 groups.

B. He can divide the beans equally into 7 groups.

C. He can divide the beans equally into 3 groups.

D. He can divide the beans equally into 9 groups.
1.3 What rule is used for the In-Out machine? Remember, there may be more than one correct answer.

A. Double the number and add 1
B. Add 1 and double the result
C. Add 2 and double the result
D. Triple the number and add 1

1.4 What is the missing number?

A. 4  B. 5  C. 6  D. 8

[4 x 1 = 4]

Question 2: Answer the following questions:

2.1 Write the number in digits.

Two hundred and eighty three thousand one hundred and sixty four.

_______________________________________________________________  (1)

2.2 Complete.

5 + 4 x 6 = __________  (1)

2.3 Which number is represented by

(4 x 100 000) + (30 x 10 000) + (900) + (7 tens) + 5
2.4 Insert brackets in the following number sentence to make it true.

\[ 2 + 5 \times 9 - 4 = 27 \]  \hspace{1cm} (1)

2.5 Which number is represented by the D on the following number line?

\[ \hspace{1cm} (1) \]

2.6 \[ 24\,367 \times 0 + 1 = \hspace{1cm} (1) \]

2.7 Round 35 963 off to the nearest 100.

\[ \hspace{1cm} (1) \]  \hspace{1cm} [8]

**Question 3: Calculate:**

3.1 Calculate the difference in value of the digits in the ten thousands and tens place values in the number 89 876.

\[ \hspace{1cm} (3) \]

3.2 \[ 3\,457 \times 10\,000 \]

\[ \hspace{1cm} (1) \]
3.3 \[ 7 \times 6 = \square \]  

\[ \frac{999}{6} \times 6 = \square \]  

(1)

3.4. List the prime numbers between 20 and 30.  

(1) [6]

**Question 4: Fill in the correct symbol: <, > or = by replacing \( \cdot \) sign.**

4.1 \[ 10648 \cdot 16480 = \square \]

(1)

4.2 \[ 505000 \cdot 78700 = \square \]  

[2 \times 1 = 2]

**Question 5: Study the table and answer the questions that follow.**

<table>
<thead>
<tr>
<th></th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>9</th>
<th>12</th>
<th>15</th>
<th>16</th>
<th>17</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>25</td>
<td>32</td>
<td>39</td>
<td>44</td>
<td>68</td>
<td>72</td>
<td>88</td>
<td></td>
</tr>
</tbody>
</table>

5.1 Which numbers have 10 as a factor?  

(1)

5.2 Which numbers are multiples of 11?  

(1)

5.3 Which numbers are divisible by 9?  

(1)

[3]

**Question 6: Number sentences**

6.1 Write a word problem for the number sentence below.  

\[ 3 \times \square = 27 \]  

(1)
6.2  Solve the number sentence. Show how you get the answer. \(28 + 8 \times 9 = \square + 5\)

\[
\begin{array}{c}
\square + 5 = 28 + 8 \\
\hline
33 = 28 + 8
\end{array}
\]  (1)

6.3  Replace the \(\square\) with the correct values to make the number sentence true.

\[
43 + \square = 43
\]  (1)  [3]

**Question 7: Estimation**

7.1  Estimate the answers by rounding off to the nearest 100.

\[1 676 + 14 234\]

\[
\begin{array}{c}
1 600 + 14 000 \\
\hline
15 600
\end{array}
\]  (2)

7.2  Use estimation to find the answer by rounding off to the nearest 1 000

\[58 621 – 34 476\]

\[
\begin{array}{c}
59 000 – 34 000 \\
\hline
25 000
\end{array}
\]  (2)  [4]

**Question 8: Basic operations**

8.1  Fill in the missing numbers in the expanded vertical addition of

\[65 432 + 8 581 + 34 794.\]

\[
\begin{array}{cccccc}
 & 65 & 432 & + & 8 & 581 \\
+ & 34 & 794 & & & \\
\hline
\text{Total} & 108 & 807 \\
\end{array}
\]

\[
\begin{array}{cccccc}
65 & 432 & = & 60 & 000 & + & 5 & 000 & + & 4 & 000 & + & \square & + & 2 \\
8 & 581 & = & + & 8 & 000 & + & \square & + & 80 & + & 1 \\
34 & 794 & = & 30 & 000 & + & 4 & 000 & + & 700 & + & 90 & + & 4 \\
\hline
\text{Total} & 90 & 807 & = & 90 & 000 & + & 17 & 000 & + & 1 & 600 & + & 200 & + & 7
\end{array}
\]  (4 x 1 = 4)
8.2 Calculate and show your workings.
\[ 654 + 52235 + 583 + 3912 \] (3)

8.3.1 Calculate and show your workings. (2)
\[ 394067 - 63605 \]

8.3.2 Check the answer by doing the inverse operation (1)

TOTAL: 40 Marks
GRADE 6 ASSIGNMENT EXEMPLAR: MEMORANDUM

Mathematics

Assignment 1  Memorandum

Total: 40

General marking note:

1. Give full marks for answers only, unless otherwise stated.
2. Accept alternative mathematically correct solutions that are not included in the memorandum.
3. CA refers to consistent accuracy.

<table>
<thead>
<tr>
<th>Question</th>
<th>Expected answer</th>
<th>Explanation</th>
<th>Mark allocation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.1 A ✓</td>
<td></td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>1.2 C ✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.3 B ✓</td>
<td>Both answers for 1 mark</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.4 C ✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2.1 283 164 ✓</td>
<td></td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>2.2 29 ✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.3 430 975 ✓</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.4 2 + 5 X (9 – 4) = 27 ✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.5 23 150 ✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.6 1 ✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.7 36 000 ✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3.1 80 000 ✓ – 70 ✓ = 79 930 ✓</td>
<td>No marks if wrong digits were chosen</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>3.2 34 570 000 ✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.3 7 999 ✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.4 23; 29 ✓</td>
<td>1 mark for both answers</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4.1 &gt; ✓</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.2</td>
<td>&gt; ✓</td>
<td>1 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5.1</td>
<td>20 ✓</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>5.2</td>
<td>44; 88 ✓</td>
<td>Both numbers get 1 marks</td>
<td>1 3</td>
<td></td>
</tr>
<tr>
<td>5.3</td>
<td>9; 72 ✓</td>
<td>Both numbers get 1 marks</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>6.1</td>
<td>Open answer</td>
<td>Consider any correct word problem</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(A number multiplied by 3 equals 27)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.2</td>
<td>95 ✓</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.3</td>
<td>0 ✓</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>7.1</td>
<td>1 700 + 14 200 ✓ = 15 900 ✓</td>
<td>Both estimated numbers must be correct</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.2</td>
<td>60 000 – 30 000 ✓ = 30 000 ✓</td>
<td>Both estimated numbers must be correct</td>
<td>2 4</td>
<td></td>
</tr>
</tbody>
</table>
| 8  | 8.1 | 65 432 = 60 000 + 5 000 + 400 + 30 ✓ + 2  
+ 8 581 = 8 000 + 500 ✓ + 80 + 1  
+34 794 = 30 000 + 4 000 + 700 + 90 + 4  
Total = 90 000 + 17 000 + 1 600 + 2 00 + 7  
= 90 000 + 10 000 + 7 000 + 1 000 + 600 ✓ + 200 + 7  
= 100 000 + 8 000 ✓ + 800 + 7  
= 108 807 | 4 10 |
| 8.2 | 240 149 ✓ ✓ | Apply CA | 3 |
| 8.3.1 | 330 462 ✓ | Apply CA | 2 |
| 8.3.2 | 330 462 + 63 605 = 394 067 ✓ | 1 |
| Bonus | 8 ✓ | 1 1 |
| Total | | 40 |
6. EXAMINATION

(a) Purpose of a mathematics examination
Examinations (and tests) are individualised assessment tasks and should be carefully designed to ensure that learners demonstrate their full potential in Mathematics content (knowledge and skills). The questions should be carefully spread to cater for different cognitive levels as contemplated in Chapter 4 of CAPS. Examinations and tests are predominantly assessed using a memorandum.

(b) Developing a mathematics examination
It is best practice to start by developing an examination framework before developing the actual examination. An example of an examination framework is provided for Grade 6 and the same approach can be adopted when developing an examination for any grade. The examination framework assists the examiner to carefully identify the important concepts and skills to be assessed as well as to spread the cognitive levels appropriately. The purposeful choices of concepts and skills as well as appropriate spread of the cognitive levels are the key ingredients of the balanced examination or test. In addition, the examination should be grade appropriate to ensure fairness.

In order to enable learners to easily acclimatise to taking an examination, especially learners who experience examination anxiety, start the examination with questions that are fairly easy and that require knowledge and routine procedures.

One of the seemingly easy but complicated questions to set is the multiple-choice questions. Very often poor or weak distractors which do not serve a meaningful purpose are included in the multiple-choice questions. In order to improve the quality of the multiple-choice questions the following elements should be considered:

- The actual question (also called stem) should:
  - specify what the question is asking for;
  - be clear and concise;
  - include common information rather than repeating it in the options;
  - be in a question format wherever possible;
  - be stated in positive form wherever possible (else negative wording should be emphasised in bold or by underlining)

- The options should:
  - be free from clues to the correct answer
  - have the distractors that are plausible and attractive to the learners. Distractors should be guided or informed by the common misconceptions. For instance when asked to simplify $a^3 \times a^2$ it is common that learners are likely to give $a^6$ instead of $a^5$. Therefore $a^6$ could make a good distractor, which is informed by the common misconceptions and could be plausible for some learners.
o be of approximately the same length;
o have only one correct answer (also called the key);
o not be positioned in any particular pattern, especially the position of the correct answer (or key). For instance, if there are four possible answers in each of the ten multiple-choice questions, the correct answer (or key) should NOT always be the first option.

(c) Administering a mathematics examination

Since the examination is an individualised assessment, it is normally administered in a controlled environment. A controlled environment through invigilation assists Intermediate Phase learners to get used to the examination conditions and cope fairly well with the more stringent examination conditions in Grade 12.

The controlled environment/condition of the examination can be quite threatening to the majority of learners. In order to ensure that they get accustomed to these conditions, tests should be administered regularly in fairly similar conditions that resemble the examination conditions.

Assignments should be administered to prepare learners adequately before the examinations are administered.
6.1. Grade 4 examination exemplar

MARKS: 60
DURATION: 1\frac{1}{2} hours

This examination paper consists of 10 pages, including the cover page.

Instructions and information to the learner
1. Read the questions carefully.
2. Answer ALL the questions.
3. Write neatly and legibly.
4. Number your answers exactly as the questions are numbered.
5. Clearly show ALL the calculations, diagrams, graphs, etc. you have used in determining the answers.
6. No calculators may be used.
7. This question paper consists of 19 questions.
8. Diagrams are NOT drawn to scale.

Four possible answers are given in question 1.1 to 1.5 and only one is correct. Circle the letter of the correct answer.

Example

72 ÷ 8 =

A  80
B  72
C  64
D  9

If you circled D, you have chosen the correct answer.
1.1 \[ 79 \times 8 = \]
A 632  
B 623  
C 87  
D 71  

1.2 What is the value of the underlined digit in 4614?
A 4000  
B 400  
C 40  
D 4

1.3 Round 2463 to the nearest 100.
A 2400  
B 2460  
C 2465  
D 2500

1.4 What is the missing number?
\[ 9000 + \square + 50 + 7 = 9657 \]
A 700  
B 600  
C 60  
D 6

1.5 Complete the pattern. 60; 90; 120; ____.
A 90  
B 120  
C 150  
D 180
2 Arrange the following numbers from biggest to smallest.

1 132; 1 184; 1 148; 1 125; 1 167; 1 138

3 Complete the following by inserting =, > or < in the space provided.

3.1 \[20 + 25 \underline{\phantom{0}} 50 - 5\]

3.2 \[\frac{1}{2} \underline{\phantom{0}} \frac{1}{4}\]

4 Calculate

4.1 \[5 362 + 2 486\] (2)

\[\underline{\phantom{0}}\]

\[\underline{\phantom{0}}\]

\[\underline{\phantom{0}}\]

\[\underline{\phantom{0}}\]

4.2 \[4 687 - 2 143\] (2)

\[\underline{\phantom{0}}\]

\[\underline{\phantom{0}}\]

\[\underline{\phantom{0}}\]

\[\underline{\phantom{0}}\]

4.3 \[43 \times 16\] (2)

\[\underline{\phantom{0}}\]

\[\underline{\phantom{0}}\]

\[\underline{\phantom{0}}\]

\[\underline{\phantom{0}}\]
4.4 \[ 432 \div 5 \] (3)

4.5 \[ \frac{1}{4} + \frac{2}{4} \] (2)

5. Complete the pattern below. (2)

6. Match sticks are used to make triangles below. (1)

6.1 Extend the pattern by drawing the triangles for stage 4.
6.2 Complete the table below.

<table>
<thead>
<tr>
<th>Number of triangles</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of match sticks</td>
<td>3</td>
<td>5</td>
<td></td>
<td></td>
<td>(1)</td>
</tr>
</tbody>
</table>

6.3 Write down a general rule for the pattern in words. (2)

7. In an orchard, one plot has 20 rows of orange trees. There are 25 trees in each row. How many orange trees are there altogether in two plots? (3)

8. Three pairs of sports socks and one school jersey cost a total of R95. The jersey costs R50. How much does one pair of sports socks cost? (3)

9. Chickens and sheep are kept in a pen. The total number of animals is 10. The total number of legs is 34. How many are chickens and how many are sheep? (3)
10. Write the time shown in the clock below in 12 hour format in the morning. (1)

11. How many quarter-hour turns of the minute hand are there between 1:00 p.m. and 3:00 p.m.? (1)

12. The table below shows the periods for a Grade 4 class on a Monday. The duration of the periods does not change throughout the week.

<table>
<thead>
<tr>
<th>Mon</th>
<th>Mathematics</th>
<th>FAL</th>
<th>Break</th>
<th>NS/Tech</th>
<th>HL</th>
<th>Break</th>
<th>SS</th>
<th>L/Skills</th>
<th>Afrikaans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Times</td>
<td>08:00</td>
<td>09:00</td>
<td>10:00</td>
<td>10:30</td>
<td>11:30</td>
<td>12:30</td>
<td>12:50</td>
<td>13:50</td>
<td>14:50</td>
</tr>
</tbody>
</table>

12.1 How many minutes are in the two breaks altogether? (1)

12.2 Mathematics is taught each day. Two periods of Mathematics are taught on Tuesday. How many hours of Mathematics are taught in one week? (2)
13. How long is the lead pencil below in mm? (1)

14. Convert the following

\[2 \text{ m } 48 \text{ cm} = \underline{\text{________}} \text{ cm}\]

15. Linda travels 3 km 500 m by bus from his home to school, and then he walks the rest of the distance to school. The total distance from his house to school is 4 km 300 m. How far must he walk to school? (2)

16. Use the shapes below to answer the following questions.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>○</td>
<td>△</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

16.1 Write the letters of ALL the shapes that are polygons. (2)
16.2 Write the letters of ALL the shapes that are hexagons.  
______________________________________________________________  

16.3 Shape A is a square. How many lines of symmetry are there in shape A?  
______________________________________________________________  

17 Complete the table below.

<table>
<thead>
<tr>
<th>3-D object</th>
<th>Name</th>
<th>Shape of faces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cylinder</td>
<td>17.1_________</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and rectangles</td>
</tr>
<tr>
<td></td>
<td>17.2_________</td>
<td>17.3_________</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and triangles</td>
</tr>
</tbody>
</table>
18. How many rectangles are there in the shape below? (2)

----

19. The bar graph below shows time spent in Vusi’s daily activities.

<table>
<thead>
<tr>
<th>Activities</th>
<th>Time in hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eating</td>
<td>2</td>
</tr>
<tr>
<td>Sleeping</td>
<td>8</td>
</tr>
<tr>
<td>School</td>
<td>7</td>
</tr>
<tr>
<td>Sport</td>
<td>1</td>
</tr>
<tr>
<td>Homework</td>
<td>4</td>
</tr>
<tr>
<td>Playing</td>
<td>1</td>
</tr>
</tbody>
</table>

19.1 Use the bar graph to complete the table below.

<table>
<thead>
<tr>
<th>Daily activity</th>
<th>Time spent</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td></td>
</tr>
<tr>
<td>Sleeping</td>
<td></td>
</tr>
</tbody>
</table>

19.2 How many more hours does Vusi spend sleeping than eating? (2)
19.3 In which activities does Vusi spend equal hours? (1)

__________________________________________________________________________

19.4 How much time does Vusi spend on homework? (1)

Write your answer as a fraction.

__________________________________________________________________________

TOTAL: 60 MARKS
GRADE 4 EXAMINATION EXEMPLAR: MEMORANDUM

MARKS: 60

Important information

- This is marking guideline. In instances where learners have used different mathematically sound strategies to solve the problems, they should be credited.
- Underline errors committed by learners and apply Consistent Accuracy (CA) marking.

**KEY**

<table>
<thead>
<tr>
<th>M</th>
<th>Method mark.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>Consistent Accuracy mark.</td>
</tr>
<tr>
<td>A</td>
<td>Accuracy mark.</td>
</tr>
<tr>
<td>S</td>
<td>Statement.</td>
</tr>
<tr>
<td>R</td>
<td>Reason.</td>
</tr>
<tr>
<td>S/R</td>
<td>Statement and reason.</td>
</tr>
</tbody>
</table>

### 1.1.

<table>
<thead>
<tr>
<th>Ques</th>
<th>Answer</th>
<th>Mark allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>A ✓ 632</td>
<td>1 mark for each correct answer</td>
</tr>
</tbody>
</table>

### 1.2

<table>
<thead>
<tr>
<th>Ques</th>
<th>Answer</th>
<th>Mark allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2</td>
<td>A ✓ 4 000</td>
<td></td>
</tr>
</tbody>
</table>

### 1.3

<table>
<thead>
<tr>
<th>Ques</th>
<th>Answer</th>
<th>Mark allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3</td>
<td>D ✓ 2 500</td>
<td></td>
</tr>
</tbody>
</table>

### 1.4

<table>
<thead>
<tr>
<th>Ques</th>
<th>Answer</th>
<th>Mark allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4</td>
<td>B ✓ 600</td>
<td></td>
</tr>
</tbody>
</table>

### 1.5

<table>
<thead>
<tr>
<th>Ques</th>
<th>Answer</th>
<th>Mark allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5</td>
<td>C ✓ 150</td>
<td></td>
</tr>
</tbody>
</table>

### Ques Answer

<table>
<thead>
<tr>
<th>Ques</th>
<th>Answer</th>
<th>Mark allocation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1 184; 1 167; 1 148; 1 138; 1 132; 1 125 ✓ A</td>
<td>Answer: 1 mark</td>
<td>1</td>
</tr>
<tr>
<td>3.1</td>
<td>20 + 25 = 50 – 5 ✓ A</td>
<td>Answer: 1 mark</td>
<td>1</td>
</tr>
<tr>
<td>3.2</td>
<td>( \frac{1}{2} &gt; \frac{1}{4} ) ✓ A</td>
<td>Answer: 1 mark</td>
<td>1</td>
</tr>
</tbody>
</table>
### Question 4.1

<table>
<thead>
<tr>
<th>5 362 + 2 486</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any method: 1 mark</td>
</tr>
<tr>
<td>Answer: 1 mark</td>
</tr>
</tbody>
</table>

| 5 000 + 2 000 = 7 000 |
| 300 + 400 = 700 ✓ M |
| 60 + 80 = 140 |
| 2 + 6 = 8 |
| 7 848 ✓ A |

Or

| 5 362 + 2 000 → 7 362 + 400 → 7 762 + 40 → 7 802 + 40 → 7 842 + 6 → 7 848 ✓ A |

### Question 4.2

<table>
<thead>
<tr>
<th>4 687 − 2 143</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any method: 1 mark</td>
</tr>
<tr>
<td>Answer: 1 mark</td>
</tr>
</tbody>
</table>

| 4 000 − 2 000 = 2 000 |
| 600 − 100 = 500 |
| 80 − 40 = 40 ✓ |
| 7 − 3 = 2 |
| 2 544 ✓ |

Or

| 4 687 − 2 000 → 2 687 − 100 → 2 587 − 40 → 3 547 − 3 → 3 544 ✓ A |

### Question 4.3

<table>
<thead>
<tr>
<th>43 × 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any method: 1 mark</td>
</tr>
<tr>
<td>Answer: 1 mark</td>
</tr>
</tbody>
</table>

| 40 × 10 = 400 ✓ M |
| 40 × 6 = 240 |
| 3 × 10 = 30 |
| 3 × 6 = 18 |
| = 688 ✓ A |

Or

```
+---+---+---+
<p>| 4 | 3 |
|---|---|---|</p>
<table>
<thead>
<tr>
<th>0</th>
<th>0</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td></td>
</tr>
</tbody>
</table>

= 688 ✓ A
```
4.4  
\[432 \div 5\]  
\[400 \div 5 = 80 \ (432 - 400 = 32) \checkmark M\]  
\[30 \div 5 = 6 \ (32 - 30 = 2)\]  
\[\checkmark A\]  
\[= 86\ \text{remainder} \ 2 \checkmark A\]  

Or  
\[
\begin{array}{c|c|c|c}
50 & +25 & +10 & +1 \\
\hline
432 & 182 & 57 & 7 \\
-250 & -125 & -50 & -5 \\
=182 & =57 & =7 & =2
\end{array}
\]

\[\checkmark A\]  
\[432 \div 5 = 86\ \text{rem} \ 2 \checkmark A\]  

4.5  
\[
\frac{1}{4} + \frac{2}{4} = \frac{3}{4} \checkmark A
\]

5  
Input values  
[1, 3, 8, 10]  
Output values  
[15, 35, 85, 105]  
Correct output : 1 mark  
Correct input : 1 mark

6.1  
Answer: 1 mark

6.2  
<table>
<thead>
<tr>
<th>Stage no.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of match sticks</td>
<td>3</td>
<td>5</td>
<td>7 \checkmark A</td>
<td>9 \checkmark A</td>
</tr>
</tbody>
</table>

6.3  
Multiply the stage number by 2 and add 1  
Or  
Add 2 to the number of match sticks in each stage to get the next stage  
\[\checkmark A \checkmark A\]  

\[
\text{Stage number } \times 2: 1 \ \text{mark} + 1: 1 \ \text{mark}
\]

7  
\[
\checkmark M \checkmark M
\]

20 \[\times 25 \times 2 : 2 \text{ marks}\]  
Answer: 1 mark

Clue board  
5 \times 100 = 500  
5 \times 50 = 250  
5 \times 25 = 125  
5 \times 10 = 50  
5 \times 5 = 25  
5 \times 2 = 10  
5 \times 1 = 5
There are 7 sheep and 3 chickens

<table>
<thead>
<tr>
<th>Heads</th>
<th>Legs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sheep</td>
<td>Chks</td>
<td>Sheep</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>24</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>28</td>
</tr>
</tbody>
</table>

Any method: 1 mark
7 sheep: 1 mark
3 chickens: 1 mark
<table>
<thead>
<tr>
<th></th>
<th>Question</th>
<th>Answer/Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>1:15 a.m.  ✓ A</td>
<td>Answer: 1 mark</td>
</tr>
<tr>
<td>11</td>
<td>8  ✓ A</td>
<td>Answer: 1 mark</td>
</tr>
<tr>
<td>12.1</td>
<td>50 minutes  ✓ A ✓ A</td>
<td>Answer: 1 mark</td>
</tr>
</tbody>
</table>
| 12.2| 1 period = 1 hour  
Maths = 6 hours  ✓ A                                     | 1 hour: 1 mark  
Answer: 1 mark                                                      |
| 13| 30 mm  ✓ A                                                              | Answer: 1 mark                                                               |
| 14| 200 cm + 48 cm = 248 cm  ✓ A                                           | Answer: 1 mark                                                               |
| 15| 4 km 300 m – 3 km 500m  
=1 300 m – 500 m  ✓ M  
= 800 m  ✓ A                | Method: 1 mark  
Answer: 1 mark                                                      |
| 16.1| A, D and E  ✓ A ✓ A                                                   | Any 2 correct: 1 mark  
All 3 correct: 2 marks                                             |
| 16.2| D and E  ✓ A                                                           | Both letters: 1 mark                                                        |
| 16.3| 4 lines of symmetry  ✓ A                                                | Answer: 1 mark                                                               |
| 17.1| Circle  ✓ A                                                            | Answer: 1 mark                                                               |
| 17.2| Square pyramid  ✓ A                                                   | Answer: 1 mark                                                               |
| 17.3| Square  ✓ A                                                            | Answer: 1 mark                                                               |
| 18| 6  ✓ A                                                                  | Answer: 1 mark                                                               |
| 19.1| School 7 hours  ✓ A  
Sleeping 9 hours  ✓ A                             | Answer: 1 mark                                                               |
| 19.2| 2 hours eating.  9 – 2 = 7 hours more sleeping than eating             | 9 – 2 one mark  
Answer: 1 mark                                                      |
| 19.3| Sport and playing  ✓ A                                                 | 1 mark for both                                                              |
| 19.4| $\frac{4}{24} = \frac{1}{6}$  ✓ A                                      | $\frac{4}{24}$ or $\frac{1}{6}$: 1 mark                                      |
Instructions and information to the learner

1. Read the questions carefully.
2. Answer ALL the questions.
3. Write neatly and legibly.
4. Number your answers exactly as the questions are numbered.
5. Clearly show ALL the calculations, diagrams, graphs, etc. you have used in determining the answers.
6. No calculators may be used.
7. This question paper consists of 19 questions.
8. Diagrams are NOT drawn to scale.
There are FOUR possible answers given in question 1.1 to 1.5 and only one is correct. Circle the letter of the correct answer as shown in the example below.

Example

Complete: 72 ÷ 8 = _____.

A 80
B 72
C 64
D 9

If you circled D, you have chosen the correct answer.

1.1 What is the value of the underlined digit in 712,395?

A 20,000
B 2,000
C 200
D 2

1.2 How many lines of symmetry does a square have?

A 2
B 3
C 4
D 1
1.3 The next number in the pattern 32; 16; 8; … is ____.

A 6
B 4
C 2
D 1

1.4 There are ___________ months in \( \frac{2}{3} \) of a year.

A. 12
B. 8
C. 6
D. 4

1.5 Write down the sum of 36 hundreds + 36 tens + 36 units.

A 363 636
B 36 396
C 3 996
D 3 936

2.1 Write the missing number indicated by letter B in the number line

\[ \begin{align*}
3 & \quad 4 \frac{1}{2} & \quad B & \quad 7 \\
\end{align*} \]

B ________________
2.2 Arrange the numbers below in ascending order (1)
24 555, 24 335, 24 533, 24 535, 24 545

___________________________________________________________________

3 Compare the following by inserting >; <; =, in the spaces provided.

3.1 \[
\frac{1}{4} \quad \square \quad \frac{2}{8}
\] (1)

3.2 \[
\frac{3}{5} \quad \square \quad \frac{5}{5}
\] (1)

4 Calculate:

4.1 \[
(3 + 8) \times (9 - 4)
\] (2)

___________________________________________________________________

4.2 \[
25 583 + 28 654
\] (2)

___________________________________________________________________

___________________________________________________________________

___________________________________________________________________

___________________________________________________________________

___________________________________________________________________

___________________________________________________________________
4.3 475 × 34

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

(3)

4.4 1 847 ÷ 12

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

(3)

4.5 \[2 \frac{1}{6} - 1 \frac{5}{6}\]

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

(3)

5 Five books and one bag cost R350. How much does one book cost, if the bag costs R100?

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

(3)
6 There are 10 bicycles and tricycles altogether with a total 24 of wheels. How many are bicycles and how many are tricycles? (4)

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

7 John is working 7 hours a day from Monday to Friday. How many minutes does he work in 2 weeks? (2)

___________________________________________________________________
___________________________________________________________________

8 Fill in the missing input and output values in the flow diagram below. (2)

```
<table>
<thead>
<tr>
<th>Input values</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>9</td>
</tr>
</tbody>
</table>

× 10 + 3

<table>
<thead>
<tr>
<th>Output values</th>
</tr>
</thead>
<tbody>
<tr>
<td>43</td>
</tr>
<tr>
<td>73</td>
</tr>
<tr>
<td>93</td>
</tr>
</tbody>
</table>
```

9 The diagrams below show the number of people sitting around the table(s). Study and answer the questions that follow.

Figure 1

Figure 2

Figure 3
9.1 Complete the table below to illustrate the number of people sitting around the table(s). (2)

<table>
<thead>
<tr>
<th>Number of tables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of people</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9.2 Describe the general rule for the above pattern in words. (2)

___________________________________________________________________
___________________________________________________________________

10 How many different triangles are there in the shape below?

___________________________________________________________________

11 Write down one similarity and one difference between a square and a rectangle. (2)
12 Complete the table about the 3-D object below

| Name of the object | 12.1 ________________________________ |
| Shape of the faces | 12.2 ____________________ and ___________________ |
| Number of faces    | 12.3 _______________ |
13 Which of the following nets can be folded to make a closed cube

(1)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
</tbody>
</table>

14 The clocks below were read in the afternoon.

<table>
<thead>
<tr>
<th>13 APRIL</th>
<th>13 APRIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLOCK A</td>
<td>CLOCK B</td>
</tr>
</tbody>
</table>

CLOCK A

CLOCK B
14.1 What is the time in clock A in 12 hour format? (1)

___________________________________________________________________

14.2 What is the time in clock B in 24 hour format? (1)

___________________________________________________________________

14.3 What is the time difference between the two clocks, in minutes? (1)

___________________________________________________________________

15 Which one is cheaper, 2 ℓ juice for R20 or 5 ℓ juice for R60? (3)

___________________________________________________________________

16 How many 250 ml cups of orange juice can fill up a 5 ℓ container? (2)

___________________________________________________________________

___________________________________________________________________

___________________________________________________________________
17 The pie chart below shows the number of Grade 5 learners who use different types of transport to school. There are 40 learners in the Grade 5 class. N.B. The pie chart is divided into 8 equal parts.

17.1 What fraction of the Grade 5 learners walk to school? (2)

___________________________________________________________________
___________________________________________________________________

17.2 How many learners use bicycles? (1)

___________________________________________________________________

17.3 How many learners use scholar transport? (1)

___________________________________________________________________
___________________________________________________________________
The following data show the marks scored by Grade 5 learners in a Mathematics test

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>30</td>
<td>40</td>
<td>32</td>
</tr>
<tr>
<td>31</td>
<td>30</td>
<td>30</td>
</tr>
</tbody>
</table>

18.1 How many learners wrote the test? (1)

___________________________________________________________________

18.2 What is the mode of the data? (1)

___________________________________________________________________

___________________________________________________________________

TOTAL MARK: 60
GRADE 5 EXAMINATION EXEMPLAR: MEMORANDUM

MARKS: 60

This memorandum consists of five pages

Important information

- This is a marking guideline. In instances where learners have used different mathematically sound strategies to solve the problems, they should be credited.
- Underline errors committed by learners and apply Consistent Accuracy (CA) marking.

<table>
<thead>
<tr>
<th>KEY</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Method mark.</td>
</tr>
<tr>
<td>CA</td>
<td>Consistent Accuracy mark.</td>
</tr>
<tr>
<td>A</td>
<td>Accuracy mark.</td>
</tr>
<tr>
<td>S</td>
<td>Statement.</td>
</tr>
<tr>
<td>R</td>
<td>Reason.</td>
</tr>
<tr>
<td>S/R</td>
<td>Statement and reason.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ques</th>
<th>Answer</th>
<th>Mark allocation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>B ✓ 2 000</td>
<td>1 mark for each correct answer</td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>C ✓ 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3</td>
<td>B ✓ 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.4</td>
<td>B ✓ 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td>C ✓ 36 996</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>$5 \frac{1}{2} \ ✓ M$</td>
<td>Answer: 1 mark</td>
<td>1</td>
</tr>
<tr>
<td>2.2</td>
<td>24 335; 24 533; 24 535; 24 545; 24 555 ✓ A</td>
<td>Answer: 1 mark</td>
<td>1</td>
</tr>
<tr>
<td>3.1</td>
<td>$\frac{1}{4} = \frac{2}{8} \ ✓ A$</td>
<td>Answer: 1 mark</td>
<td>1</td>
</tr>
<tr>
<td>3.2</td>
<td>$\frac{3}{5} &lt; \frac{5}{5} \ ✓ A$</td>
<td>Answer: 1 mark</td>
<td>1</td>
</tr>
<tr>
<td>4.1</td>
<td>$(3 + 8) \times (9 - 4) \ ✓ M$</td>
<td>$11 \times 5: 1$ mark</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>$11 \times 5 \ ✓ A$</td>
<td>Answer: 1 mark</td>
<td></td>
</tr>
</tbody>
</table>
4.1 25 583 + 28 654
20 000 + 20 000 = 40 000
5 000 + 8 000 = 13 000
500 + 600 = 1 100 \( \checkmark \) M
80 + 50 = 130
3 + 4 = 7

\[ \boxed{54 237} \checkmark \text{A} \]

Or
25 583 + 20 000 \( \rightarrow \) 45 583 + 5 000 \( \checkmark \) M
50 583 + 3000 \( \rightarrow \) 53 583 + 500
54 083 + 100 \( \rightarrow \) 54 183 + 20
54 203 + 30 \( \rightarrow \) 54 233 + 4 \( \rightarrow \) 54 237 \( \checkmark \) A

Any method: 1 mark
Answer: 1 mark

4.3 475 \times 34
400 \times 10 \times 3 = 12 000 \( \checkmark \) M
70 \times 10 \times 3 = 2 100
5 \times 10 \times 3 = 150 \( \checkmark \) M
400 \times 4 = 1 600
70 \times 4 = 280
5 \times 4 = 20 \( \checkmark \) A

\[ \boxed{16 150} \]

Or
4 7 5
1 2 1
6 8 0
1 5 0

= 16 150 \( \checkmark \) A

Any method: 2 marks
Answer: 1 mark
### 4.4 \[ 1847 \div 12 \]

1. \[ 1200 \div 12 = 100 \]
2. \[ 600 \div 12 = 50 \]
3. \[ 36 \div 12 = 3 \]
4. \[ 1 \quad 847 \]

\[ \begin{array}{c|c|c|c}
\hline
100 & +50 & +2 & +1 \\
\hline
1847 & 647 & 47 & 23 \\
\hline
-1200 & -600 & -24 & -12 \\
\hline
=647 & =47 & =23 & =11 \\
\hline
\end{array} \]

\[ \sqrt{A} \]

\[ 1847 \div 12 = 153 \text{ remainder } 11 \]

\[ \sqrt{M} \]

**Or**

\[ 1847 \div 12 = 153 \text{ remainder } 11 \sqrt{A} \]

### 4.5

1. \[ 2 \quad \frac{1}{6} - \frac{5}{6} \]

\[ 2 - 1 + \frac{1}{6} - \frac{5}{6} \]

\[ 6 \quad \frac{1}{6} - \frac{5}{6} \]

\[ \frac{7}{6} - \frac{5}{6} \]

\[ \frac{1}{3} \]

\[ \frac{2}{6} = \frac{3}{6} \]

**Clue board**

<table>
<thead>
<tr>
<th>12</th>
<th>200</th>
<th>600</th>
<th>120</th>
<th>240</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>( x 100 )</td>
<td>( 1 )</td>
<td>( 2 )</td>
<td>( 3 )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[ 12 \times 100 = 1 \]
\[ 12 \times 50 = 600 \]
\[ 12 \times 10 = 120 \]
\[ 12 \times 20 = 240 \]
\[ 12 \times 1 = 12 \]

### 5

1. \[ R350 - R100 = R250 \]

\[ \sqrt{A} \]

\[ \sqrt{M} \]

\[ R250 \div 5 = R50 \]

\[ \sqrt{C} \]

\[ \sqrt{A} \]

\[ R \] 250: 1 mark

\[ R \] 250: 1 mark

Answer: 1 mark

Answer: 1 mark

**Answer:** 1 mark

**Answer:** 1 mark

3
There are 6 bicycles and 4 tricycles

Any method: 2 marks
6 bicycles: 1 mark
4 tricycles: 1 mark

7 \times 5 \times 60 \times 2 : 2 marks
Answer: 1 mark

Or
35: 1 mark
35 \times 60 \times 2: 1 mark
Answer: 1 mark

Correct output: I mark
Correct input: I mark
<table>
<thead>
<tr>
<th>9.1</th>
<th>Number of tables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>10</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of people</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>9.2</td>
<td>✓ A   ✓ A</td>
<td>Multiply by 2 and add 2</td>
<td>× 2: 1 mark</td>
<td>+ 2: 1 mark</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>3+2+1= 6 ✓ A ✓ A ✓ M</td>
<td>Between 3 and 6: 1 mark</td>
<td>Answer: 2 marks</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Similarity ✓ A</td>
<td>Difference</td>
<td>Both have right angles</td>
<td>A square has all sides equal and a rectangle has both pairs of opposite sides equal ✓ A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.1</td>
<td>Hexagonal pyramid ✓ A</td>
<td>Answer: 1 mark</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.2</td>
<td>Hexagon ✓ A and triangles ✓ A</td>
<td>Hexagon: 1 mark</td>
<td>Triangles: 1 mark</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.3</td>
<td>7 ✓ A</td>
<td>Answer: 1 mark</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>A ✓ A</td>
<td>Answer: 1 mark</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.1</td>
<td>12:20 p.m. ✓ A</td>
<td>Answer: 1 mark</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.2</td>
<td>19:20 ✓ A</td>
<td>Answer: 1 mark</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
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<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.3</td>
<td>$7 \times 60 = 420$ minutes</td>
<td>✓ A ✓ A</td>
<td>Answer: 1 mark</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>$\frac{20}{2} = R10/l$ or $\frac{50}{5} = R12/l$</td>
<td>R15/l: 1 mark R12/l: 1 mark</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 l juice for R60 is cheaper ✓ A</td>
<td>Answer: 1 mark</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>$5000 \text{ m} \div 250 \text{ m} = 20$ ✓ M</td>
<td>5000 m l ÷ 250 m l: 1 mark</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Or</td>
<td>Answer: 1 mark</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$1000 \text{ m} \div 250 \text{ m} = 4$ ✓ M</td>
<td>Or</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$4 \times 5 = 20$ ✓ A</td>
<td>$1000 \text{ m} \div 250 \text{ m} = 4$: 1 mark</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$4 \times 5 = 20$: 1 mark</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.1</td>
<td>$\frac{1}{2}$ ✓ M</td>
<td>Answer: 2 marks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.2</td>
<td>$\frac{1}{8} \times 40 = 5$ ✓ A</td>
<td>$\frac{1}{8} \times 40$: 1 mark</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Answer: 1 mark</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.3</td>
<td>$\frac{1}{8} \times 40 = 5$ ✓ A</td>
<td>Answer: 1 mark</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.1</td>
<td>9</td>
<td>Answer: 1 mark</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.2</td>
<td>30 ✓ A</td>
<td>Answer: 1 mark</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6.3. Grade 6 examination (framework)

Test Specifications

<table>
<thead>
<tr>
<th>KEY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>K:</td>
<td>Knowing facts and procedures</td>
</tr>
<tr>
<td>RP:</td>
<td>Routine Procedures</td>
</tr>
<tr>
<td>CP:</td>
<td>Complex procedures</td>
</tr>
<tr>
<td>PS:</td>
<td>Problem solving</td>
</tr>
<tr>
<td>MCQ:</td>
<td>Multiple-choice question</td>
</tr>
<tr>
<td>CR:</td>
<td>Constructive Response</td>
</tr>
<tr>
<td>Item Number</td>
<td>Content Area</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>1.1</td>
<td>Numbers, operations and relationships</td>
</tr>
<tr>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>1.4</td>
<td>Space and shape</td>
</tr>
<tr>
<td>1.5</td>
<td>Patterns, functions and algebra</td>
</tr>
<tr>
<td>1.6</td>
<td>Space and shapes</td>
</tr>
<tr>
<td>1.7</td>
<td>Numbers, operations and relationships</td>
</tr>
<tr>
<td>1.8</td>
<td>Whole numbers</td>
</tr>
<tr>
<td>1.9</td>
<td>Common fractions</td>
</tr>
<tr>
<td>1.10</td>
<td>Measurement s</td>
</tr>
<tr>
<td>2.1</td>
<td>Numbers, operations and relationships</td>
</tr>
<tr>
<td>2.2</td>
<td>Whole numbers</td>
</tr>
<tr>
<td></td>
<td>Numbers, operations and relationships</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------</td>
</tr>
<tr>
<td>3.2</td>
<td>Whole numbers</td>
</tr>
<tr>
<td>4.1</td>
<td>Addition of whole numbers</td>
</tr>
<tr>
<td>4.2</td>
<td>Subtraction of whole numbers</td>
</tr>
<tr>
<td>4.3</td>
<td>Whole numbers</td>
</tr>
<tr>
<td>4.4</td>
<td>Whole numbers</td>
</tr>
<tr>
<td>4.5</td>
<td>Whole numbers</td>
</tr>
<tr>
<td>4.6</td>
<td>Mixed numbers</td>
</tr>
<tr>
<td>4.7</td>
<td>Decimal fractions</td>
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<tr>
<td>5</td>
<td>Problem solving with whole numbers</td>
</tr>
<tr>
<td>6</td>
<td>Problem solving with whole numbers</td>
</tr>
<tr>
<td>7</td>
<td>Problem solving with whole numbers</td>
</tr>
<tr>
<td>8</td>
<td>Measurement</td>
</tr>
<tr>
<td></td>
<td>Patterns, functions and algebra</td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>10.1</td>
<td>Geometric patterns</td>
</tr>
<tr>
<td>10.2</td>
<td>Patterns, functions and algebra</td>
</tr>
<tr>
<td>10.3</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Space and shape</td>
</tr>
<tr>
<td>12</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Properties of 3-D objects</td>
</tr>
<tr>
<td>14.1</td>
<td></td>
</tr>
<tr>
<td>14.2</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Measurement</td>
</tr>
<tr>
<td>16</td>
<td>Capacity/volume</td>
</tr>
<tr>
<td>17</td>
<td></td>
</tr>
<tr>
<td>18.1</td>
<td>Data handling</td>
</tr>
<tr>
<td>18.2</td>
<td></td>
</tr>
<tr>
<td>18.3</td>
<td></td>
</tr>
<tr>
<td>18.4</td>
<td></td>
</tr>
<tr>
<td>19.1</td>
<td></td>
</tr>
<tr>
<td>19.2</td>
<td></td>
</tr>
</tbody>
</table>

Summary: Content Area

<table>
<thead>
<tr>
<th>Content Area</th>
<th>Number of items</th>
<th>Actual Total Marks</th>
<th>Proportion (%) of total test mark (Weighting)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numbers, operations and relationship</td>
<td>21</td>
<td>38</td>
<td>51%</td>
</tr>
<tr>
<td>Patterns, functions and algebra</td>
<td>5</td>
<td>9</td>
<td>12%</td>
</tr>
<tr>
<td>Space and shape</td>
<td>6</td>
<td>12</td>
<td>16%</td>
</tr>
<tr>
<td>Measurement</td>
<td>4</td>
<td>8</td>
<td>10%</td>
</tr>
<tr>
<td>Data handling</td>
<td>6</td>
<td>8</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>42</strong></td>
<td><strong>75 marks</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
### Summary: Cognitive Levels

<table>
<thead>
<tr>
<th>Cognitive Level</th>
<th>Number of items</th>
<th>Actual Total marks</th>
<th>Proportion (%) of total test mark (Weighting)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge (25%)</td>
<td>15</td>
<td>21</td>
<td>28%</td>
</tr>
<tr>
<td>Routine procedures (45%)</td>
<td>17</td>
<td>33</td>
<td>44%</td>
</tr>
<tr>
<td>Complex procedures (20%)</td>
<td>8</td>
<td>15</td>
<td>20%</td>
</tr>
<tr>
<td>Problem solving (10%)</td>
<td>2</td>
<td>6</td>
<td>8%</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>42</strong></td>
<td><strong>75</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

### Summary: Type of item

<table>
<thead>
<tr>
<th>Type of item</th>
<th>Number of items</th>
<th>Total marks</th>
<th>Proportion (%) of total test mark (Weighting)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCQ</td>
<td>10</td>
<td>10</td>
<td>13%</td>
</tr>
<tr>
<td>CR</td>
<td>32</td>
<td>65</td>
<td>87%</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>41</strong></td>
<td><strong>75</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
GRADE 6 EXAMINATION EXEMPLAR

MARKS: 75
DURATION : 1 $\frac{1}{2}$ hours

This examination paper consists of 13 pages, including the cover page.

Instructions and information to the learner

1. Read the questions carefully.
2. Answer ALL the questions.
3. Write neatly and legibly.
4. Number your answers exactly as the questions are numbered.
5. Clearly show ALL the calculations, diagrams, graphs, etc. you have used in determining the answers.
6. No calculators may be used.
7. This question paper consists of 19 questions.
8. Diagrams are NOT drawn to scale.
There are FOUR possible answers given in question 1.1 to 1.10 and only one is correct. Circle the letter of the correct answer.

Example

Complete: \(400 \times 7 = \) _____.

A 4 800  
B 1 100  
C 2 800  
D 7 000

If you circled C, you would have chosen the correct answer.

1.1 What is the place value of the underlined digit in 584 289 732? (1)

A Ten thousand  
B Hundred thousand  
C Hundred million  
D Ten million

1.2 Which number is a prime number? (1)

A 25  
B 27  
C 14  
D 11
1.3 What is the value of the underlined digit in 153,25?

A 0,02  
B 0,2  
C 20  
D 2

1.4 Which one of the following figures has more than one line of symmetry?

A  
B  
C  
D

1.5 What are the two missing numbers in the pattern below?

1; 2; 4; _____; ____; 32

A 6; 8  
B 6; 16  
C 8; 24  
D 8; 16

1.6 How many sides does a quadrilateral have?

A. 3  
B. 4  
C. 5  
D. 6

1.7 What is the product of 1,63 and 100?
1.8 Which number is halfway between 5900 and 6500?
A. 12400
B. 7000
C. 6200
D. 6000

1.9 Which percentage has the same value as 0.25?
A. 0.25%
B. 2.5%
C. 5.2%
D. 25%

1.10 How many glasses of water can a bottle with a capacity of 2 l hold if one glass has a capacity of 250 ml?
A. 500
B. 125
C. 8
D. 4

2.1 Write the missing number indicated by letter B in the number line

\[
\begin{array}{ccccccc}
3 &  &  &  &  &  & 7 \\
\hline
&  &  &  & B &  & \\
\end{array}
\]

B _________________
2.2 Arrange the numbers below in ascending order
918 143; 189 243; 891 123; 198 123

___________________________________________________________________

3 Compare the following by inserting >; < or =, in the spaces provided.

3.1 100%  [ ] 1

3.2 $\frac{1}{2}$  [ ] $\frac{2}{3}$

4 Calculate:

4.1 \((3 + 7) \div 2 + 3 \times 5 - 3 \div 3\)

___________________________________________________________________

___________________________________________________________________

4.2 \(25,583 + 8,654 + 2,910\)

___________________________________________________________________

___________________________________________________________________

___________________________________________________________________

4.3 \(93,056 - 63,625\)

___________________________________________________________________

___________________________________________________________________

___________________________________________________________________
4.4  \[ 2058 \times 268 \]  

\[ \square \square \square \]

\[ \square \square \square \]

\[ \square \square \square \]

\[ \square \square \square \]

\[ \square \square \square \]

\[ \square \square \square \]

4.5  \[ 3.54 + 2.83 \]  

\[ \square \square \square \]

\[ \square \square \square \]

\[ \square \square \square \]

\[ \square \square \square \]

\[ \square \square \square \]

4.6  \[ 8648 \div 475 \]  

\[ \square \square \square \]

\[ \square \square \square \]

\[ \square \square \square \]

\[ \square \square \square \]

\[ \square \square \square \]

4.7  \[ \frac{3}{10} - \frac{2}{5} \]  

\[ \square \square \square \]

\[ \square \square \square \]

\[ \square \square \square \]

\[ \square \square \square \]
5. Pat wants to buy a hockey stick that costs R400. Her mother gave her 75% of the total cost. How much does she still need in rands?

6. The cost of 10 text books for Grade 6 Mathematics is R1 200. How much will 15 textbooks of the same kind cost?

7. Each picture below represents a number. By adding the numbers, you will find the totals in the boxes. Calculate the rest of the totals and fill in the empty boxes.

Key: shell = 4; Flower = 2
8. John is working 7 hours a day on Saturdays. How many minutes does he work in one month?

9. Fill in the missing input and output values in the flow diagram below.

10. The hexagons made of matchsticks below form a pattern.
10.1 Complete the table below to illustrate the number of match sticks and hexagons in each stage.

<table>
<thead>
<tr>
<th>No. of hexagons</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>10</th>
<th>____</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of matchsticks</td>
<td>6</td>
<td>11</td>
<td>16</td>
<td>____</td>
<td>____</td>
<td>76</td>
</tr>
</tbody>
</table>

10.2 Describe the general rule for the above pattern in your own words.

___________________________________________________________________
___________________________________________________________________

10.3 Write down any number sentence to describe the pattern above.

___________________________________________________________________

11 Write down the similarity and the difference between a rectangle and a parallelogram.

<table>
<thead>
<tr>
<th>Parallelogram</th>
<th>Rectangle</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Parallelogram" /></td>
<td><img src="image2.png" alt="Rectangle" /></td>
</tr>
</tbody>
</table>
12  How many different rectangles are there in the shape below? (2)

[Diagram of rectangles]

______________________________
13 Complete the table below. (4)

<table>
<thead>
<tr>
<th>3-D OBJECT</th>
<th>Name</th>
<th>Number of faces</th>
<th>Number of edges</th>
<th>Number of vertices</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Pentagonal pyramid" /></td>
<td>Pentagonal pyramid</td>
<td>5</td>
<td>9</td>
<td>6</td>
</tr>
</tbody>
</table>

14 Name the 3-D objects that can be formed from the nets below. (2)

<table>
<thead>
<tr>
<th><img src="image2" alt="Net 1" /></th>
<th><img src="image3" alt="Net 2" /></th>
</tr>
</thead>
<tbody>
<tr>
<td>14.1______________</td>
<td>14.2______________</td>
</tr>
</tbody>
</table>
15 The clocks below show time for different countries in the morning of 13 April.

<table>
<thead>
<tr>
<th>COUNTRY A : 13 APRIL</th>
<th>COUNTRY B : 13 APRIL</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Clock" /></td>
<td><img src="image2.png" alt="Clock" /></td>
</tr>
</tbody>
</table>

If the time in country B is 3:00 a.m., what will the time and date in country A be in 24 hour format?

___________________________________________________________________
___________________________________________________________________

16 To make a 250 ml of juice, one needs 50 ml orange juice and 200 ml water. What is the ratio of orange juice to water in its simplest form?

___________________________________________________________________
___________________________________________________________________

17 How many 250 ml juice can be made from 2 ℓ orange juice?

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
The pie chart below shows the percentages of Grade 6 learners who like different types of fruit. There are 45 Grade 6 learners in the school.

18.1 Which are the two types of fruit that learners like the least? (2)

___________________________________________________________________
___________________________________________________________________

18.2 What type of fruit is most liked by learners? (1)

___________________________________________________________________

18.3 What is the percentage of learners who like peaches more than mango? (2)

___________________________________________________________________
___________________________________________________________________
The following data indicates the number of eggs laid by chickens at Mr Bee’s farm.

66  72  69  64  68
66  72  69  66  68
64  69  72  66  66
65  71  66  72

19.1 What is the mode of the data?  

19.2 What is the median of the data?  

Total: 75 marks
GRADE 6 EXAMINATION EXEMPLAR: MEMORANDUM

Important information

- This is a marking guideline. In instances where learners have used different mathematically sound strategies to solve the problems, they should be credited.
- Underline errors committed by learners and apply Consistent Accuracy (CA) marking.

### KEY

<table>
<thead>
<tr>
<th>M</th>
<th>Method mark.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA</td>
<td>Consistent Accuracy mark.</td>
</tr>
<tr>
<td>A</td>
<td>Accuracy mark.</td>
</tr>
<tr>
<td>S</td>
<td>Statement.</td>
</tr>
<tr>
<td>R</td>
<td>Reason.</td>
</tr>
<tr>
<td>S/R</td>
<td>Statement and reason.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ques.</th>
<th>Answer</th>
<th>Mark allocation</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>5.5 ✓ A</td>
<td>Answer: 1 mark</td>
<td>1</td>
</tr>
<tr>
<td>2.2</td>
<td>189 243; 198 123; 891 123; 918 143 ✓ A</td>
<td>Answer: 1 mark</td>
<td>1</td>
</tr>
<tr>
<td>3.1</td>
<td>= ✓ A</td>
<td>Answer: 1 mark</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>3.2</td>
<td>$&lt; A$</td>
<td>Answer: 1 mark</td>
<td>1</td>
</tr>
<tr>
<td>4.1</td>
<td>$(3 + 7) ÷ 2 + 3 \times 5 - 3 ÷ 3$</td>
<td>$10 ÷ 2 + 15 - 1: 1$ mark</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>$10 ÷ 2 + 15 - 1 \checkmark M$</td>
<td>Answer: 1 mark</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$5 + 14$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$19 \checkmark A$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.2</td>
<td>$25,583$</td>
<td>Any correct method: 1 mark</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>$8,654 \checkmark M$</td>
<td>Answer: 1 mark</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$2,910$</td>
<td>Answer: 1 mark</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$3,7147 \checkmark CA$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.3</td>
<td>$93,056$</td>
<td>Any correct method: 1 mark</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>$-63,625 \checkmark M$</td>
<td>Answer: 1 mark</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$29,431 \checkmark CA$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.4</td>
<td>$2,058 \checkmark M$</td>
<td>Method: 1 mark</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>$\times 268$</td>
<td>All 3 products: 1 mark</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$16,464$</td>
<td>Answer: 1 mark</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$123,480$</td>
<td>Answer: 1 mark</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$411,600 \checkmark A$</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$551,544 \checkmark A$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.5</td>
<td>$3,54 + 2,83$</td>
<td>Any correct method: 1 mark</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>$3,54$</td>
<td>Answer: 1 mark</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$+ 2,83 \checkmark M$</td>
<td>Answer: 1 mark</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$6,37 \checkmark A$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.6  
1  
2  
5  
10 $\checkmark$ M  
475 $\sqrt{8 648}$  
$\underline{-4 750}$ (475 \times 10 = 4 750)  
3 898  
$\underline{-2 375}$ (475 \times 5 = 2 375) $\checkmark$ M  
1 523  
$\underline{-9 50}$ (475 \times 2 = 950)  
573  
$\underline{-4 75}$ (475 \times 1 = 475)  
98  
$8 648 \div 475 = 18 \text{ rem } 98 \checkmark A$  

4.7  
$\frac{3}{10} - \frac{2}{5}$  
$3 - 2 + \frac{3}{10} - \frac{4}{10} \checkmark M$  
$\frac{10}{10} + \frac{3}{10} - \frac{4}{10}$  
$\frac{13}{10} - \frac{4}{10} \checkmark A = \frac{9}{10} \checkmark CA$  

5.  
100% $-75\% = 25\% \checkmark M$  
$\frac{25}{100} \times 400 \checkmark M$  
R100 $\checkmark A$  

Any correct method: 2 marks  
Answer: 1 mark

3

3 $- 2 + \frac{3}{10} - \frac{4}{10}$ : 1 mark  
$\frac{13}{10} - \frac{4}{10}$ : 1 mark  
Answer: 1 mark

3

100% $-75\% = 25\% \checkmark M$  
$\frac{25}{100} \times 400$ : 1 mark  
Answer: 1 mark

Or  
$\frac{75}{100} \times 400$ : 1 mark

3
<table>
<thead>
<tr>
<th>Question</th>
<th>Description</th>
<th>Correct Answer</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>$\frac{75}{100} \times 400 \checkmark M$</td>
<td>R300 $\checkmark$ A</td>
<td>1 mark</td>
</tr>
<tr>
<td></td>
<td>R400 – R300 = R100 $\checkmark$ A</td>
<td>R300: 1 mark</td>
<td>1 mark</td>
</tr>
<tr>
<td></td>
<td>Answer: 1 mark</td>
<td>Answer: 1 mark</td>
<td>1 mark</td>
</tr>
<tr>
<td>6</td>
<td>R 1 200 $\div 10$ = R 120 $\checkmark$ A</td>
<td>R120: 1 mark</td>
<td>1 mark</td>
</tr>
<tr>
<td></td>
<td>$\checkmark$ A</td>
<td>R 120 $\times 15$ = R 1 800 $\checkmark$ A</td>
<td>1 mark</td>
</tr>
<tr>
<td></td>
<td>OR</td>
<td>R600: 1 mark</td>
<td>1 mark</td>
</tr>
<tr>
<td></td>
<td>5 textbooks = R1 200 $\div 2$ = R600 $\checkmark$ A</td>
<td>R1 200 + R600: 1 mark</td>
<td>1 mark</td>
</tr>
<tr>
<td></td>
<td>$\checkmark$ A</td>
<td>Answer: 1 mark</td>
<td>1 mark</td>
</tr>
<tr>
<td></td>
<td>= R1 200 + R600 = R1 800 $\checkmark$ A</td>
<td>Answer: 1 mark</td>
<td>1 mark</td>
</tr>
<tr>
<td>7</td>
<td><img src="image_url" alt="Image" /></td>
<td><img src="image_url" alt="Image" /></td>
<td>4 marks</td>
</tr>
<tr>
<td>8</td>
<td>$\checkmark M$</td>
<td>Any correct method: 1 mark</td>
<td>2 marks</td>
</tr>
<tr>
<td></td>
<td>$7 \times 4 \times 60 = 1680$ minutes $\checkmark$ A</td>
<td>Answer: 1 mark</td>
<td>2 marks</td>
</tr>
</tbody>
</table>
10.1  

<table>
<thead>
<tr>
<th>No. of hexagons</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>10</th>
<th>15 ✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of match sticks</td>
<td>6</td>
<td>11</td>
<td>16</td>
<td>21 ✓</td>
<td>51 ✓</td>
<td>76</td>
</tr>
</tbody>
</table>

10.2  

Multiply the stage number by 5 ✓ A and add 1 ✓ A  
Stage number × 5: 1 mark  
+1: 1 mark  

10.3  

5 × 1 + 1 = 6 ✓ A  
5 × 2 + 1 = 11 ✓ A  
5 × 3 + 1 = 16  
Any correct number sentence: 1 mark  

11.  

<table>
<thead>
<tr>
<th>Similarity ✓</th>
<th>Difference ✓</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two opposite sides are equal / parallel.</td>
<td>Parallelogram has 2 obtuse and 2 acute angles and in a rectangle all are right angles</td>
</tr>
</tbody>
</table>

12.  

10 different rectangles ✓ ✓  
More than 4 different rectangles: 1 mark  
Answer: 1 mark  

2
<table>
<thead>
<tr>
<th>Name</th>
<th>No. of faces</th>
<th>No. of edges</th>
<th>No. of vertices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triangular prism ✓</td>
<td>9 ✓</td>
<td>6 ✓</td>
<td>9 ✓</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10 ✓</td>
</tr>
</tbody>
</table>

14.1 Cube ✓ A
Answer: 1 mark

14.2 Square pyramid ✓ A
Answer: 1 mark

15. Monday at 20:00. ✓ A
12 April ✓ A
20:00: 1 mark
12 April: 1 mark

16 50: 200 ✓ A
1:4 ✓ CA
50: 200: 1 mark
Answer: 1 mark

17 2 000 ml ÷ 50 ml ✓ M
40 ✓ CA
2 000 ml ÷ 50 ml: 1 mark
Answer: 1 mark

18.1 Apple ✓ A and mango ✓ A
Correct answer each: 1 mark

18.2 Orange ✓ A
Answer: 1 mark

18.3 9 % − 4 % ✓ A
5 % ✓ A
9 % − 4 %: 1 mark
Answer: 1 mark

18.4 \( \frac{9}{100} = 0,09 \) ✓ A
Answer: 1 mark

19.1 66 ✓ A
Answer: 1 mark

19.2 68 ✓ A
Answer: 1 mark

Total: 75 marks
7. INVESTIGATIONS

(a) Purpose of a mathematics investigation

Investigations promote critical and creative thinking. They are primarily used to discover rules or concepts and may involve inductive reasoning, identifying or testing patterns or relationships, drawing conclusions, and establishing general trends.

(b) Developing a mathematics investigation

Since investigations are primarily used to discover rules or concepts, relevant mathematics content should be selected to enhance inductive reasoning. On the other hand, an investigation involves a guided discovery, where learners are led through a process of discovering a particular concept or idea through leading questions. This guided discovery may include the collection of data and/or information to solve a problem. In the CAPS the cue for the relevant concepts that are appropriate for the investigation are prefixed by “investigate…”.

For instance, in the Measurement topic The Theorem of Pythagoras learners are required to “Investigate the relationship between the lengths of the sides of a right-angled triangle to develop the Theorem of Pythagoras”.

Similarly, in Space & Shape in the topic construction of geometric figures, learners are required to “By construction, investigate the angles in a triangle, focusing on:

- the sum of the interior angles of triangles
- the size of angles in an equilateral triangle
- the sides and base angles of an isosceles triangle”

The acquisition of the investigative skill in mathematics does not happen spontaneously; instead it happens as a result of the investigative teaching approach. In other words, teachers must employ the investigative teaching approach to guide their learners to discover general rules in mathematics or establishing general trends. Learning through investigation is one of the meaningful ways to enhance conceptual understanding.
(c) Administering a project

To avoid having to assess work which is copied without understanding, it is recommended that whilst initial investigation could be done at home, the final write-up should be done in class, under supervision, without access to any notes.

Investigations are generally assessed using rubrics, which can be specific to the task, or generic, listing the number of marks awarded for each skill. These skills include:

- organising and recording ideas and discoveries using, for example, diagrams and tables
- communicating ideas with appropriate explanations
- calculations showing clear understanding of mathematical concepts and procedures
- generalising and drawing conclusions
INVESTIGATING THE COMBINATIONS OF REGULAR POLYGONS

The aim of this assessment task is to assist you to discover properties and characteristics of shapes that can make meaningful combinations such as tiling and tessellations, including transformations.

**NB**: Use the rubric on the last page as a checklist in order to ensure that you have completed each activity as required. This checklist will also assist you to obtain a good score for this assessment task if you follow all instructions and answer all questions carefully.

Name: ____________________________________________
Grade: ____________________________________________

**What are composite shapes? (As in tessellations)**

Basically, a combination of regular polygons could be a number of similar shapes placed side by side in order to form a certain pattern (design). This is another way to show how the tiling of floors with shapes can be done, so that there is no overlapping and no gaps in between shapes.

**COMPOSITE SHAPES:**

**RULE 1**: The combinations of regular polygons must be designed in such a way that it could tile a floor, as a pattern, without overlapping one another or leaving gaps in between the shapes.

**RULE 2**: The tiles could be regular polygons – having equal sides.

**Activity 1: Which regular polygons form a pattern/combination?**

1.1 Trace and cut out the regular polygons in the addendum.

1.2 Tile an A4 cardboard with each of them.

1.3 Determine whether a combination that form a pattern is possible with the shape. **NB**: Start with a triangle until you try with an octagon.
Record your findings:

<table>
<thead>
<tr>
<th>Name of polygon</th>
<th>How many sides does it have?</th>
<th>Form a pattern – Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triangle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Square</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rectangle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Name of polygon</td>
<td>How many sides does it have?</td>
<td>Tessellate – Yes/No</td>
</tr>
<tr>
<td>Pentagon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hexagon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Octagon</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.4 What did you discover from the previous activity regarding the:

a) triangle, square and the rectangle?
___________________________________________________________________
___________________________________________________________________

b) pentagon, hexagon and the octagon?
___________________________________________________________________
___________________________________________________________________

Activity 2: Create your own composition of shapes (tessellation)

You may use the same shapes as was given, however you are to design a pattern in terms of the rules in Activity 1 in an A4 or bigger page image. The design MUST be coloured to look like something, e.g. house, person, etc.

Activity 3:

a) List three places in your surroundings in which such patterns/tessellations appear.

b) List three places in nature in which such patterns/tessellations appear.
GRADE 4 INVESTIGATION EXEMPLAR: MARKING GUIDE

RUBRIC

Activity 1

<table>
<thead>
<tr>
<th>Your final product must include:</th>
<th>Checklist</th>
<th>Max</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Trace and cut out the regular polygons</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>• Determination of whether a combination forms a pattern</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>• A summary of the findings/discovery made</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>13</td>
<td></td>
</tr>
</tbody>
</table>

Activity 2

<table>
<thead>
<tr>
<th>Your final product must include:</th>
<th>Checklist</th>
<th>Max</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The tile(s) that you combined (tessellated)</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>• Correctly combining/tessellating the image</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>• The image in the pattern is repeated enough times to fill the entire page (A4 is fine, but you may create a larger poster if you wish). The image must form a pattern by at least 20 times/shapes</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>• The tessellated images MUST be coloured to look like something. Simply colouring the shapes will not earn you full credit.</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

Activity 3

<table>
<thead>
<tr>
<th>Context of patterns/tessellations</th>
<th>Checklist</th>
<th>Max</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Places in your surroundings and in nature where such patterns/tessellations exist</td>
<td></td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Total: 30
Polygons
7.2. Grade 5 investigation exemplar

INVESTIGATING PROBABILITY

In this investigation, you will complete three activities in groups in order to discover the probability of certain events. The aim of the investigation is to assist you to discover the idea of probability through experiments.

NB: Work in groups of three and each person does the experiments. Combine your results at the end of each experiment.

Use the rubric on the last page as a checklist in order to ensure that you have completed each experiment and answered the questions as required. This checklist will also assist you to obtain a good score for this assessment task if you follow all instructions.

Name:______________________________________________
Grade:_____________________________________

Experiment 1:

1) Draw a picture of your spinner.
2) Spin your spinner twelve times and record the results in the table below.

<table>
<thead>
<tr>
<th>Colour</th>
<th>Red</th>
<th>Blue</th>
<th>Green</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPIN 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPIN 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPIN 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPIN 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPIN 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPIN 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPIN 7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPIN 8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPIN 9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPIN 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPIN 11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPIN 12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3) Compare your results with those of your friends. What do you observe?

__________________________________________________________________________

4) After 12 spins, how many times did the spinner land on red?

__________________________________________________________________________

5) After 12 spins, how many times did the spinner land on blue?

__________________________________________________________________________

6) After 12 spins, how many times did the spinner land on white?

__________________________________________________________________________

7) Can you predict where the spinner will land? Explain.

__________________________________________________________________________

__________________________________________________________________________
Experiment 2:

1) Flip a coin 10 times for the first trial and record the number of heads or tails you got in the table below:

<table>
<thead>
<tr>
<th>Number of flips</th>
<th>Number of heads</th>
<th>Number of tails</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First trial</strong></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td><strong>Second trial</strong></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>20</strong></td>
<td></td>
</tr>
</tbody>
</table>

2) Write a fraction of the number of heads out of 10 tosses and the number of tails out of 10 tosses. ________________________________________________

3) Did the results surprise you? Why?

_____________________________________________________________________
_____________________________________________________________________

4) Write the results as the second trial and complete the table above.

5) Calculate the totals. Did you expect this result? Why?

_____________________________________________________________________

6) Combine the results of all three groups (three pairs) – 60 in total. Write fractions out of the total for heads out of 60 and tails out of 60. What do you notice?

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

7) What do you think would happen if you flipped the coin 100 times? 1 000 times? Why?

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________
**Experiment 3:**

Place **three red, two blue, two green,** and **five yellow cards** in an open bag/box or hat.

You will draw one card at a time for this experiment and replace the card after each draw.

1) There are 12 cards in the bag. Do you have a better chance of drawing red or of drawing blue? Why? What colour are you most likely to draw? Why?

____________________________________________________________________________

____________________________________________________________________________

__________________________________

2) Make 12 draws, remembering to return the card to the bag/box after each draw. Record the results in the first row for the first trial.

<table>
<thead>
<tr>
<th></th>
<th>Number of draws</th>
<th>Number of red drawn</th>
<th>Number of blue drawn</th>
<th>Number of yellow drawn</th>
<th>Number of green drawn</th>
</tr>
</thead>
<tbody>
<tr>
<td>First trial</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second trial</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3) Share your results with your friend. Write their results as the second trial. Calculate the totals. Did you expect this result? Why?

____________________________________________________________________________

____________________________________________________________________________

4) Combine the results of all three in the group – 72 draws in total. Write fractions out of the total for each coloured card drawn.

____________________________________________________________________________

____________________________________________________________________________

5) Compare the total results with your predictions. Are they alike or different? Why?

____________________________________________________________________________

____________________________________________________________________________
Conclusion:

- What common fraction, in the previous table no. 4, is this closest to?

_______________

➢ Place these words on a probability line: unlikely, likely, possible, impossible, and even chance

0______________________________________________________________1

➢ Does probability tell us exactly what happens? Explain.

______________________________________________________________

______________________________________________________________
GRADE 5 INVESTIGATION EXEMPLAR: MARKING GUIDE

Rubric:

<table>
<thead>
<tr>
<th>Criteria</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A picture of the spinner and records</td>
<td>A picture of the spinner has been drawn and records have been kept, neatly and precisely.</td>
<td>A picture of the spinner has been drawn and part of the records have been kept.</td>
<td>An incorrect picture of the spinner has been drawn and part of the records have been kept.</td>
<td>No picture and no records.</td>
<td></td>
</tr>
<tr>
<td>2. Stated the probability of the spinner landing on red, blue and white</td>
<td>The probability of the spinner landing on red, blue and white, has been clearly and well stated.</td>
<td>Some of the probability of the spinner landing on red, blue and white, has been stated.</td>
<td>The probability of the spinner landing on red, blue and white, has not been stated.</td>
<td>No statement made</td>
<td></td>
</tr>
<tr>
<td>3. Recorded the number of heads or tails</td>
<td>The number of heads or tails has been recorded with more clarity.</td>
<td>Not all the number of heads or tails has been recorded.</td>
<td>Incorrect recording made</td>
<td>No recording made</td>
<td></td>
</tr>
<tr>
<td>4. Recorded the results of 12 draws made</td>
<td>The results of 12 draws made have been recorded with better clarity.</td>
<td>Not all the results of 12 draws recorded were made</td>
<td>Incorrect results of 12 draws were made/recorded</td>
<td>No results were made</td>
<td></td>
</tr>
<tr>
<td>5. Conclusions</td>
<td>Findings and conclusions were well written.</td>
<td>Findings and conclusions were written</td>
<td>Some of the findings and conclusions were poorly communicated</td>
<td>Incorrect findings and conclusions were poorly communicated</td>
<td>No findings and conclusions communicated</td>
</tr>
</tbody>
</table>

TOTAL: 20
What is an Investigation? Caps, page 229

An investigation promotes critical and creative thinking. It can be used to discover rules or concepts and may involve inductive reasoning, identifying or testing patterns or relationships, making conclusions, and establishing general trends. To avoid having to assess work that is copied without understanding, it is recommended that whilst initial investigation could be done at home, the final write-up should be done in class, under supervision, without access to any notes. Investigations are assessed with rubrics, which can be specific to the task, or generic, listing the number of marks awarded for each skill, for example:

- Organising and recording ideas and discoveries using, for example, diagrams and tables
- Communicating ideas with appropriate explanations
- Calculations showing clear understanding of mathematical concepts and procedures
- Generalising and making conclusions

**NB:** The teacher must ensure that learners are given grid paper to draw their shapes.

**NB:** Learners use the rubric on the last page as a checklist in order to ensure that you have completed each activity as required. This checklist will also assist you to obtain a good score for this assessment task if you follow all instructions and answer all questions carefully.

**TOPIC:** Investigate the relationship between the area and perimeter of squares and rectangles. (CAPS pg. 282-283)

**AIM:** In this investigation you will discover the relationship between the area and perimeter of squares and rectangles.
1 a. Draw at least two different rectangles on 1 cm squared paper, all with the same perimeter of 16 cm.

b. Does the area remain the same? ____________________

c. Would you be able to draw different squares, all with the same perimeter? _______

d. Draw a square with an area of 4 square centimetres. Record the perimeter.

Perimeter = _______________
2. Use a piece of 1 cm squared paper to draw these shapes:

   a. A square A with sides 4 cm.

   b. A rectangle B with a length of 8 cm and a width of 2 cm.

   [Grid diagram of a square and a rectangle]

   c. Enlarge the square by doubling the measurement of each side.

   [Grid diagram of a larger square]

   [Grid diagram of a rectangle 16 cm by 4 cm]
d. Enlarge the rectangle by doubling the measurement of each side.

e. What happens to the perimeter and the area of the shapes after they have been doubled?
___________________________________________________________________
___________________________________________________________________

f. Reduce a square by halving the measurement of each side.
g. Reduce a rectangle by halving the measurement of each side.

h. What happens to the perimeter and the area of the shapes after they have been reduced?

___________________________________________________________________
___________________________________________________________________
<table>
<thead>
<tr>
<th>Criteria</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Drawing rectangle with perimeter of 16 cm</strong></td>
<td>Rectangle drawn with 16 cm perimeter, clearly labelled units and sides</td>
<td>Rectangle drawn with 16 cm perimeter</td>
<td>Rectangle drawn with incorrect perimeter</td>
<td>The diagram drawn is not a rectangle</td>
<td>No diagram drawn</td>
</tr>
<tr>
<td>2. <strong>Drawing of square with an area of 4 cm².</strong></td>
<td>A square drawn with an area of 4 cm², clearly labelled units and sides</td>
<td>A square drawn with an area of 4 cm²</td>
<td>A square drawn with incorrect perimeter</td>
<td>The diagram drawn is not a square</td>
<td>No diagram drawn</td>
</tr>
<tr>
<td>3. <strong>Drawing of a square and a rectangle.</strong></td>
<td>Square and rectangle drawn with correct dimensions, clearly labelled units and sides</td>
<td>Square and rectangle drawn with correct dimensions</td>
<td>Square and rectangle drawn with incorrect dimensions</td>
<td>The diagrams drawn are not a rectangle and a square</td>
<td>No diagram drawn</td>
</tr>
<tr>
<td>4. <strong>Communicating the findings for doubling the area and perimeter.</strong></td>
<td>A clear description of what happens to the perimeter and the area of the shapes after they have been doubled</td>
<td>A reasonable description of what happens to the perimeter and the area of the shapes after they have been doubled</td>
<td>Any logical explanation for the doubling of area and perimeter</td>
<td>An explanation is incorrect</td>
<td>No explanation provided</td>
</tr>
<tr>
<td>5. Communicating the findings for reducing the area and perimeter.</td>
<td>A clear description of what happens to the perimeter and the area of the shapes after they have been reduced</td>
<td>A reasonable description of what happens to the perimeter and the area of the shapes after they have been reduced</td>
<td>Any logical explanation for reducing the area and perimeter</td>
<td>An explanation is incorrect</td>
<td>No explanation provided</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

**TOTAL = 20 MARKS**
8. PROJECT

(a) Purpose of a mathematics project

Projects are used to assess a range of skills and competencies. Through projects, learners are able to demonstrate their understanding of different Mathematics concepts and apply them in real-life situations. It is therefore essential that conceptual understanding should be emphasised in the teaching and learning of mathematics so that the concepts are applied meaningfully. Good projects involve the collection and display of real data, followed by deductions that can be substantiated. The assessment criteria should be clearly indicated on the project specification and should focus on the Mathematics involved and not on duplicated pictures and facts copied from reference material.

(b) Developing mathematics projects

Since projects are used to assess a range of skills and competencies, it is advisable to develop a project after a substantial amount of mathematics concepts are covered. It is for this reason that a project is administered in Terms 3 and 4 in Mathematics.

The following are some of the issues to be considered when developing a project:

- A theme or a focus of the project should be carefully conceptualised such that it is appropriate, relevant and appealing to the learners. In other words the theme/focus should speak to the learners’ context.
- Although the project theme/focus may be used to create awareness of how mathematical relationships are applied in social, environmental, cultural and economic contexts, the choice of these contexts should be sensitive to issues of gender, disability, race, etc., and should generally contribute to social cohesion.
- The data to be collected should be accessible to the learners. For instance, if the data to complete a project are exclusively obtainable from the Internet, learners who do not have access to the Internet will not be able to complete and present their project.
- If the project requires learners to collect data outside the school environment, the general welfare of learners should be considered.
(c) Administering a project
One mathematics project should be administered per grade per year. Although this is the case, teaching should be characterised by, *inter alia*, project-based learning to expose learners to and prepare them adequately on the subtleties of presenting good projects. In other words, learners should not be exposed to a project for the first time when they are assessed formally.

When administering mathematics projects, teachers are urged to explain the requirements and the process of carrying out the project. Projects are generally context-based and if not thoroughly explained, learners are likely to be distracted by the context and lose the essence of mathematics embedded in the project.

Unlike other forms of assessment such as tests/examinations, mathematics projects take longer to complete; therefore clear guidelines should be provided to learners on the timelines for submitting different sections of the project. In other words it is recommended that a Mathematics project should be presented and marked/evaluated in stages to: *firstly* ease the workload associated with marking long projects if they are not presented in stages; and *secondly* to identify learner mistakes earlier so that they can improve the next stages of the project, subsequently optimising the chances of overall performance in the project.
PROJECT EXEMPLAR

PATTERNS AND TESSELLATIONS

MARKS 40

TIME: 2 WEEKS

Projects are used to assess a range of skills and competencies. Through projects, learners are able to demonstrate their understanding of different Mathematics concepts and apply them in real-life situations. Caution should, however, be exercised not to give projects that are above learners' cognitive levels. The assessment criteria should be clearly indicated on the project specification and should focus on the Mathematics involved and not on duplicated pictures and facts copied from reference material. Good projects contain the collection and display of real data, followed by deductions that can be substantiated.

OVERVIEW

Patterns are repetitive sequences and can be found in nature, shapes, events, sets of numbers and almost everywhere you care to look. For example, seeds in a sunflower, snowflakes, geometric designs on quilts or tiles. Patterns are found everywhere in nature, from the leaves on a tree to the microscopic structure of those leaves. Shells and rocks have patterns, animals and flowers have patterns, even the human body follows a pattern and includes countless patterns within it.

By studying patterns in mathematics, humans become aware of patterns in our world. Observing patterns allows individuals to develop their ability to predict future behavior of natural organisms and phenomena. Civil engineers can use their observations of traffic patterns to construct safer cities. Meteorologists use patterns to predict thunderstorms, tornadoes, and hurricanes. Seismologists use patterns to forecast earthquakes and landslides. Mathematical patterns are useful in all areas of our life.

In nature, patterns are not set to a standard of rules. Sure, we can identify patterns, but they are not necessarily uniform. One snowflake has a pattern that is different from every other snowflake, for instance. A natural pattern can also be broken up by a single irregularity or be found outside of the context of an exact replication. For instance, a species of tree may have a pattern to its branches but that doesn't mean every branch grows from a designated spot. Man-made patterns, on the other hand, tend to strive for perfection.

This project will ensure that learners develop the following specific aims:

- an appreciation for patterns and that
• a critical awareness of how mathematical relationships are used in social, environmental, cultural and economic relations
• a spirit of curiosity and a love for Mathematics
• an appreciation for the beauty and elegance of Mathematics
• recognition that Mathematics is a creative part of human activity
• deep conceptual understanding in order to make sense of Mathematics
• acquisition of specific knowledge and skills necessary for the application of Mathematics to physical, social and mathematical problems
• the study of related subject matter (e.g. other subjects).

IMPLEMENTING THE PROJECT

1. Working with number patterns:
   1.1 Investigate and extend numeric patterns looking for relationships or rules of patterns.
   1.2 Creating number patterns and codes.

2. Working with geometric patterns:
   2.1 Investigate and extend geometric patterns looking for relationships or rules of patterns.
   2.2 Creating geometrical patterns and codes.

3. Creating our own tessellations.

It is expected of every group to keep within the framework of progress of the project.

The project should be done over a period of two weeks.

Number Patterns:

Worksheet 1

Mathematicians are paid very well to create codes in high security environments. We often use codes to protect our interests. Here are some codes that are used in computers and security locks. See if you can break the following codes!

1.1  
1 2 3 __ 2 1

1.2  
1 2 2 1 2 ___ 1 2 ___

1.3  
1 1 3 3 __ 1 3 3

1.4  
A F K P __ __ Z

1.5  
E Z U P __ F __ A V Q
Create your own 5-digit or 5-letter alphabetical code and see if your friends can break your code!

1.6
1.7

TOTAL: / 10

2. Name four places or occupations where we will find people that make use of codes to protect their interests, e.g. the army, etc.

2.1
2.2
2.3
2.4

TOTAL: /4

Worksheet 2

Codes can also be made by using colours, such as the example below.

Create your own colour code, using only three different colours in no. 1.1

Complete the following codes by inserting the missing symbol. (1.2 – 1.4)

Use four different 2D shapes to create your own secret codes. (1.5 – 1.8)

<table>
<thead>
<tr>
<th>Red</th>
<th>Orange</th>
<th>Blue</th>
<th>Red</th>
<th>Orange</th>
<th>Blue</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>✨</td>
<td>✨</td>
<td>✨</td>
<td>✨</td>
<td>___</td>
</tr>
<tr>
<td>1.3</td>
<td>□</td>
<td>□</td>
<td></td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>1.4</td>
<td>〇</td>
<td>●</td>
<td>□</td>
<td>□</td>
<td>___</td>
</tr>
</tbody>
</table>
You are now able to see that we can use any shape or number or symbol to form a pattern and that there are an infinite number of patterns or combinations of patterns.

1. Triangles can become patterns:

<table>
<thead>
<tr>
<th>STEP 1</th>
<th>STEP 2</th>
<th>STEP 3</th>
<th>STEP 4</th>
<th>How many triangles in STEP 100?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Triangle</td>
<td>2 Triangles</td>
<td>3 Triangles</td>
<td>4 Triangles</td>
<td>(1)</td>
</tr>
</tbody>
</table>

You will find that there are many different ways to arrange four triangles (of the same size), such as the following three examples provided. Try your own combinations.

Numbers 1 and 2 are just arrangements of triangles, but number 3 is a special arrangement where the tiles have no overlapping or any gaps between them.
When we arrange any shapes so that no gaps are left, we say that the shapes are tessellating. A tessellation of a flat surface is the tiling of a plane using one or more geometric shapes, called tiles, with no overlaps and no gaps. Tessellations have been used to create decorative motifs since ancient times.

Let’s create!

Examples of beautiful plates:

Worksheet 3:

Activity 1: Create your own tessellation with the attached polygons

Trace and cut out the regular polygons in the addendum and tile a cardboard (or a page), with any of them. Determine whether a tessellation is possible with that shape. Start with the circle and end with the octagon.

Activity 2: Create your own tessellations

<table>
<thead>
<tr>
<th>Your final product must include:</th>
<th>Checklist</th>
<th>Max</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The tile that you tessellated</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Correctly tessellating the image</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• The image tessellated enough times to fill the entire page (A4 is fine, but you may create a larger poster if you wish)</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• The tessellated images MUST be coloured.</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Your tessellation MUST find a place where all people can appreciate it. (Wall, book, window, etc. ANY place where it can serve as a decoration.)</td>
<td>8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total: 15

Total: 40
Addendum: Shapes
8.2. Grade 6: Project exemplar

Subject: Mathematics
Form of assessment task: Project
Grade: 6  Marks: 28
Name & Surname: __________________________________________________

INSTRUCTIONS TO LEARNERS:

- Answer ALL the questions.
- Write your answer in the spaces provided.
- For Activity 2 and 3, record your data on the table and draw your graph on the grid provided.

Problem statement:

Your class is going to do a fundraising activity for the prize-giving day function. You want to sell different kind of soft drinks to your fellow learners. To do this you need to find out what soft drink your fellow learners like the most. You will have to write up your project results and give advice to the principal as to how much of each kind of drink should be ordered. Assume 150 people will buy drinks during the function.

Activity 1: Collecting data

You should:

- Interview 50 learners from different classes/grades.
- Select 5 to 10 learners per class/grade.
- Ask them what soft drink from the following list they like the most:
  - Coke
  - Cream soda
  - Spar-berry
  - Lemon twist
  - Iron brew
  - Fanta orange
  - Stoney
• Make a list of learners interviewed, class and grade, and their choice of soft drink (see example below). Submit the list with your project.

Example:

<table>
<thead>
<tr>
<th>Name of learner</th>
<th>Class/Grade</th>
<th>Drink</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Activity 2: Organising data

• Organise the data you collected on the table below:

<table>
<thead>
<tr>
<th>Soft drinks</th>
<th>Tally</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coke</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cream soda</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spar–berry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lemon twist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron brew</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fanta orange</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stoney</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Activity 3: Representing data**

Represent the data you collected by drawing a graph on the grid provided below. Choose the kind of graph that you think will best represent your data. Give your graph a suitable title.

**Title: _________________________________________________________**

![Graph Grid]

**Type of drink**

**Activity 4: Analysing and interpreting**

Use your table and your graph to answer the following questions:

4.1 Name the drink(s) that is the mode of the data.

________________________________________________________________________ (1)

4.2 How is the mode identified in your graph?

________________________________________________________________________ (1)

4.3 Which drink(s) need to be ordered in large quantities? Why?

________________________________________________________________________ (2)
4.4 Which drink(s) should be ordered in small quantities? Why?
____________________________________________________ (2)

4.5 Write a report to the school principal in which you summarise the data you collected from
50 learners. In the report determine how many of each type of drink must be purchased in
order to serve 150 people. (4)
# Grade 6 Mathematics Assessment Rubric and Memo

Name: ____________________________  
Grade: ____________________________

<table>
<thead>
<tr>
<th>Activity</th>
<th>Criteria</th>
<th>LEVELS</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Collecting data</td>
<td>Less than 25% of the required sample interviewed&lt;br/&gt;About 25% of the required sample interviewed&lt;br/&gt;50% of the required sample interviewed&lt;br/&gt;More than 50% but less than 100% of the required sample interviewed&lt;br/&gt;A sample of 100% interviewed</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Organising data</td>
<td>Tallies and frequencies incorrect&lt;br/&gt;Tallies correct but frequencies incorrect OR tallies incorrect but frequency correct&lt;br/&gt;Tallies and frequencies correct</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Representing data</td>
<td>All the labels on the graph are incorrect&lt;br/&gt;Less than half of the bars correct height. Labels correct, bars not the same width and not equally spaced&lt;br/&gt;Most bars correct height. Labels correct, bars not the same width and not equally spaced&lt;br/&gt;Bars correct height. Labels correct, bars not the same width and not equally spaced&lt;br/&gt;Bars correct height. Labels correct, bars the same width and equally spaced</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td>18</td>
</tr>
</tbody>
</table>

## Activity 4

4.1 Correct mode ✓

4.2 Tallest bar (bar graph), or correct answer according to graph used ✓

4.3 Correct response ✓ reason ✓

4.4 Correct response ✓ reason ✓

4.5 Two marks for summary report of data. ✓ ✓ Two marks for number of cans of each kind of drink to be ordered for 150 people (3 x number of cans for each type of drink) ✓ ✓

10 marks

[28 marks total]