



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Cor na Madadh, Baile Átha Luain, Co. na hIarmhí
Cornamaddy, Athlone, Co. Westmeath

S.60/09

To: Management Authorities of Second-Level Schools

Re: *Formulae and Tables* booklet

Dear Principal,

I refer to the State Examinations Commission Circular No. S.56/09 (copy enclosed) and I now enclose three copies of the new *Formulae and Tables* booklet. This new booklet will be used in the **2010 examinations and thereafter**, and the older *Mathematics Tables* booklet will no longer be provided.

The new booklet is now available in book shops and directly from the Government Publications Sale Office. As with the previous booklet, candidates will **not** be allowed to bring their own copies into the examinations. Copies will be available from the superintendents in the examination centres.

SEC Circular S.56/09 referred to some changes in presentation that will arise on some examination papers to coincide with the introduction of the new booklet. In particular, in questions related to geometry on mathematics papers in 2010 and thereafter, upper-case letters will be used to denote points and lower-case letters to denote lines and circles. This applies to mathematics examinations in the Junior Certificate, Leaving Certificate and Leaving Certificate Applied. The notation for geometry is given on page 17 of the *Formulae and Tables* booklet. Some examples of relevant questions from recent examination papers are given as an appendix to this circular. Each example is followed by a presentation of how the same question would appear from 2010 onwards.

Teachers and students should note the information in SEC Circular S.56/09 regarding the content of the new booklet and its relevance for a number of subject areas. They should furthermore note the general principle that information in the *Formulae and Tables* booklet will not be repeated on an examination paper and the implications of this principle for the examinations **in 2011 and thereafter**. Circular S.56/09 also referred to further information in respect of Leaving Certificate Construction Studies. This will issue to schools in due course.

To obviate confusion in the future it is suggested that copies of the existing *Mathematical Tables* booklet be disposed of, in an environmentally responsible manner.

School management authorities are asked to bring this information to the attention of the representatives of parents and teachers on the board of management, or other appropriate representatives of parents and teachers, for transmission to individual parents and teachers.

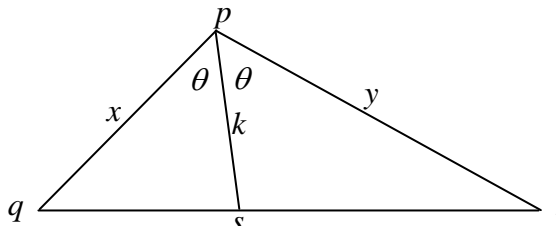
If you have any queries in relation to this circular, please call (090) 644 2765.

Tom Carney,
Assistant Principal
August, 2009

Appendix: Examples of change in geometry notation.

Leaving Certificate Higher Level Paper 2, 2009, Question 4(c), as presented:

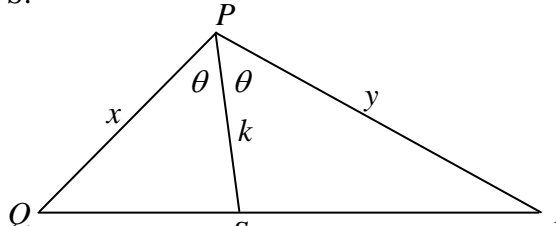
(c) The bisector of $\angle qpr$ meets $[qr]$ at s .
 $|\angle qpr| = 2\theta$, $|pq| = x$,
 $|pr| = y$ and $|ps| = k$.



(i) Find the area of the triangle pqs in terms of x , k and θ .
(ii) Show that $k = \frac{2xy \cos \theta}{x + y}$.

The above question as it might appear in the future:

(c) The bisector of $\angle QPR$ meets $[QR]$ at S .
 $|\angle QPR| = 2\theta$, $|PQ| = x$,
 $|PR| = y$ and $|PS| = k$.



(i) Find the area of the triangle PQS in terms of x , k and θ .
(ii) Show that $k = \frac{2xy \cos \theta}{x + y}$.

Leaving Certificate Higher Level Paper 2, 2009, Question 2(b), as presented:

(b) In the triangle abc , p is a point on the side $[bc]$.
The point q lies outside the triangle such that $\vec{pq} = \vec{pb} + \vec{pc} - \vec{pa}$.

(i) Express \vec{q} in terms of \vec{a} , \vec{b} and \vec{c} .
(ii) Hence show that $abqc$ is a parallelogram.

The above question as it might appear in the future:

- (b) In the triangle ABC , P is a point on the side $[BC]$.
The point Q lies outside the triangle such that $\overrightarrow{PQ} = \overrightarrow{PB} + \overrightarrow{PC} - \overrightarrow{PA}$.
- (i) Express \vec{q} in terms of \vec{a} , \vec{b} and \vec{c} .
- (ii) Hence show that $ABQC$ is a parallelogram.

In part (i) above, note that the vector \overrightarrow{OQ} , where O is the origin, is written when using a single letter as \vec{q} , (see page 17 of the *Formulae and Tables* booklet). This part could equally well be stated as: (i) Express \overrightarrow{OQ} in terms of \overrightarrow{OA} , \overrightarrow{OB} and \overrightarrow{OC} .

Junior Certificate Higher Level Paper 2, 2009, Question 2(c), as presented:

- (c) (i) ✍ Verify that the points $(3, 0)$ and $(0, -2)$ are on the line $L: 2x - 3y = 6$.
- (ii) ✍ Find the equation of the line K through $(3, 0)$ which is perpendicular to L .
- (iii) ✍ Show the lines L and K on a coordinate diagram on graph paper.
- (iv) ✍ Find the area of the triangle formed by the lines L and K and the y -axis.

The above question as it might appear in the future:

- (c) (i) ✍ Verify that the points $(3, 0)$ and $(0, -2)$ are on the line $l: 2x - 3y = 6$.
- (ii) ✍ Find the equation of the line k through $(3, 0)$ which is perpendicular to l .
- (iii) ✍ Show the lines l and k on a coordinate diagram on graph paper.
- (iv) ✍ Find the area of the triangle formed by the lines l and k and the y -axis.

Note that subscripts may also be used, where convenient, so that the lines l and k above could equally well be labelled l_1 and l_2 .



**Coimisiún na Scrúduithe Stáit
State Examinations Commission**

S. 56/09

To: Management Authorities of Second-Level Schools

Re: New booklet of *Formulae and Tables* for use in the State Examinations from 2010

1. In 2007, the State Examinations Commission established a working group to review and update the *Mathematics Tables* booklet that has been used in the State Examinations for many years. The working group comprised representatives from the State Examinations Commission, the Department of Education and Science and the National Council for Curriculum and Assessment. A draft document was widely circulated in April 2008 for comment from interested parties. Following this consultative process, the booklet was finalised and is currently in production. It will be used in the 2010 examinations and subsequent years, and the older *Mathematics Tables* booklet will no longer be provided.

In order to avoid any possible confusion regarding the 2009 examinations, the new booklet will not be made available to booksellers until the end of June 2009. However, many schools include the current *Mathematics Tables* booklet on their book lists and may currently be preparing such lists for the 2009/2010 school year. As the current booklet will no longer be relevant or available after the 2009 examinations, it would be appropriate to include the new *Formulae and Tables* booklet in its place on these book lists. As with the previous booklet, it will be published by the Government Publications Sales Office and will be available from booksellers from the start of July 2009.

The new booklet is substantially updated and modernised. Whereas its primary purpose is as a reference document for use in the State Examinations, efforts have been made to ensure that it will also continue to serve as a valuable reference document for students and teachers throughout post-primary school and beyond. Many additional formulae have been included, along with additional statistical

tables, additional scientific information, some formulae related to economics and finance, and a list of the most frequently used electrical circuit symbols. Some information that is no longer needed in the context of the use of scientific calculators, such as the tables of logarithms and trigonometric functions, has been removed. To improve clarity, the type size is larger than in the previous booklet. Greater consistency has been applied to the bilingual layout so as to allow easier navigation by readers in either language.

The State Examinations Commission will forward sample copies of the new booklet to schools at the beginning of the new school year.

2. The change to the reference information available to candidates in the examinations has some implications for the examinations in some subjects. As a general principle, information in the *Formulae and Tables* booklet will not be repeated on an examination paper. This change to the examination papers will be implemented in 2011 and subsequent years. This means that, in 2010 only, candidates will have access to the information concerned in both the new *Formulae and Tables* booklet and on the examination paper. The implications for the examinations most affected and the manner in which these implications will be addressed are as follows.

Mathematics

At Junior Certificate Ordinary Level, in 2011 and subsequent years, the co-ordinate geometry formulae will no longer be reproduced on the examination paper.

At Leaving Certificate Foundation Level, in 2011 and subsequent years, the formulae for compound interest and depreciation and the formula for the roots of a quadratic equation will no longer be reproduced on Paper 1. However, the formula sheet accompanying Paper 2 will continue to be made available until the forthcoming change of syllabus, as this sheet includes some information that is not in the new *Formulae and Tables* booklet.

Furthermore, in Mathematics at all levels, the notation used in the *Formulae and Tables* booklet will be used on the examination papers in 2010 and subsequent years. For example, in geometric diagrams, points will generally be labelled with upper-case letters and lines and circles with lower-case letters. This change will bring the presentation of such diagrams into line with international norms. While candidates are encouraged to follow the same convention as appears in the question, they will not be penalised for labelling their own diagrams in whatever way they choose, provided that their work is clear.

Science subjects

In 2011 and subsequent years, any information that is available in the *Formulae and Tables* booklet will not be reproduced on the examination papers (for example, equations of motion, data available in the periodic table).

Economics

Candidates and teachers should note that some formulae relevant to the economics syllabus now appear in the *Formulae and Tables* booklet.

Technology and Engineering

Candidates may be asked to use the *Formulae and Tables* booklet to identify given electronic symbols. Candidates should be aware that the formulae relating

to many calculations involving resistance, current, voltage and capacitance, will be available in the booklet.

Where notation or units are used on the examination papers, these will be in line with the *Formulae and Tables* booklet from 2010.

Construction Studies

Candidates should be aware that formulae and unit definitions relating to thermal calculations and U-values are available in the booklet.

Note that a separate circular regarding the use of units and notation in relation to thermal calculations in Construction Studies will issue in Autumn 2009. This circular will be accompanied by worked examples.

School management authorities are asked to bring this information to the attention of the representatives of parents and teachers on the board of management, or other appropriate representatives of parents and teachers, for transmission to individual parents and teachers.

Queries in relation to this circular should be made to (090) 644 2765.

Tom Carney,
Assistant Principal
May, 2009