THE CHESHIRE CAT
EDUCATIONAL SERIES

MATHS

`O´ LEVEL REVISION PART ONE

(Calculus, Arithmetic, Construction)

BBC MODEL B

MATHS 'O' LEVEL PART ONE

An entire Maths department at a top school has devised this brilliant program. They have drawn heavily on their vast experience in this important subject to cleverly reinforce those areas of the syllabus students usually find most difficult to comprehend.

Clearly illustrated, fully animated, worked examples are skilfully devised to tackle these problem areas from a number of angles to eliminate any doubt or misunderstanding.

The entire program is carefully designed to fully explain, illustrate and demonstrate the subject. Then a revision course of questions and answers in each topic section thoroughly tests the student's acquired knowledge – seeking out weaknesses and areas for further study.

Conventional examination questions are set to enable the student to simulate genuine examination conditions, while still interacting with the program for ready reference and assistance.

This interaction is a vital first step to examination success – the cornerstone to the student's future.

Maths part one is the first step in a three-part, comprehensive course covering the syllabus for not only all the 'O' Level Examination Boards, but CSE and 16+ examinations.

Maths 'O' Level Part One consists of two cassettes with programs on four sides covering the following three major subjects:

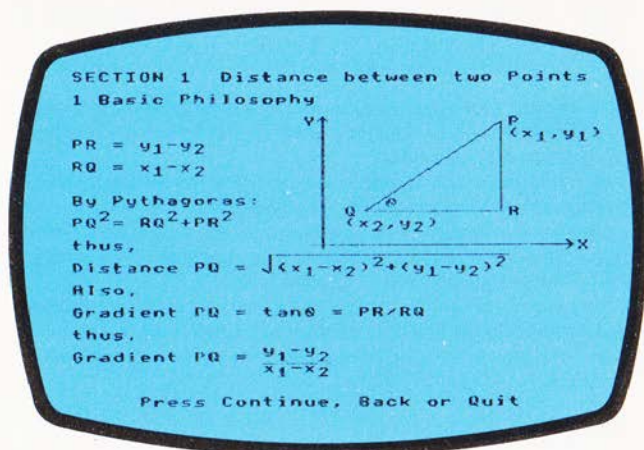|		
TAPE 1:	SIDE A	CALCULUS 1
	SIDE B	CALCULUS 2
TAPE 2:	SIDE A	ARITHMETIC
	SIDE B	CONSTRUCTIONS

LOADING YOUR TAPES

Simply follow these steps:
1. Connect your tape recorder to your computer and switch on.
2. Choose your cassette and side.
3. Rewind the tape fully.
4. Type CHAIN ""
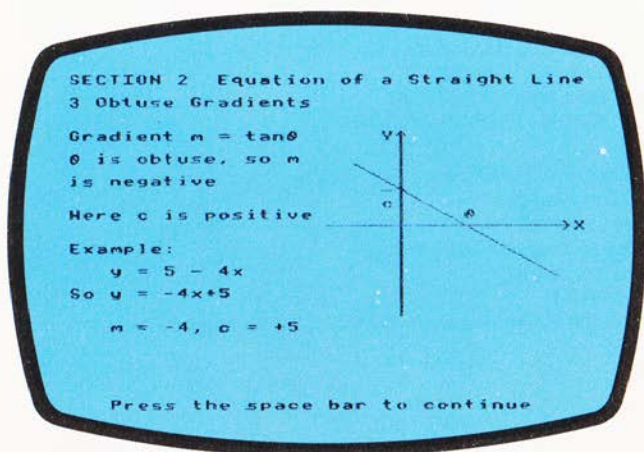5. Hit the RETURN key and press PLAY on your tape recorder.

IMPORTANT NOTE: If you cannot load the program, switch off, rewind and try again – after adjusting the volume level on your tape recorder. If your computer has a Disk Operating System installed you will need to type the following to load and run the program: ✳ TAPE then RETURN; PAGE= &EØØ then RETURN; CHAIN "" and RETURN.

CALCULUS PART ONE: DIFFERENTIATION


```
SECTION 1   Distance between two Points
1 Basic Philosophy

PR = y₁-y₂
RQ = x₁-x₂

By Pythagoras:
PQ² = RQ²+PR²
thus,
Distance PQ = √(x₁-x₂)²+(y₁-y₂)²
Also,
Gradient PQ = tanθ = PR/RQ
thus,
Gradient PQ = y₁-y₂
              x₁-x₂

        Press Continue, Back or Quit
```

(Fig A)

Calculus part one covers four major topics: distance between two points; Equation of a straight line; Differentiation; Turning points (Max and Min).


```
SECTION 2   Equation of a Straight Line
3 Obtuse Gradients

Gradient m = tanθ
θ is obtuse, so m
is negative

Here c is positive

Example:
    y = 5 - 4x
So  y = -4x+5

    m = -4, c = +5

     Press the space bar to continue
```

(Fig B)

Each topic can be selected in any order of study from the main menu. Each topic contains a comprehensive explanation followed by worked examples. A revision section of questions and answers ends each topic.

Hit C key to continue program, B key to refer back, Q key to return to main menu.

CALCULUS PART TWO: INTEGRATION


```
SECTION 2    Definite Integration
Detailed Answer
```

$$\int_{-1}^{0}(x^2+4x+3)dx=\left[\frac{x^3}{3}+\frac{4}{2}x^2+3x\right]_{-1}^{0}$$

$$=\left[0\right]-\left[(-\frac{1}{3})^3+2(-1)^2+3.-1\right]$$

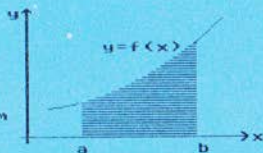$$=-\left[-\frac{1}{3}+2-3\right]=-\left[-\frac{4}{3}\right]$$

$$=\frac{4}{3}$$

```
Press the space bar to continue
```

(Fig C)

Calculus part two introduces : Basic integration; Definite integration; Area under a curve; volumes of revolution; Distance, Velocity and Accleration.


```
SECTION 3    Area under a Curve
1 Basic Philosophy

The shaded area is          y=f(x)
the area between
the curve y = f(x)
and the X-axis from
x=a to x=b

Its value is given by    ∫ₐᵇ ydx

Press Continue, Back or Quit
```

(Fig D)

In this section the basic philosophy – the explanations – are followed by : the rules for integration; worked examples; revision questions and answers; finding the constant; further questions and answers to find the constant.

ARITHMETIC


```
SECTION 2 - Ratios
2 - Worked Examples

1   A man works for 7½hr/day. Find the
    ratio of his working time to the
    rest of the day

    ratio = 7½:16½ = 15:33 = 5:11
                     2  2

2   Divide £240 in the ratio 5:3

    £240 is divided into 8 parts (5+3)
    so each part is £240 = £30
                      8

    so 1st share (5 parts) = £150
       2nd share (3 parts) = £ 90
                       Check £240


    Press the space bar to continue
```

(Fig E)

An invaluable insight into Maths working in the real world is contained in this section with comprehensive explanations of simple interest and the compound interest used in banking and HP agreements.


```
SECTION 5 - Compound interest
2 - Worked Examples

Find the compound interest on £400 for
3 years at 5% pa

Year 1:  P = £400, R = 5%, T = 1
    I = PRT = 400 × 5 × 1 = £20
        100   100
Year 2:  P = £420, R = 5%, T = 1
    I = PRT = 420 × 5 × 1 = £21
        100   100
Year 3:  P = £441, R = 5%, T = 1
    I = PRT = 441 × 5 × 1 = £22.05
        100   100

interest = 20 + 21 + 22.05 = £63.05

    Press Continue, Back or Quit
```
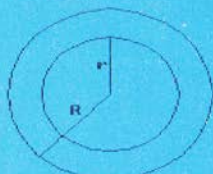
(Fig F)

Other disciplines required in the fast moving financial world are also clearly explained through Averages, Ratios and Percentages.

```
SECTION 3 - More circular properties
1 - Circular rings

The area of a circular ring (ANNULUS)
is the area of the larger circle minus
the area of the smaller circle

Area = πR²-πr²

     = π(R²-r²)

     = π(R-r)(R+r)

Press Continue, Back or Quit
```

(Fig G)

Area and Volume calculations are vitally important in industry. A section on polygons explores the various calculation formulae required for triangles, parallelograms and trapeziums.


```
SECTION 3 - More circular properties
3 - Cones
EXAMPLE: From a circle of radius 5cm
a sector containing an angle of 72° is
removed. The edges OA and OB are
brought together to form a cone. The
radius of the circle becomes the slant
height of the cone

Press the space bar to continue
```

(Fig H)

Circles and solids and similar figures receive the same detailed attention. All topics contain their own exhaustive revision sections and all topics are wholly flexible in their running order and progress.
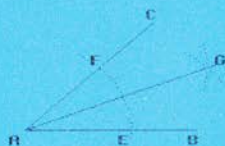
Hit C key to continue program, B key to refer back, Q key to return to main menu.

CONSTRUCTIONS


```
SECTION TWO - Constructing Angles
1   Construction of an angle which
    bisects a given angle

    Join point A to point G; this line
    bisects the given angle BAC

                    C


            F               G


    A           E       B



Type R to repeat this construction, or
     Press Continue, Back or Quit
```
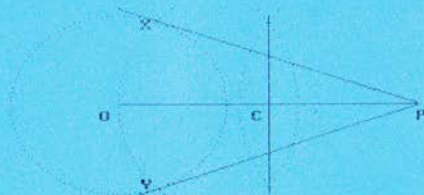
(Fig I)

A comprehensive, full colour, animated guide and revision course of constructions — under full user control. This section consists of constructing: perpendiculars; angles; bisecting angles; parallel lines; tangents to a circle; segments of a circle; locus, and many more.


```
SECTION FOUR - Further Constructions
4   Construction of two tangents to
    a circle from an external point P

    Join PX and PY, which are the two
    required tangents

            X


        O       C           P


        Y


Type R to repeat this construction, or
     Press Continue, Back or Quit
```
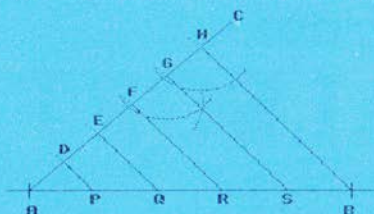
(Fig J)

Simple step by step examples demonstrate clearly the techniques for other constructions such as a triangle with an area equal to a given quadrilateral, or a square with area equal to a given rectangle.
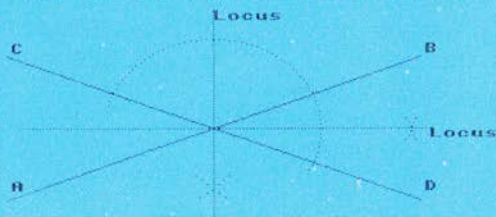
(Fig K)

Locus illustrates the path to be traced out when constructing a circle, parallel lines, intersecting loci and perpendicular bisectors.

Topics throughout this section can be selected in any order of study from the main menu. Each contains a comprehensive explanation with worked examples. A revision section of questions and answers ends each topic.

(Fig L)

A fascinating chapter completes this program – Examination Techniques. A series of handy hints towards achieving full marks.

Hit C key to continue program, B key to refer back, Q to return to main menu.

CHESHIRE CAT
EDUCATIONAL SERIES
from
AMPALSOFT

The superb and original range of Cheshire Cat Educational Programs for the BBC Micro home computers now available and coming shortly include:

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Basic Tutorial

MATHS `O´ LEVEL REVISION PART ONE

(Calculus, Arithmetic, Construction)

A brilliantly designed series of action-packed exercises that skilfully eliminate the traditional drudgery from Maths examination revision.

This totally new and exciting formula – devised by an entire top school Maths department – draws heavily on the graphics, animation and sound facilities of the home computer to intrigue, test and fire the imagination of the user.

A wholly flexible program uses an easily followed, step by step technique to explore the 22 major areas of the current Maths syllabuses of all the Examination Boards for 'O' Level, CSE and 16 plus examinations.

Cheshire Cat MATHS 'O' LEVEL REVISION PART 1 includes:-

Calculus Pt 1;	differentiation, basic integration etc.
Arithmetic Pt 1 :	simple and compound interest, averages.
Calculus Pt 2 :	definite integration, distance, velocity and acceleration.
Constructions :	perpendicular, angles, parallel lines, locus.
Arithmetic Pt 2:	areas, volumes, ratios, percentages.
Examinations techniques.	

and much, much more ....

More than 100 fascinating exercises, carefully illustrated and animated, cover the key examination questions and the program integrates fully with other parts of the syllabus available in the Cheshire Cat range. Cheshire Cat programs cover Maths from 1st School to A Level standard.

A vital additional exercise included in this program of 'O' Level revision is an invaluable insight into examination techniques which are the cornerstones of success.