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To: Management Authorities of Second Level Schools

Leaving Certificate Mathematics

The Implications of Revisions to the Junior Certificate Mathematics Syllabuses

for Leaving Certificate Mathematics

Following implementation of the revised syllabuses for Junior Certificate Mathematics the National Council for Curriculum and Assessment (NCCA) reconvened the Senior Cycle Mathematics Course Committee to examine the implications of the revisions on the existing Leaving Certificate Mathematics syllabuses. The course committee has now completed its deliberations.

The purpose of this circular is to provide official confirmation that **there will be no amendments to the syllabuses** for Leaving Certificate Mathematics at higher, ordinary or foundation levels. **Neither will there be any changes in the assessment of these syllabuses.**

The document accompanying this circular is based on the deliberations of the NCCA Senior Cycle Mathematics Course Committee. Its purpose is to inform and guide teachers who are teaching Leaving Certificate mathematics to students whose Junior Certificate studies were based on the revised syllabuses introduced in September 2000.

Please bring this circular and the attached document to the notice of the teachers concerned.

Second level school authorities are requested to provide a copy of this circular to the appropriate representatives of parents and teachers for transmission to individual parents and teachers.

John Dennehy,
Secretary General.

    May, 2004.

The Implications of Revisions to the Junior Certificate Mathematics Syllabuses for Leaving Certificate Mathematics – Guidance for Teachers

In 2000, a revised Junior Certificate mathematics syllabus was introduced at each of three levels: foundation, ordinary and higher. The revised syllabuses were first examined in June 2003.

This document identifies areas of Junior Certificate mathematics within which changes have taken place that will impact on the teaching of Leaving Certificate mathematics syllabuses. It is intended to guide teachers when planning their mathematics classes at Leaving Certificate and, in particular, to assist them in ensuring that the needs of students who have followed the revised Junior Certificate syllabuses are catered for.

Teachers are advised to be alert to the fact that textbooks covering the Leaving Certificate mathematics syllabuses may not take into account the revisions that have occurred at Junior Certificate level. It is therefore strongly recommended that the relevant syllabus documents are consulted on an ongoing basis.

In the following pages, a table for each of the three levels of Junior Certificate mathematics identifies the topics in the various sections of the appropriate Junior Certificate syllabus that are relevant to Leaving Certificate mathematics and that have been either included or excluded. Where a topic has been included in the revised mathematics syllabuses at Junior Certificate students can now be expected to be familiar with this topic when they progress to Leaving Certificate. Conversely, topics that have been excluded from the revised syllabuses will now require greater attention during the teaching of the Leaving Certificate course. Where relevant, the tables offer comments to assist teachers in planning for specific inclusions or exclusions.

It is recognised that the changes in Junior Certificate mathematics have implications at Leaving Certificate. However, in any consideration of these "knock-on" effects, account must be taken of the increased emphasis in Junior Certificate mathematics on teaching for understanding, with the use of active methodologies designed to improve the student's grasp of the mathematical concepts involved. This should have a positive impact for Leaving Certificate mathematics, as should the use of calculators in the teaching, learning and assessment of Junior Certificate mathematics. A further factor for consideration is the absence of choice in the Junior Certificate mathematics examinations, which should contribute to complete syllabus coverage by all junior cycle students and, therefore, should enable them to have a more solid basis when starting a Leaving Certificate syllabus.

When students embark on a Leaving Certificate mathematics course, circumstances commonly require that time is given to revision of Junior Certificate material in order to ensure that students have grasped the basics in the full range of topics. This was particularly likely to happen under the previous syllabuses where, given the choice that was available in examinations, it was possible that some sections/topics could have received cursory treatment. With syllabus coverage now being more complete and a greater emphasis on learning with understanding, some of this time can be devoted to bridging the gap that arises as a result of the syllabus revisions at Junior Certificate. Also, it may be appropriate for teachers of mathematics in Transition Year to concentrate on addressing the 'gaps' issue for part of the year.

In setting aside time to prepare students for their Leaving Certificate examination it should be noted that the structure of the examination papers accompanying the revised Junior Certificate syllabuses is now closely aligned to that currently in use for Leaving Certificate. Questions typically have a three-part structure—(a), (b), (c)—that leads students from easier work to more challenging tasks. Thus, a level of familiarity, not applicable heretofore, can be assumed.

Additional information regarding mathematics syllabus changes at Junior Certificate may be obtained in the *Guidelines for Teachers* that were published to support the implementation of the syllabus revisions (these guidelines are available online at www.education.ie).

SUMMARY OF SIGNIFICANT CHANGES AT JUNIOR CERTIFICATE

FOUNDATION LEVEL

Section	Topics included	Topics excluded	Comment
Sets		Examples with three sets	
Number systems	Order for **N** Estimation Division of decimals	Notation N_o Nesting of brackets General division of fractions Use of mathematical Tables	Fraction-decimal conversion (with calculator) expanded.
Applied arithmetic and measure	Percentage profit of CP or SP (as specified) Percentage increase Perimeter Area of square and rectangle		(Sub)multiples limited to specified list "Use of scales" replaces "drawing to scale" π not necessarily accepted as 3.14 or 22/7
Algebra	Elementary simplification Extra example of equation $4(x - 1) = 12$		Coefficients and values of x in expressions restricted to **N**
Statistics and data handling	Collecting, recording and tabulating data Pictogram Additional material on tables of data and on relationships between these and graphs		Pie charts are restricted to angles that are multiples of 30° and 45° (see Section 4.8 of *Guidelines for teachers*)

Geometry
      Synthetic geometry
 	
  Transformation geometry
	
	Central symmetry
		
		Translation
		Construction of non-rectilinear figures
			Different presentation and treatment (see Section 3.3 and Appendix 2 of *Guidelines for Teachers*).

Relations, functions and graphs	Non-integral co-ordinates for plotting points		

ORDINARY LEVEL

Section	Included	Excluded	Comment
Number systems	Prime factorisation HCF Estimation Rounding for any number of decimal places Index notation for square root	Notation $\mathbf{N}_o$ Significant figures Use of Tables Scientific notation: $n \in \mathbf{Z} \setminus \mathbf{N}$	Junior Certificate students will now be familiar with calculator use
Applied arithmetic and measure	Percentage profit of CP or SP (as specified) Perimeter Surface area of rectangular solids	Rates Simple Interest	(Sub)multiples limited to specified list π not necessarily accepted as 3.14 or 22/7 Tax credits system now in place
Algebra	Rational expressions with numerical denominator	Division of expressions Rearrangement of formulae Rational expressions with variable in the denominator Formula for solution of quadratic equations	Factorising cubic expressions by using division now needs to be covered 'ab initio' for Leaving Certificate Factorisation of quadratics restricted to those with coefficient of x^2 unity Difference of two squares restricted to simple examples such as $x^2 - y^2$ Coefficients and solutions for simultaneous equations restricted to $\mathbf{Z}$
Statistics	Collecting, recording and tabulating data		

Geometry
    Synthetic geometry:
 	
    Transformation geometry:
 	
    Co-ordinate geometry:
	
	Co-ordinates of image points for specified simple examples
		
		Format $y = mx + c$
			Different treatment; see Section 3.3 and Appendix 2 of the *Guidelines for Teachers*
			
			Intuitive approach
			
			Diagrams restricted to same scale on each axis
			Intersection with axes retained (using algebraic methods)

Trigonometry		Trigonometric functions of angles greater than 90º Minutes	Familiarity with handling trigonometric functions on the scientific calculator can be assumed

		Use of Tables Compass directions	for Leaving Certificate
Functions and graphs	Codomain	Relations and arrow diagrams Graphing inequalities of forms such as $a < x < b$	

SUMMARY OF SIGNIFICANT CHANGES AT JUNIOR CERTIFICATE

HIGHER LEVEL

Heading	Topics included	Topics excluded	Comment
Sets		Symmetric difference Closure Cartesian product	Topics, particularly relevant for Group Theory, to be treated 'ab initio' for Leaving Certificate
Number systems	Prime factorisation HCF Estimation Rounding for any number of decimal places Significant figures	Notation $\mathbf{N}_o$ Use of mathematical Tables Logarithms Division applied to $a \pm \sqrt{b}$	The concept of logarithms, rules for their use and the solving of equations involving logarithms will be new material for Leaving Certificate students
Applied arithmetic and measure	Percentage profit on CP or SP (as specified) Perimeter Surface area of rectangular solids	Rates Simple Interest	(Sub)multiples limited to specified list
Algebra	Rational expressions with numerical denominator Simple rational expressions with variable in denominator	Sum and difference of two cubes	
Statistics	Collecting, recording and tabulating data		

Geometry
   Synthetic geometry:
 	
   Transformation geometry:
 	
   Co-ordinate geometry:
	
	Line formula $ax + by + c = 0$
		
		Parallel projection and equation of image of line under translation
		
		Area of triangle
			Different treatment, with fewer proofs to be examined (see Section 3.3 and Appendix 2 of Teacher Guidelines).
			
			Intuitive approach

Trigonometry	Use of triangles for surd form of ratios for specified angles	Use of mathematical Tables Angles outside range 0º-360º Proof of sine rule and area formulae	
Functions and graphs		Relations and arrow diagrams Composition of functions Inverse of functions	Topics will require treatment 'ab initio' at Leaving Certificate