Study Aids to use with your programs

● **For essential information on which to base your revision**

Letts Study Aids:	*Revise Mathematics*	Duncan Graham MSc
Letts Key Facts:	*Modern Mathematics Passbook*	A J Sly BA
Letts Key Facts:	*Algebra Passcards*	J M Remington BSc
Letts Key Facts:	*Arithmetic & Trigonometry Passcards*	A J Flint MSc
Letts Key Facts:	*Geometry Passcards*	M Preston MEd
Letts Key Facts:	*Modern Mathematics Passcards*	L E Duffy BSc
Letts Key Facts:	*Algebra Course Companion*	A J Sly BA
Letts Key Facts:	*Arithmetic & Trigonometry Course Companion*	B P Brindle MSc
Letts Key Facts:	*Geometry Course Companion*	J E G Rowell MSc and S Nickerson MA
Letts Key Facts:	*Modern Mathematics Course Companion*	A K Beard BSc

● **For practising examination questions**

Letts Study Aids:	*Objective Questions Mathematics*	Duncan Graham MSc and Christine Graham BSc
Letts Key Facts:	*Multiple Choice Modern Mathematics*	A J Sly BA
Letts Key Facts:	*Model Answers Modern Mathematics*	A J Sly BA

● **For quick reference**

Letts Key Facts:	*Reference Library Traditional and Modern Mathematics*	K Ahmad MA
Letts Key Facts:	*Dictionary of Mathematics*	J Daintith BSc, PhD

Letts **Key facts** REVISION SOFTWARE

For O-Level GCE, CSE and GCSE

Mathematics

THEOREM OF PYTHAGORAS

$AC^2 = AB^2 + BC^2$

or

YELLOW area = BLUE + area

Hit any key to continue
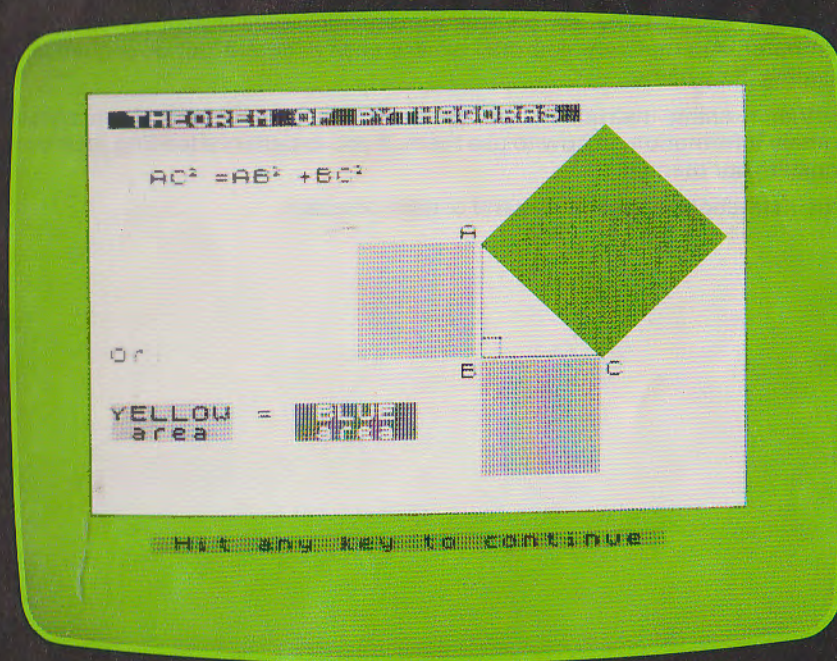
Spectrum 48K

Produced by
David R Hopkins

Loading and running instructions

IMPORTANT If you have INTERFACE I fitted to your Spectrum then type in the following before trying to load and run a program:

`RANDOMIZE USR Ø ENTER`

All programs are loaded as follows:

`LOAD " " ENTER`

The computer will display the words

'program: program name'.

Leave the tape running until the program has finished loading. You will then be instructed to stop the tape.

Loading from tape is slow but it can be made easier if the counter numbers are marked in this booklet – a space is provided.

Both sides of Tapes 1 and 2 contain a number of programs which can be accessed sequentially as on the introductory tape provided with your computer. Alternatively you may access each program out of sequence by 'loading' it by name.

Further running instructions are given in this booklet, and the programs contain information on how to use them. If you experience loading problems, consult your manual.

Exit instructions appear at the end of each program.

How to use the programs in a revision scheme

The programs on these cassette tapes have been devised to make your revision more approachable and enjoyable. Organization is the key to making the most of your revision time. For each subject follow these simple rules.

1 Know your syllabus. A quick reference to the relevant syllabus analysis table to be found at the front of Letts Study Aids *Revise* series is advised.

2 Devise a timetable, as soon as the Mocks are over, which will allow you to go through the syllabus at least twice (more for problem areas).

3 For each topic, read all your available material – class notes and textbooks. Make summary notes as you go, then test yourself. Key Facts *Multiple Choice* or Letts Study Aids *Objective Questions* will give invaluable practice and help. Finally, run the relevant computer program which will both test your knowledge and give you another perspective.

4 Just before the examination, use all your summary notes to jog your memory and the whole subject program suite to reinforce your understanding.

The mathematics suite comprises:

— a summary of important theory points
— screen demonstrations where the visual medium is fully exploited e.g. calculator sequences
— user interaction where the power of the computer is under user control e.g. graphs
— several quizzes on common core topics (randomized) where the computer marks answers and demonstrates correct solutions step by step
— a one hour trial examination to highlight problem areas

The programs bring mathematical processes to life in a stimulating way and have been designed to give you deeper insight into a wide range of topics – therefore helping you to master the difficult concepts involved.

The Programs *(Program loading names in brackets)*

Tape 1
Side A
Calculator ("calculator")
Arithmetic quiz ("arithquiz")

Side B
Algebra quiz ("algquiz")
Geometry quiz ("geomquiz")
Constructions ("construct")

Tape 2
Side A
Trigonometry 1 ("trig1")
Trigonometry 2 ("trig2")

Side B
Graphs ("graphs")
Transformations ("transforms")
Exam ("exam")

# The Programs

1 Calculator ("calculator")

Counter number:
The first screen displays a menu.

1 Layout of a calculator
2 Solving important problems

You are invited to select either.

The more important features of a typical calculator are explained with the use of the Letts 48K model – which is displayed on the screen.
Seven important problems (which may be solved using a calculator) are demonstrated using, again, the Letts model and incorporating flowcharts.
The calculator display is shown working realistically during the demonstration and you may practise on your own calculator at the same time.
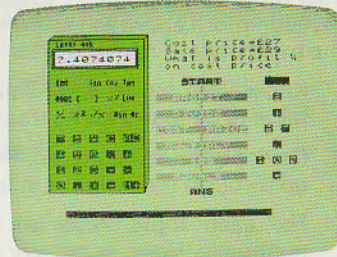
2 Arithmetic quiz ("arithquiz")

Counter number:
The quiz format allows you to try each of the randomized questions and/or watch the computer solving the problem and setting out the answer properly. You will have the additional option of seeing the correct calculator sequence displayed on the screen in flowchart form (where appropriate).
The computer will mark your answer to each question. Helpful on-screen instructions are available at all times and you will be able to use the quiz for as long (or as often) as you like.

All the important arithmetical processes from the 16+ syllabuses are included and you should have pencil/paper/calculator available for your written solutions.

3 Algebraic quiz ("algquiz")

Counter number:
A menu is displayed from which you make a choice to try one of the 10 mini-quizzes on the main algebraic topics and problem areas found in 16+ syllabuses.
Helpful on-screen instructions are available at all times and each of the questions is randomized so that you can practise 'problem areas' over and over again until you've mastered all the techniques involved.
Each quiz allows you to try the questions yourself and enter your answer and then you are given the option to see the solution set out correctly by the computer.
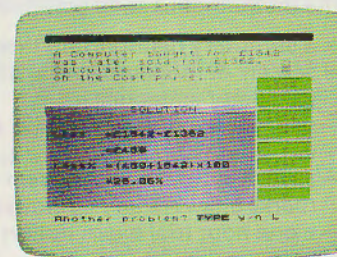
The ten mini-quizzes are:

0 Set theory
1 Sorting terms
2 Substitution
3 Indices
4 Simple equations
5 Simultaneous equations
6 Expansion of brackets
7 Factorization
8 Quadratic equations
9 Algebraic fractions

4 Geometric quiz ("geomquiz")

Counter number:
The quiz format is identical to programs 2 and 3 and is fully randomized so that you may use it over and over again to master the important geometric properties/theorems covered.
The computer will mark your answers to the questions and/or solve the problems, showing you how to set out the solutions properly.
You should have a pencil/paper/calculator for your solutions and the computer has been programmed to mark your answer correct to 1 decimal place (where applicable).

5 Constructions ("construct")

Counter number:

The computer will demonstrate the following constructions faithfully on the screen:

1 60°
2 90°
3 Angle bisector
4 Perpendicular ($\perp$'r) bisector of a line
5 Perpendicular ($\perp$'r) on to a line
6 Parallel line
7 Triangles (randomized)

The seventh option uses randomized constructions of a triangle. You may try the constructions yourself (the computer will mark your answers) and/or see the 'accurate' version which the computer draws on the screen.
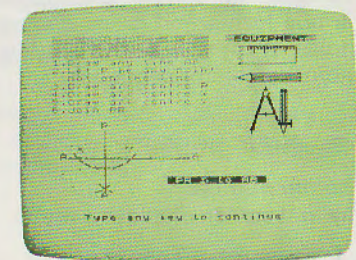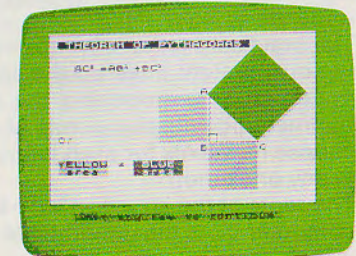
6 Trigonometry 1 ("trig1")

Counter number:
The first screen displays a menu

1 Theorem of Pythagoras
2 Quiz – Pythagoras
3 Check your bearings
4 Scale drawings

You are invited to make a selection.

The theorem of Pythagoras is explained and the quiz involves random questions which you may solve yourself (the computer checks your answers) and/or see the problem worked out in the correct sequence.

Bearings are randomly drawn on the screen and the computer shows you the compass and three figure equivalents.

The computer will set random problems on scale drawing and reveal an 'accurate' representation on the screen. The computer will mark the accuracy of your answer in each case.

7 Trigonometry 2 ("trig2")

Counter number:
The first screen displays a menu.

1 Sin, cos and tan ratios
2 Sin, cos and tan quiz
3 Sin/cos rules for any triangle
4 Sin/cos rules quiz

You are invited to make your selection from 1-4.

The trigonometric ratios of a right-angled triangle are explained and quizzed randomly in the same format as previous programs. The relevant calculator sequence is displayed on request.

The sine and cosine rules applicable to any triangle are explained in their various forms and quizzed randomly. You will be tested as to the correct choice of formula and then you can see the computer's complete solution and/or calculator sequence.

8 Graphs ("graphs")

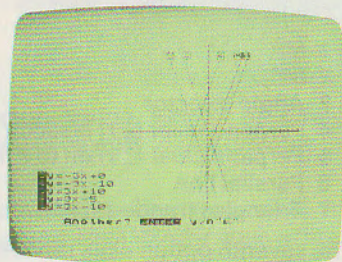*Counter number:*
The first screen displays a menu.

1 $y=mx+c$ Theory
2 $y=mx+c$ Quiz
3 $y=mx+c$ Practical
4 Roots of $ax^2+bx+c = 0$

You are invited to make your selection from 1-3.

The theory of $y=mx+c$ explains the significance of 'm' and 'c' in an easy-to-understand way.

The practical section of $y=mx+c$ allows you to instruct the computer to draw various straight lines on the screen (you choose 'm' and 'c'). You have the option of superimposing the lines on the same axes and therefore experimenting with the effects of altering 'm' and/or 'c', or you may otherwise choose new axes for each line (you can overlay up to five lines on the screen at any one time!)

The roots of the equation $ax^2+bx+c = 0$ are investigated graphically and the computer plots the quadratic of your choice (you have to enter values for a, b and c).

The computer chooses the X and Y-axis scales to show the position of the roots most clearly.

9 Transformations ("transforms")

Counter number:
The first screen displays a menu.

1 Coordinates quiz
2 Vectors
3 Geometric transforms
4 Reflection/rotation quiz

You are invited to make a selection from 1-4.

The coordinates quiz is designed as a multiple-choice exercise where the computer plots a random point and you have to determine its coordinates from four close alternatives.

Vectors are randomly produced by the computer and their components are shown. You can then see the vector as a displacement demonstrated and its magnitude worked out.

The computer produces randomly a right-angled triangle and you may choose to reflect, rotate about the origin or translate this triangle.

The reflection/rotation quiz is in the same format as previous quizzes and the computer produces a random point in the X-Y plane and gives you its coordinates. You are then asked to specify the coordinates of its image under one of a random seven transformations and the computer marks your answer. The transformation is then shown on the screen.
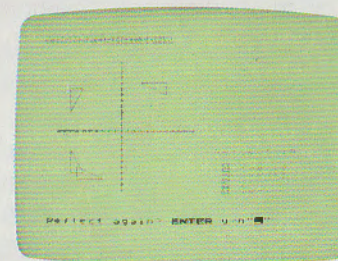
10 Exam ("exam")

Counter number:
The trial exam is based on the common core of the GCE mathematics syllabuses and involves forty searching multiple-choice questions to be completed in a maximum of one hour.

In order to simulate examination conditions as nearly as possible you should ensure that you set aside a whole hour for the completion of the examination and you will be given easy-to-follow instructions and frequent time checks throughout its duration. You must not press BREAK during the exam.

You will receive (at the end of the examination) a breakdown of your performance and as the questions have been randomized you will be able to use the examination several times during your preparation and revision. You may wish to sit this examination straight away in order to highlight areas of difficulty and/or misunderstanding to give you an indication of how to use the *Letts Key Facts Revision Software* most profitably.