

THE NATIONAL BENCHMARK TESTS:
PREPARING YOUR LEARNERS FOR THE
ACADEMIC AND QUANTITATIVE LITERACY
(AQL) TEST

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INFORMATION FOR TEACHERS ON THE NATIONAL BENCHMARK TESTS OF ACADEMIC AND QUANTITATIVE LITERACY

1. PURPOSE OF THE DOCUMENT

This booklet will assist you in understanding what the National Benchmark Test (NBT) of Academic and Quantitative Literacy (AQL) is about and provide you with guidelines on how you could help prepare your learners for these tests.

2. BACKGROUND

The National Benchmark Tests (NBTs) are an outcome of the National Benchmark Tests Project (NBTP) that was commissioned by Universities South Africa (formerly known as Higher Education South Africa) in 2005. They are designed to measure a candidate's levels of proficiency in Academic Literacy (AL), Quantitative Literacy (QL) and Mathematics (MAT) in relation to the demands of tertiary study.

The NBTs also provide information to assist in the selection and placement of students in appropriate curricular routes (e.g. regular, augmented, extended, bridging or foundation programmes) and with the development of curricula for Higher Education programmes. In addition, they assist Higher Education to interpret school-leaving results, such as those of the National Senior Certificate (NSC).

The AL and QL tests focus on the application of knowledge that was learned in the senior phase of secondary school. The cognitive abilities and skills underlying the school curriculum are required to be transferable to another context, the higher education context, and this is essentially what the AL and QL tests are assessing.

Based on their performance on each of the tests, candidates are placed in one of three categories: Basic, Intermediate, or Proficient. These categories, or bands, are rigorously determined through a Standards Setting process which takes place every three years to ensure that benchmarks are current and relevant.

Table 1: NBT benchmark bands

Basic	Intermediate	Proficient
Performance at the <i>Basic</i> level suggests that candidates will have difficulty in meeting the demands of regular academic programmes.	Performance at the <i>Intermediate</i> level suggests that candidates may experience difficulties in domain areas and may require appropriate assistance	Performance at the <i>Proficient</i> level suggests that candidates should be able to cope with regular programmes of study.

3. THE ACADEMIC AND QUANTITATIVE LITERACY (AQL) TESTS

The Academic and Quantitative Literacy tests are criterion-referenced tests. This means that the scores obtained on the tests provide information about Academic Literacy and Quantitative Literacy readiness for tertiary education. They are available in both languages of instruction in Higher Education, viz. English and Afrikaans.

The objective of the tests is to determine whether the candidates have acquired and can apply their generic academic and quantitative literacies in contexts that mirror those that they might encounter at university.

In the next two sections, the NBT AL and NBT QL domains and subdomains are described, exemplars of test questions are provided, and some ideas of how learners can be prepared are discussed.

4. WHAT CAN YOU EXPECT FROM THE NBT ACADEMIC LITERACY TEST?

The NBT AL test aims to assess candidates' ability to do the following:

- negotiate meaning at word, sentence, paragraph and whole-text level;
- understand discourse and argument structure and the text “signals” that underlie this structure;
- extrapolate and draw inferences beyond what has been stated in text;
- separate essential from non-essential and super-ordinate from sub-ordinate information;
- understand and interpret visually encoded information, such as graphs, diagrams and flow-charts;
- understand and manipulate numerical information;
- understand the importance and authority of own voice;
- understand and encode the metaphorical, non-literal and idiomatic bases of language; and
- negotiate and analyse text genre.

4.1. The NBT AL subdomains

Each NBT AL test comprises approximately 75 multiple-choice questions. All these questions are developed on the basis of the specifications deriving from the NBT AL abilities that were presented above. These specifications are summarized in the table of subdomains below:

Table 2: Description of AL subdomains

Subdomain	Description
Communicative function	Students' abilities to 'see' how parts of sentences / discourse define other parts; or are examples of ideas or are supports for arguments; or attempts to persuade.
Inferencing	Students' capacities to draw conclusions and apply insights, either on the basis of what is stated in texts or is implied by these texts.
Vocabulary	Students' abilities to derive/work out word meanings from their context
Relations 1. Cohesion 2. Discourse	Students' capacities to 'see' the structure and organisation of discourse and argument, by paying attention – within and between paragraphs in text – to transitions in argument; superordinate and subordinate ideas; introductions and conclusions; logical development.
Essential/non-essential	Students' capacities to 'see' main ideas and supporting detail; statements and examples; facts and opinions; propositions and their arguments; being able to classify, categorise and 'label'.
Grammar/syntax	Students' abilities to 'see' / analyse the way in which sentence structure / word, phrase order affects meaning and emphasis in language
Metaphor	Students' abilities to understand and work with metaphor in language. This includes their capacity to perceive language connotation, word play, ambiguity, idiomatic expressions, and so on
Text genre	Students' abilities to perceive 'audience' in text and purpose in writing, including an ability to understand text register (formality / informality) and tone (didactic / informative / persuasive / etc.).

The multiple-choice questions in the AL test are designed to measure these subdomains to varying degrees of length and complexity. This means that some subdomains have more test questions than others.

In all sections of the AL test, students are required to read short passages that mirror those that they will encounter at university and then answer multiple-choice questions based on those passages. Examples of such questions and the type of passage on which such questions are typically based are presented below. In each case, the name of the subdomain assessed by the question is indicated.

4.2. Exemplar questions

Read the following passage on advertising and answer the multiple-choice questions that follow:

The Influence of Advertising

1. Advertising was initially meant to make people aware of the goods available in the market. It was as simple as announcing what you have in your store or the services you offer in your premises. Over the years, advertising has evolved into a major industry that goes beyond informing, to persuading and influencing. It is a form of brainwashing consumers.

2. Advertising has become a type of culture with ardent followers. In the process, it attracts enviable attention from manufacturers and service providers who fancy an edge over their competitors. Unfortunately, in keeping with the ever-increasing demands of the manufacturers, the advertisers have resorted to creating unnecessary wants and excess consumption in most of us. This is a craving for harmful products that we are better off without. It preys on our minds, rendering us completely irrational. The billboards (hoardings), television and radio advertisements target us from a very early age, forming our view of the world as we grow into adults.

3. The notion that the media are primarily in place to give us news is not very true. If the truth may be told, the media are there to gather a large enough audience, package them into a pricey commodity and sell it to the advertisers. The advertisers, on the other hand, are always on the lookout for a target audience to persuade them that this product or service is better than that of the competitor.

4. In a nutshell, advertising does influence people. Most of the advertisements are filled with images that equate emotional well-being with material acquisition and associate independence and leisure with consumption of alcohol. Advertising also makes people lavish their affect on products rather than real people, thereby destroying human relationships. We have become trapped in the web of advertising where products like brands of beer and cigarettes take over our minds, doing away with our core family values.

[Adapted from
<http://www.englishdaily626.com/comprehension.php?340>. Accessed online on 20 March 2015]

- 4.2.1 The overall purpose of paragraph 1 is to do the following: (communicative function)**
- a. introduce the reader to the basics/fundamentals of advertising
 - b. inform the reader that advertising is brainwashing
 - c. indicate that advertising means announcing what you have in store
 - d. indicate that advertising has changed to become influencing
- 4.2.2 In paragraph 4, we read that “Most advertisements ... associate independence and leisure with consumption of alcohol.” This suggests that advertisements mainly communicate the message that (inferencing)**
- a. independence and leisure encourage people to drink alcohol
 - b. independence and leisure are always accompanied by alcohol consumption
 - c. independence and leisure enable people to relax
 - d. lack of independence and leisure makes it impossible for people to relax
- 4.2.3 In the first sentence of paragraph 2, the phrase “has become” signals that the change in advertising: (grammar/syntax)**
- a. started in the past and ended in the past
 - b. started yesterday and ended yesterday
 - c. started in the past and is still in progress
 - d. started yesterday and will end tomorrow
- 4.2.4 In paragraph 2, the word “ardent” can be substituted with the word: (vocabulary)**
- a. passionate
 - b. obsessed
 - c. compassionate
 - d. energetic
- 4.2.5 In paragraph 2, we read: “This is a craving for harmful products that we are better off without.” In this sentence, the word “This” mainly refers to (cohesion)**
- a. enviable attention
 - b. excessive consumption
 - c. unnecessary wants
 - d. increasing demands

4.2.6 Which of the following statements best describes the relationship between paragraph 1 and paragraph 2 of this passage? (discourse)

- a. Paragraph 2 takes over from paragraph 1.
- b. Paragraph 2 solidifies the point made in paragraph 1.
- c. Paragraph 2 corroborates the point made in paragraph 1.
- d. Paragraph 2 develops the point made at the end of paragraph 1.

4.2.7 The main idea of paragraph 3 is that (essential/non-essential)

- a. The media and advertisers aim to achieve different goals
- b. The media and advertisers complement each other
- c. Both the media and advertisers target the same consumers
- d. The media and advertisers aim to outsmart competitors

4.2.8 In paragraph 2, the phrase “fancy an edge over” means: (metaphor)

- a. take pleasure in pushing others to the edge
- b. wish that someone falls over an edge
- c. wish to have an advantage over others
- d. hope to have an opportunity to win

4.2.9 The writer’s attitude towards advertising in this text can best be described as: (text genre)

- a. neutral
- b. positive
- c. negative
- d. supportive

5. WHAT CAN YOU EXPECT FROM THE NBT QUANTITATIVE LITERACY TEST?

The NBT QL test assesses the candidate's ability to do the following:

- Understand basic numerical concepts and information used in text.
- Select and use a range of quantitative terms and phrases;
- Apply quantitative procedures in various situations;
- Formulate and apply simple formulae;
- Interpret tables, graphs, charts and text and integrate information from different sources;
- Do calculations involving multiple steps accurately;
- Identify trends and patterns in various situations;
- Apply properties of simple geometric shapes to determine measurements;
- Reason logically; and
- Interpret quantitative information presented verbally, symbolically, and graphically

5.1 The NBT QL test subdomains

There are 50 multiple-choice questions in the QL test. These questions are developed to assess the quantitative literacy of the learners based on the specifications summarized in Table 3. Candidates do not require a calculator to write the QL test and where necessary formulae are provided.

Table 3: Description of the QL subdomains

Subdomain	Description
Quantity, number, and operations.	<ul style="list-style-type: none">• The ability to order quantities, calculate and estimate the answers to computations required by a context, using numbers (whole numbers, fractions, decimals, percentages, ratios, scientific notation) and simple operations (+, -, ×, ÷, positive exponentiation) on them.• The ability to express the same decimal number in alternative ways (such as by converting a fraction to a percentage, a common fraction to a decimal fraction and so on)• The ability to interpret the words and phrases used to describe ratios (relative differences) between quantities within a context, to convert such phrases to numerical representations, to

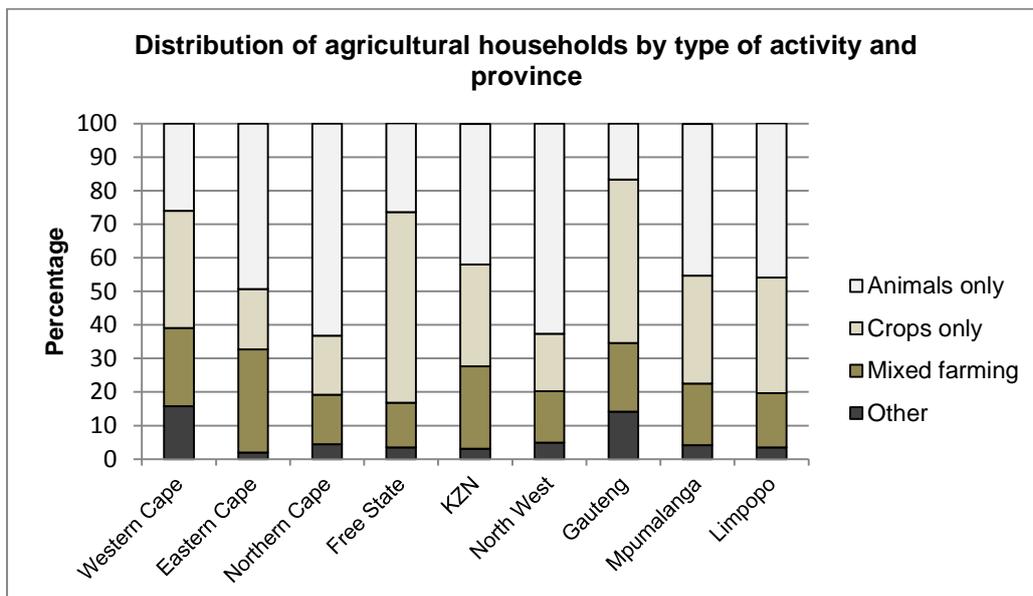
	perform calculations with them and to interpret the result in the original context. The ability to work similarly with ratios between quantities represented in tables and charts, and in scale diagrams.
Shape, dimension and space.	<ul style="list-style-type: none"> • The ability to understand the conventions for the measurement and description (representation) of 2- and 3-dimensional objects, angles and direction, • The ability to perform simple calculations involving areas, perimeters and volumes of simple shapes such as rectangles and cuboids.
Relationships, pattern, permutation	<ul style="list-style-type: none"> • The ability to recognize, interpret and represent relationships and patterns in a variety of ways (graphs, tables, words and symbols) • The ability to manipulate simple algebraic expressions using simple arithmetic operations.
Change and rates	<ul style="list-style-type: none"> • The ability to distinguish between changes (or differences in magnitudes) expressed in absolute terms and those expressed in relative terms (for example as percentage change) • The ability to quantify and reason about changes or differences. • The ability to calculate average rates of change and to recognise that the steepness of a graph represents the rate of change of the dependent variable with respect to the independent variable. • The ability to interpret curvature of graphs in terms of changes in rate.
Data representation and analysis	<ul style="list-style-type: none"> • The ability to derive and use information from representations of contextualised data in tables (several rows and columns and with data of different types combined), charts (pie, bar, compound bar, stacked bar, 'broken' line, scatter plots) graphs and diagrams (such as tree diagrams) and to interpret the meaning of this information. • The ability to represent data in simple tables and charts, such as bar or line charts.

5.2 Exemplar questions

What follows below are exemplars of QL test questions you may expect. Refer to Table 3 when working through the questions. Examples are often helpful, although ‘teaching to the test’ limits real engagement with the topics that are being assessed. The National Benchmark Tests Project (NBTP) does not make any NBT test papers available to the public. This means that all learners are treated equally and it avoids the negative effects of teaching to the test.

Question 1: Data handling

The data comes from the Statistics SA website and the chart is a “Distribution of agricultural households by type of activity and province”. Learners should know how to design and construct graphs and a variety of different kinds of charts so that they will be able to read and interpret them. For example, learners should be able to read off values from the chart below. They should be able to recognise that the horizontal axis displays the provinces and that the vertical axis represents the percentage or proportions of households in different mutually exclusive categories.



1.1 *Approximately what percentage of agricultural households were involved in “Crops only” activity in Limpopo?*

- A) 20 % B) 33 % C) 54 % D) 80 %

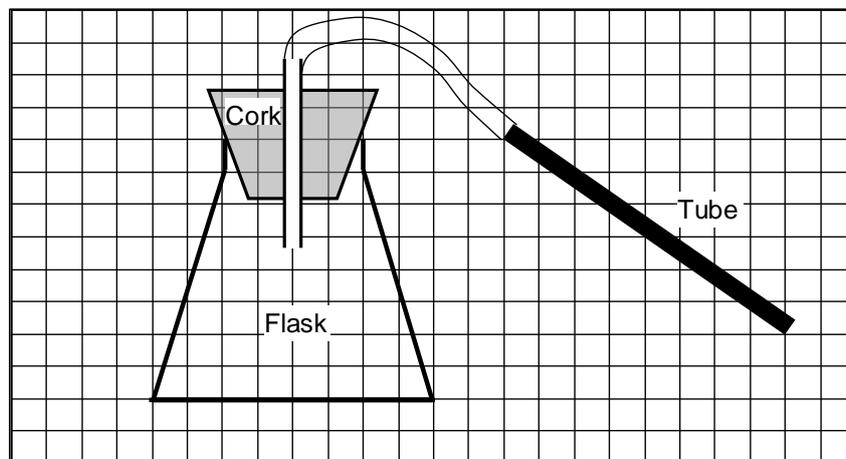
1.2 Approximately what percentage of agricultural households in Limpopo province was not involved in “Crops only” nor “Mixed farming” agricultural activity?

- A) 4 % B) 20 % C) 50 % D) 80 %

Question 2: Shape, dimension and space

Learners should be able to understand the terms used for different shapes (e.g. cylinder, cube, rectangle, etc.), and the terms used to describe their properties, such as surface area, volume, perimeter, radius and diameter. Learners should be able to calculate these using the given formula. Learners should know the difference between the diameter and the radius of a shape. Learners should be able to interpret a scale diagram and 2D representations of 3D objects such as the diagram shown below.

The diagram below shows the side view of an apparatus in a laboratory, consisting of a conical glass flask, a cork, and some tubing. The flask has a circular base. The diagram is drawn to scale on a grid in which each block represents 5 mm x 5 mm.



2.1 What is the radius of the top end of the flask into which the cork fits?

- A) 10 mm B) 20 mm C) 40mm D) 80mm

Question 3: Quantity, number and operations

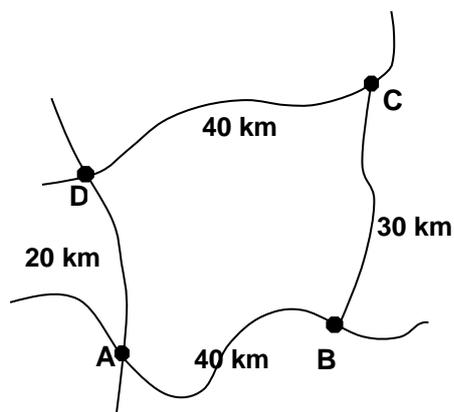
Learners should be able to calculate and estimate the answers to computations required that are within a given context.

A primary school has 40 teachers and 160 learners in the school. What is the ratio of teachers to learners?

- A) 1:3 B) 1:4 C) 2:4 D) 3:4

Question 4: Change and rates

Driver	Route	Time taken minutes
W	D to C	30
X	A to D to C	40
Y	A to B	35
Z	A to B to C	60



Which driver travelled the fastest between the various points?

- A) Driver W B) Driver X C) Driver Y D) Driver Z

Question 5: Ratios

Learners should be able to know what a proportion represents and be able to interpret ratios. The table represents the number of singles tennis championships won by males from 1974 until 2014.

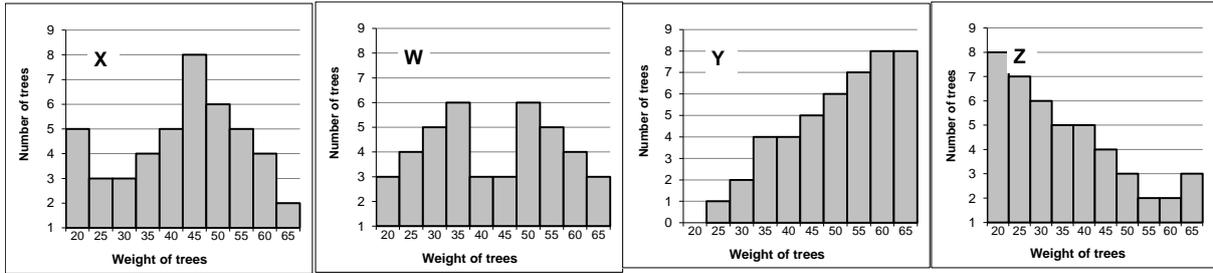
	Tennis Championship (Grand Slam)				
Tennis player	French Open	Wimbledon	Australian Open	American Open	Total
Roger Federer	1	7	4	5	17
Rafael Nadal	9	2	1	2	14
Pete Sampras	0	7	2	5	14
Novak Djokovic	0	2	5	1	8
Jimmy Connors	0	2	1	5	8
Total	10	20	13	18	61

What proportion of the Australian Open tennis championships did Novak Djokovic win?

- A $\frac{5}{13}$ B $\frac{5}{8}$ C $\frac{5}{61}$ D $\frac{8}{5}$

Question 6: Measures of central tendency

Learners should know the meaning of mean, mode and median and be able to calculate these from a given set of data. Learners should also know the properties of the central measures of tendencies. Learners should know what a frequency table represents and the data could be illustrated graphically.



In which distribution is the mode, median and the mean the same?

- A) X B) W C) Y D) Z

Question 7: Probability

Learners should know that probability is a number that is used to measure the likelihood of an event occurring and is represented by a number between 0 and 1, where 0 indicates impossibility of an event occurring and 1 indicates certainty of an event occurring.

A school band consists of 40 learners. Five of the learners play the drums, 10 learners play the guitar, 3 learners play the flute, 2 learners play the saxophone and the rest of the learners play the trumpet.

If a learner in the school band is picked at random, what is the probability that this learner plays the guitar?

- A) 0.25 B) 25% C) 0.50 D) 30%

5.3 How can you help prepare your learners for AL and QL tests?

In order to prepare learners for the AL test, high school teachers firstly need to be familiar with what the test aims to measure. The list of abilities that constitute the construct of academic literacy measured in the NBT is presented in the section “WHAT CAN YOU EXPECT FROM THE ACADEMIC LITERACY (AL) TEST” above. These are the general abilities that candidates aiming to apply for university study in all programmes should possess so that they have a fair chance to succeed. While the NSC English and Afrikaans subjects are informed by the Curriculum and Assessment Policy Statement (CAPS) that aims to teach these skills, it is difficult to establish the extent to which learners have gained these abilities. Similarly, it is difficult to demonstrate if and how these skills are

assessed in the NSC English and Afrikaans examinations. If teachers of high school subjects could make an effort to integrate these academic literacy skills into their teaching of all high school subjects, learners could be better prepared in academic literacy. It might also be a good idea for these teachers to work with English and Afrikaans language teachers to make better sense of how these skills could be integrated across the high school content curriculum.

In order to prepare learners for the QL test, teachers at school can engage with learners interactively by ensuring that they understand and can apply the basic concepts used in mathematics and mathematical literacy classes. They should encourage the use of graphs, charts, maps, and tables in a variety of learning contexts. Teachers should make sure that learners understand how to create graphs and tables and how to read and interpret the information in these graphical representations.

The information and data displayed in graphs, maps and charts should be embedded in a real life context, and at the same time, the data should be authentic and factual. Teachers could use information on current affairs that is relevant for this purpose. For example, Eskom recently submitted a proposal to increase the price of electricity units it supplies to the ordinary South African citizen. Teachers could use the increase in price of electricity units to show how this would affect the budget of a learner's parents and their households. Teachers could ask learners to interact and ask them for suggested solutions to the current electricity shortage facing South Africa. This activity would get learners to do computations and could encourage them to think critically and to reason. Teachers are encouraged to develop number sense and teach students to estimate without using calculators to arrive at their answers. Teachers should encourage learners to interrogate their answers by using evidence to support their answers. Teachers should pay attention when covering ratios, proportions, and fractions and encourage students to develop reasoning around these quantitative concepts.

Finally, the AL and QL tests comprise multiple-choice items that learners need to read carefully before working out the correct response. If learners are not familiar with working with multiple-choice questions, teachers could start using these in the classroom.

6. THE DIFFERENCE BETWEEN THE NATIONAL BENCHMARK TESTS AND THE NATIONAL SENIOR CERTIFICATE

6.1. The NBT AL and the NSC English and Afrikaans examinations

The AL test aims to provide information that is additional to that provided by the NSC English and Afrikaans examinations. Both these assessments focus on measuring language ability. The difference between the two is that, while the NSC English or Afrikaans examinations focus on assessing a variety of language abilities, the AL test solely focuses on assessing academic literacy, the ability to cope with university education in English or in Afrikaans. What this means is that the essential focus of the AL test is that it generates information on candidates' ability to use English or Afrikaans effectively to succeed at university. This is not the case with the NSC English or Afrikaans examinations, where this ability is only part of the focus.

6.2. The NBT QL test and NSC Mathematical Literacy examination

The QL test is designed to assess candidates' levels of academic readiness in the area of quantitative literacy. It assesses the ability to manage situations or solve problems in a context that is relevant to Higher Education study, using basic quantitative information that may be presented verbally, graphically, in tabular or symbolic form. According to the DoE (2003), the NSC subject Mathematical Literacy *"provides learners with an awareness and understanding of the role that mathematics plays in the modern world. Mathematical Literacy is a subject driven by life-related applications of mathematics. It enables learners to develop the ability and confidence to think numerically and spatially in order to interpret and critically analyse everyday solutions and to solve problems."* In Mathematical Literacy, there are two examinations, paper 1 (basic skills paper) and paper 2 which focusses on the application of mathematical knowledge. The fundamental difference between the NSC Mathematical Literacy examination and the NBT QL test is that the NBT QL test assesses whether a candidate is prepared for the academic demands of tertiary education, whilst the NSC Mathematical Literacy examination assesses the extent to which the school leaver has met curriculum expectations.

6.3. The NBT QL test and NSC Mathematics

The NBT QL test is designed to assess candidates' levels of academic readiness in the area of mathematics comprehension. According to the Subject Assessment Guidelines for Mathematics (DoE, 2008), in grade 12, the assessment consists of two components: a Programme of Assessment which comprises 25% of the National Senior Certificate mark for Mathematics and an external examination which makes up the remaining 75%. The major difference between the NSC

Mathematics and NBT QL test is that the NBT QL test assesses whether a candidate is prepared for the academic demands of tertiary education, whilst the NSC Mathematics assesses to what extent a grade 12 student has met the Curriculum Statement expectations as expressed in the Mathematics Assessment Guidelines.

7. FREQUENTLY ASKED QUESTIONS

Question: English (or Afrikaans) is my first language. Why should I write the AL test?

The language skills involved in speaking English or Afrikaans as a first language are useful for social conversation and do not amount to competence in the academic and formal English or Afrikaans required for success at university. For this reason, first language speakers of English or Afrikaans do not necessarily perform well in a test of academic language such as the NBT AL. This means that in spite of their high level of proficiency in conversational English, speakers of English or Afrikaans as a home language are not automatically ready to cope with the demands of tertiary education in either of these languages. It is for the benefit of first language speakers of English or Afrikaans, therefore, that their levels of academic English or Afrikaans are also measured prior to their entrance to the world of higher education.

Question: My English (Afrikaans) mark in the NSC English (Afrikaans) examination is very high.

Why should I write the AL test?

The NSC English and Afrikaans examinations aim to assess a number of language abilities including academic literacy. The NBT AL assesses academic literacy only. The NSC English or Afrikaans examinations assess academic literacy to a very small degree, if at all. The NBT AL is, therefore, a better indicator of academic literacy readiness for those applying for admission to university. This is the case even if their Grade 12 English or Afrikaans mark is high.

Question: My child does well in school Mathematics and Mathematical Literacy. Why is his/her QL score low?

Learners have access to past NSC Mathematics and Mathematical Literacy papers and they use these papers to practise answering the questions. By doing so, learners are “practising to the test” and it is therefore possible for them to get high marks. Learners are able to identify a pattern of answering the questions if they practise them enough. The NBT QL test is not only about knowing how to answer questions, but also about being able to apply their knowledge, which is required in Higher Education.

8. WHO HAS PERMISSION TO PROVIDE SPECIAL PREPARATORY SESSIONS FOR NBT?

We are aware that a number of organisations are offering unwary learners the opportunity to download material off the internet or attend classes with claims that these will prepare them to write the NBTs. While there may be sites that provide AL and QL training and others that provide information related to multiple-choice types of questions, **none of these organisations have the authority to speak on behalf of the NBTP and none of them have any special knowledge of the content of the tests.**

There are also many teachers who quite legitimately want to help their learners prepare for the NBT. They will then be engaging with the points noted above and doing their best to provide their learners with solid AL and QL foundations. However, **no teacher has the authority to speak on behalf of the NBTP**; neither do teachers have the authority to use the NBTP or Universities South Africa logo on any of their own material, which may create the impression that it is sanctioned by the NBTP.