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**CHIEF MARKER / INTERNAL MODERATOR'S
REPORT**

LEARNING AREA: MATHS AND MATHS SCIENCE

DATE OF EXAMINATION: NOVEMBER 2011

NAME OF EXAMINING BODY:

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NSC 2011 CHIEF MARKER'S REPORT

SUBJECT	MATHS AND MATHS SCIENCE		
PAPER	I		
DATE OF EXAMINATION:	NOVEMBER 2011	DURATION:	3 HOURS

This report is aimed at providing valuable feedback to schools, subject advisors, teachers and learners about common errors committed by candidates in the answering of questions, to assist teachers and subject advisors to identify areas that need to be given special attention in the teaching and learning of the subject in 2012.

Your responses will be based on two parts:

Section 1: General overview of Learner performance in the question paper as a whole

Section 2: Comment on candidates' performance on individual questions (Detailed explanations must be provided **per question** as follows: (You may include sub questions where necessary)

- (d) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?
- (e) Why the question was poorly answered?
- (c) Provide suggestion for improvement in relation to teaching and learning
- (d) Describe any other specific observations relating to responses of learners
- (e) Any other comments useful to teachers, subject advisors, teacher development

SECTION 1:

(General overview of Learner Performance in the question paper as a whole)

The question Paper is well set and it covers all the US IDs, SOs and assessment criteria. The mathematical language used is simple and is relevant to level 4 learners' level of understanding. Learners showed good performance.

55% of the learners responded well to most of the questions especially to questions 3, 4 and 5, which were a bit more academic than others and required more knowledge and skills.

45% of learners performed badly in question 1, 2 and 6. The Numeric patterns were not known by some learners, application of Pythagoras's theory in right angled triangles and plotting of points on a given graph using tables or grids are still a problem to some learners, as they struggled with the inequality question (in Question 6). Overall performance of the learners this year shows improvement, but more work needs to be done by educators to uplift the standard of mathematics in the province.

SECTION 2:

**Comment on candidates' performance in individual questions
(It is expected that a comment will be provided for each question on a separate sheet).**

QUESTION 1
(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?
US ID 7448: SO1, 2: NUMERIC PATTERNS, SERIES AND SEQUENCES. Average performance because some learners struggled because they did not know what was expected of them. They were expected to describe patterns, to extend patterns, identify the order whether descending or ascending, what is the constant difference between terms especially for example in question 1.3 where they had to answer decreasing or increasing and give a reason for their answer and also in question 1.4.

<p>(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.</p>	
<p>Learners struggled in question 1.3 – “Is the pattern increasing or decreasing?” ($\frac{1}{2}, \frac{1}{4}, \frac{1}{8}$) – They did not know it was decreasing. They thought that if the denominator increases so is the pattern and were penalized. In question 1.4, the learners were required to write down the first three terms of the pattern starting with the first prime number and multiply by 6 each time. Few learners got the pattern right. They started with 1 instead of 2 – confused about prime numbers as 2 is also an even number. The first two sub-questions were answer exceptionally well.</p>	
<p>(c) Provide suggestions for improvement in relation to Teaching and Learning</p>	
<p>This question belongs to the 7448 US ID which is the most vital part of the mathematics Unit Standard because all the basic laws and operations that are used throughout are taught using this ID. Educators must ensure that they teach using the assessment guidelines which tabulates exactly what must be taught, the specific outcomes and assessment criteria and they must use questions extracted from previous years’ question papers and design class works, assignments and developmental tasks. This can help in familiarizing learners with the questioning style used.</p>	
<p>(d) Describe any other specific observations relating to responses of learners</p>	
<p>Some learners know the rules but cannot interpret or fully describe the rule when required to do so. If required to give a reason or to motivate her/ his answer the language became an issue. They cannot make a statement.</p>	
<p>e) Any other comments useful to teachers, subject advisors, teacher development etc.</p>	
<p>Educators must teach relevant topics stated in the outcome range as stated in the Specific Outcomes and learning area committees of Maths Science in centres must be trained in unpacking topics to teach and how to develop developmental tasks during the continuous assessment sessions. Intensive revision exercises are needed to prepare learners for the examination. They must work as a team so that if one educator is not competent in a certain title (ID), one must take over.</p>	

QUESTION 2	
(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?	
<p>QUESTION 2: US ID 7448 SO2-5 - DIAGRAMATIC PATTERNS.</p> <p>The learners were required to draw a missing pattern number 3, to complete a table to generate a formula, to calculate and substitute and solve. Average performance in this question because they cannot read the growth pattern in the diagrams. The next questions are a build-up from the first question that said they must study the diagram in order to answer all the questions that follow.</p>	
(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.	
<p>The learners who did badly in this question did not recognize the growth pattern of the number of dots per number of squares. The ability to answer the subsequent questions rested on the correct reading and understanding of how many dots that will be added per each square, for example question 2.1.1.- required learners to draw 3 squares with 18 dots – They could not complete the table correctly and they were also required to calculate the number of dots for any number of squares using the formula, $d = 5s + 3$, by substitution – they struggled because they missed the constant number that is added per square to the pattern</p>	
(c) Provide suggestions for improvement in relation to Teaching and Learning	
<p>Question 1 and 2 share the same Unit Standard and educators must not separate numeric patterns and diagrammatic patterns when teaching. Numbers have patterns, sequences and series, the constant difference and also can use question papers, borrow grade 9 books and all relevant teaching material to design developmental tasks.</p>	
(d) Describe any other specific observations relating to responses of learners	
<p>The critical thinking skills that should be displayed in question 2.1.5 where they were required to determine the number of dots for a large number of squares – they could not explain their choice – Language issue (Barrier)</p>	

(e) Any other comments useful to teachers, subject advisors, teacher development etc.	
<p>The educators must always start teaching this Unit Standard US ID as soon as possible because the concepts and all the operations that the learners learn in this Unit Standard ID for a firm foundation and it cuts across all other US IDs. For example, learners had to complete tables up to question 3.1.1., 4.1.1. and 4.2.1. Constant use of assessment guidelines together with previous years question papers is encouraging. More developmental tasks should be given to learners to empower them with all the necessary skills required for essential embedded knowledge to be acquired by all learners</p>	
QUESTION 3	
(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?	
<p>US ID 7452 SO5 1, 2, 4, AND 5: READING, UNDERSTANDING AND INTERPRETATION OF GRAPHS AND PYTHAGORAS'S THEOREM.</p> <p>Good performance by most of the learners in this question. They were able to read and interpret the graph. They were able to complete tables using values in the graphs, only a small percentage did not achieve this question because some cannot explain or give reasons in question 3.1.3 and also cannot match given graphs in question 3.2 with relevant descriptions that were given below.</p>	
(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.	
<p>The problem areas in this question where learners struggled in answering questions 3.1.3 where they were required to look at the graph and read the temperature at 1 minute. They forgot that seconds make minutes and that the horizontal axis is in seconds and not in minutes. Also in question 3.2 they were to study the graphs and match them with each relevant description. Also 3.4.2 which involved the use of the theorem of Pythagoras to calculate the side AG in the triangle AFG. Some forgot to write units and some do not find the square root of their answer, thus losing marks.</p>	
(c) Provide suggestions for improvement in relation to Teaching and Learning	
<p>Educators must teach different kinds of graphs. How to represent data collected in graphs. Also, certain collected data can be represented in graphs. Learners must also be taught how to draw</p>	

<p>graphs. For statistical information, graphs are also used. The learners should be taught how to plot points in graphs, for example the Cartesian plane, functions and all other aspects of graphs. Educators must also describe each kind of graph so that the learners can be able to match graphs with relevant descriptions easily if required to do so as it is the case in questions 3.2.1, 3.2.2 and 3.2.3 respectively.</p>
<p>(d) Describe any other specific observations relating to responses of learners</p>
<p>Most Learners did well in this question except for the reasoning parts and where they have to formulate sentences and they have the tendency of leaving units of measurement used and they will spell words incorrectly. They are lazy to read statements in form of little paragraphs narrating something or stating distance travelled from point A to end point G-as in question 3.4.1 (a) and (b), where they had to read and calculate the distance travelled and apply Pythagoras's theory to calculate the distance between the starting and ending points of the journey.</p>
<p>(e) Any other comments useful to teachers, subject advisors, teacher development etc.</p>
<p>Educators must make sure that when teaching this ID of the Unit Standard, they design, collect and make use of formal school grade 9 oxford textbooks which clearly states graphs, Histograms, displacement, and at the last pages of this book, there is a glossary of all mathematical words used throughout the book and this can help educators to define certain mathematical words and formulae. They must also start with the Cartesian plane, $y = mx + c$, which is the standard theorem with y-axis and x-axis, since most graphs use vertical and horizontal axis's and also make learners competent in plotting and labelling graphs</p>
<p>QUESTION 4</p>
<p>(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?</p>
<p>US 742 SO 1, 2, 3, 4 AND 5 -DATA COLLECTION, CREATING TABLES FROM DATA, PLOTTING POINTS IN THE GRAPH USING VALUES IN THE TABLE, FORMULATE EXPRESSIONS OR FORMULA USING INFORMATION FROM TALE.</p> <p>Good performance was displayed by most learners in this question because they completed tables correctly and were able to plot points on the graph correctly</p>

<p>(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.</p>	
<p>The Only questions that imposed a problem were sub-questions 4.1.3 where they were supposed to give an expression fee F against hours H – and also sub-question 4.2.4 and also labeling of the graph. The lines of the graphs were close to each other and others failed to plot the points correctly – and the graph had 7 marks – some did not attempt the graphs because they could not see the sequence in the tables.</p>	
<p>(c) Provide suggestions for improvement in relation to Teaching and Learning</p>	
<p>When teaching graphs, educators are advised to scale drawn graphs for practical activities to be filled in by learners (the graph paper). Practice makes perfect. Some do not know what the scale is in a given grid that they are supposed to use, as in the case of question 4.12, 4.2.2 and 4.2.3 respectively (7 Marks) all which learners did not get because they plotted points incorrectly. They do not know that the scale is 1: 10</p>	
<p>(d) Describe any other specific observations relating to responses of learners</p>	
<p>Most learners did well in this question because they had to fill in tables first of John's call out fees and than for Kagiso's call out fees respectively which were 4 marks each, before plotting points using the values from the tables and most of them got between 10 and 19 marks in this question. Only a small percentage lost this question.</p>	
<p>(e) Any other comments useful to teachers, subject advisors, teacher development etc.</p>	
<p>I advise educators to teach data handling and probability topics, creating tables from given information, to give learners assessment tasks or projects that involve research and collection of data and representation of data in tables and transference of data collected values from tables to graphs, as it is in question 4. Those who empower learners with this knowledge do a wonderful job.</p>	

QUESTION 5	
(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?	
<p>US ID 7464 SO1-3 – ANALYTICAL GEOMETRY (GEOMETRIC SHAPES), TRANSFORMATIONS, LINES OF SYMETRY</p> <p>Average performance in this question – the part that was badly answered is sub-question 5.3. They were to identify the lines of symmetry, the transformation, to draw the ribbon after the reflection has taken place. The learners were required to study the ribbon and analyse all geometric shapes in the diagram and answer questions based on the diagram. Critical thinking and the application of mathematics in real life situations.</p>	
(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.	
<p>The level of understanding in this question was analysis – the learners had to read a common symbol in a form of a red ribbon and associate it with a real life situation. Some could not identify geometric shapes formed in the diagram and the mathematical vocabulary is a problem to others, especially when it comes to transformations (rotations, translations, reflections). They could not draw the sketch of the symbol after the reflection has taken place. Question 5.3 – 5.4</p>	
(c) Provide suggestions for improvement in relation to Teaching and Learning	
<p>This section of all the question paper belongs to the section that says “cultural forms that are used to decorate houses e.g. Venda huts decorations on the outside, decorations in beadwork which the old Unit Standard called EPOCH” – this means that geometric shapes or spheres and lines of symmetry and translations or transformations can be also used and found in real life as in the case of the HIV ribbon used in question 5.2.1. Educators must also teach about different forms in pattern as for the soccer ball in question 5.1.1 and 5.1.2. Hexagons and pentagons and also give mathematical vocabulary with definitions so that learners know what are polygons, pentagons, 3-dimensional and 2-dimensional figures and spheres and their physical properties.</p>	
(d) Describe any other specific observations relating to responses of learners	
<p>Though this was an easy question, learners did not perform well because they did not know that mathematics cuts across the curriculum. We use mathematics throughout our lives and this question integrated with both art and health. Essential knowledge of HIV/AIDS was required</p>	

<p>which learners could not provide- this was provoking critical thinking and their critical cross field outcomes. Mathematics is everywhere around us.</p>
<p>(e) Any other comments useful to teachers, subject advisors, teacher development etc.</p> <p>Educators must be aware that for every question or lesson taught there should be an essential embedded knowledge and skill that could be required of learners (cognitive level of understanding and taxonomies). All that they learn, they must be able to remember or recall to memory, able to identify, able to recognise, able to analyse, able to synthesise and also to evaluate. This question needed all this thinking skill. Example is in question 5.2., the aid symbol</p>
<p>QUESTION 6</p>
<p>(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?</p> <p>US I 7453 SO1-3: ALGEBRA – ADDITION OF POLYNOMIALS, LIKE AND UNLIKE TERMS, FACTORIZATION, SOLVING OF INEQUALITIES</p> <p>Average performance by learners in this question – learners cannot add like terms with the same exponent and forget about the law of integers, especially in question 6.1. they cannot factorise a difference of two squares, cannot solve the inequality and also draw a number line for the solution (5 marks), cannot convert temperature to degrees Celsius (°C) to Fahrenheit (°F) using a given formula (6.4.1 – 6.4.2)</p>
<p>(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.</p> <p>It may happen that educators do not dwell much in algebra. The learners do have an idea but cannot follow all the steps correctly. They tended to change the inequality to a quadratic equation ending, changing the whole inequality sign to an equal sign in question 6.3. some got stuck in the middle of the calculation. All operational laws in algebra that were needed in question 6 were not wholly done.</p>
<p>(c) Provide suggestions for improvement in relation to Teaching and Learning</p> <p>For level 4 learners, these are ± 20 topics to be taught to learners so that they can be competent in US ID 7453 – all the operations that are applicable to numbers also apply to algebra, for</p>

example addition of terms, subtraction, division, and multiplication, exponential laws, powers of the same base, differences of two squares, algebraic expressions, like and unlike terms, factorization, and substitution and the use of letter symbols in formulae. This is what was required from learners in all the sub-questions in question 6

(d) Describe any other specific observations relating to responses of learners

Learners forgot that if you add numbers or terms with different signs, you subtract the smallest term from the largest term and keep the sign of the largest (Law of integers as in question 6.1). Learners were careless when adding like terms – most learners did not know that there is no negative area, question 6.2.2. and they have difficulty in converting Fahrenheit to Celsius in question 6.4.1. and 6.4.2 respectively

e) Any other comments useful to teachers, subject advisors, teacher development etc.

Before presenting any topic, educators must research and must bring more teaching aids or examples from various books. Algebra also cuts across the whole Unit Standard. Even in the first question – US ID 7448 uses algebra when learners have to generate a general rule in patterns e.g. question 2.1.3 for every unknown we use algebra until there is a solution. For distance, perimeters, volume, circumference and all other aspects that involve letters of the alphabet, learners must be well informed.

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