

StudyWorks! 2002 for Mathematics

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StudyWorks!® is partly a subset of the facilities, and partly an educational enhancement of the professional mathematical software package Mathcad. Our last review [1] considered an earlier version  and the reader is referred to this for general background on the package. Since then there have been StudyWorks 2001  and now StudyWorks Mathematics DELUXE  (in the guise of StudyWorks 2002). All these upgraded names and icons are confusing, and there are no prizes for the name of next year's version! It is worth visiting the MathSoft "Math in Action" website [4] not only to understand the market and audience but also to link to and explore the comprehensive, interesting StudyWorks! Online support [5]. (See for example Figure 1):

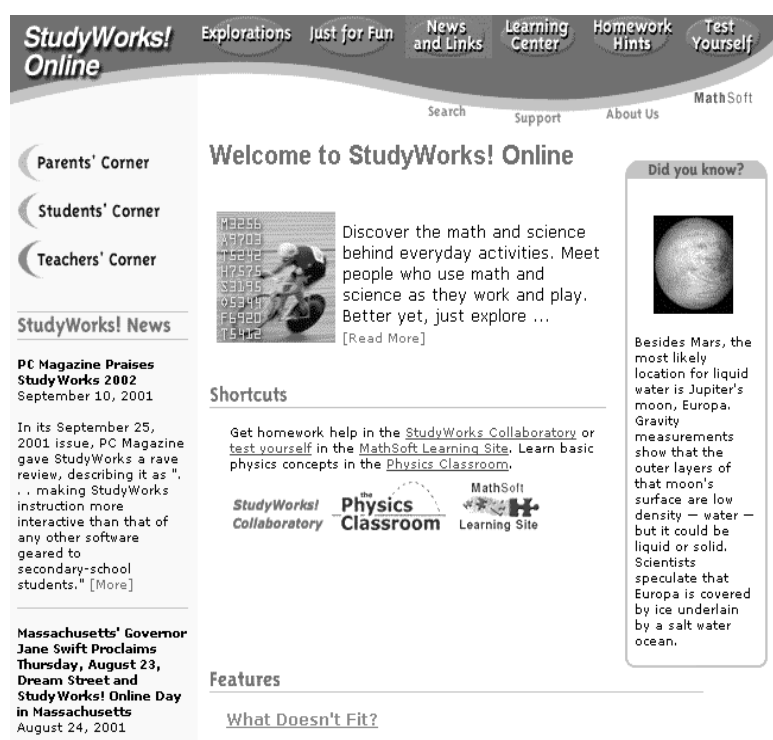


Figure 1

StudyWorks has, rather irritatingly, both a Mathematics and a Science CDROM, which actually work in consort, and buying one gains a discount on the other. We concentrate here only on the Mathematics CD.

Enhancements to StudyWorks 2002

We assume that those with no knowledge of the package will refer to the previous review [1], and here we begin by asking what then are the differences between the earlier versions and this most recent one?

The first thing to note is that it comes in a bigger, glossier box holding a Companion Workbook containing practice problems with worked out solutions. This hard copy support material may be of particular use to those who have to face "the mathematics problem" daily in the UK (see for example [2]). In fact it is worth mentioning here that in response to the last review, the manufacturers suggested that while StudyWorks! is mainly for a basic mathematical skills market, universities might more profitably use Mathcad. We merely point out

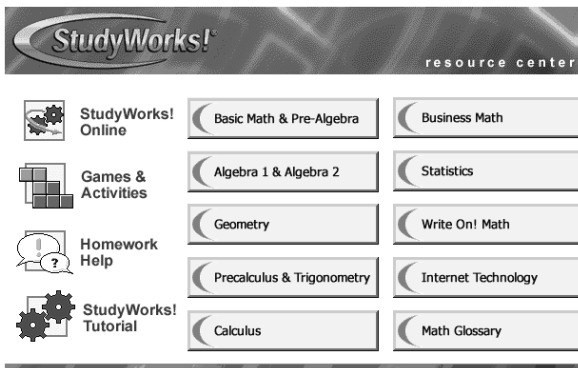


Figure 2

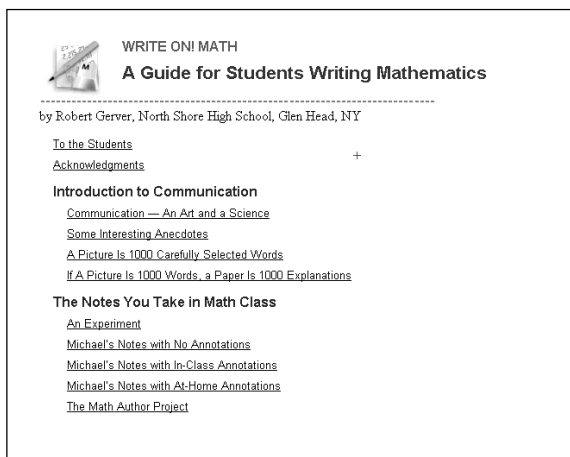


Figure 3



Figure 4

that the preoccupations of many university mathematics departments, and indeed the MSOR network itself, include what is traditionally called "service teaching". This is not seen as a secondary activity, being important to those non-mathematics students who need to develop their mathematical skills including those which they never really mastered at school, as well as a critical part of the financial health of mathematics departments. Thus StudyWorks! does indeed have a role to play at university level.

As before, the usual range of mathematical features of a CAS system are present. It is useful to note that if many of the extensive Mathcad files are saved appropriately then they can be used in the StudyWorks environment, but one major enhancement is the increase in amount of resource on the disk (Figure 2).

The magnitude and multitude of support over a wide range of mathematical topics (in full colour) gives one key to the popularity of StudyWorks! - although this popularity is mainly in the USA and Canada (as reform-type syllabi seem to find it harder to take root in the academically conservative atmosphere of England in particular).

Of particular interest to those who are interested in key skills development (as mentioned in the Dearing report and Curriculum 2000) is the Write On! Math resource (Figure 3) where some of the issues around skills are examined in the context of mathematics.

Apart from the built-in Online Help, the possibility still exists of sharing work and gleaning On-Line homework help through the collaboratory (Figure 4).

There are Java applets (Figure 5) for examples and (in some cases step by step) solutions.

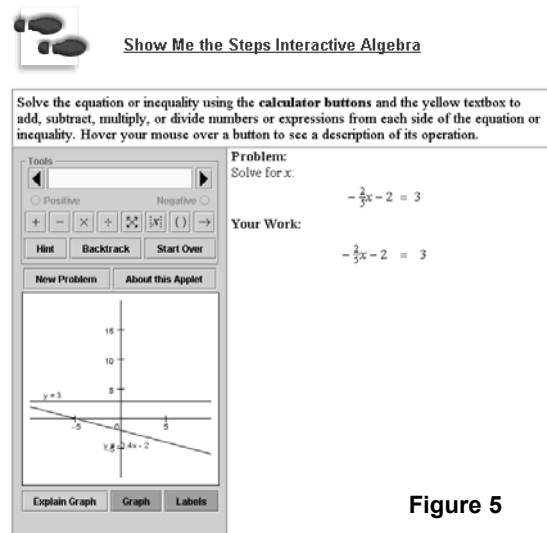


Figure 5

Additional activities include:


- The facility to import large data sets from data collection devices such as a CBL™, CBL2™, or CBR™, or from data sites on the Web, giving model validation an exciting edge.
- An enhanced range of games and puzzles to look at, investigate and enjoy.

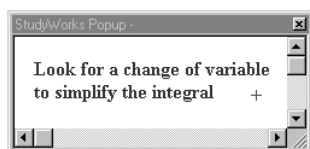


StudyWorks Games
and Activities



Puzzle of the Week
on StudyWorks! Online

- Animations which are simple to set up, and give an exciting interactive dimension to the illustration of mathematical concepts.
- Pops - those familiar with later Mathcad versions will recognise these, and be aware of how they can provide hints and solutions to help to students along towards understanding the processes of doing mathematics. For example if you press  then up “pops”



- “Quicksheets” (again these will be recognised by Mathcad users) which are mathematical templates set up to carry out any mathematical process. The “reader” then just changes the functions, parameters, etc. to tailor the sheet to their particular problem. (So who needs tables now?)

Apart from this content, there are one or two nice touches in the latest version. The stern mortar board which formed the symbolic processor indicator of the previous versions has been replaced by a “Eureka” light flashing bulb, lightening the atmosphere!

Finally the profiles of the essential uses of mathematics in various careers are worth a mention. These are illuminating and worth discussing since not many people studying mathematics will finish up calling themselves a mathematician (a fact providing an important caveat for mathematics teachers and lecturers!).



Math in Your Career

A topical point

It is possible to use StudyWorks 2002 to diagnose the skills of each student in chosen areas. From these results it is fairly simple and not particularly time-consuming to plan an individual course to cater for a student’s needs.

Students can of course also test themselves using the Online testing support pages (Figure 6). We can only hope that this colourful, visual and animated package can add to the motivation to engage in mathematics!

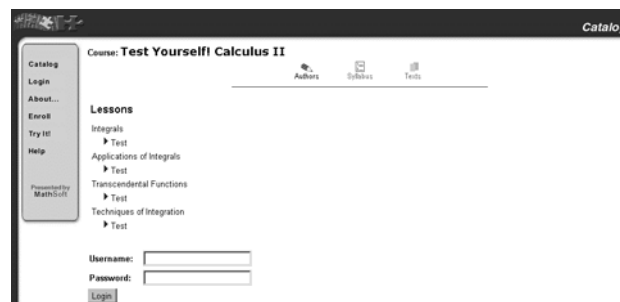


Figure 6

Conclusion

In conclusion StudyWorks! 2002 is a comprehensive educational mathematical software package which is well worth the modest investment not only for lecturers and teachers but more importantly for students. It provides a cheap text book full of notes, a CAS package, interactive sheets, examples, exercises, shared good practice, support, tests, and so on. The differences in this latest version have enhanced the package without damaging its essence.

In the UK the package would support students studying GCSE, AS level, and A level Mathematics. It is also useful for university students across a wide range of disciplines who need to consolidate, develop and enhance their basic mathematical skills. A student on a more mathematical degree could start with StudyWorks! 2002 and if they enjoy the experience then they can move on, when appropriate, to the full Mathcad environment.

The colorful approach to mathematics can change ill informed and old fashioned preconceptions of what “doing mathematics” consists of, now that technology is here to stay [3].

We repeat our conclusions from our earlier review. StudyWorks provides value for money, a rich and integrated environment for learning both alone and in consort with others, a powerful mathematics processor and an introduction to a Mathcad-type environment. The environment provides opportunities for genuine student centred learning, and can make a useful contribution to student mathematical development in these days of wider access and heterogeneous intake of students.

References

- [1] Challis N V, Gretton H W and Bloom L (Feb 1999), "Review of StudyWorks! for Mathematics", <<http://www.bham.ac.uk/ctimath/reviews/feb99/swreview.pdf>> (accessed 23 October 2001)
- [2] Croft A C (2001), "Following up cycles of QAA subject assessments for non-mathematicians", *MSOR Connections*, 1, 2, pp 17-18
- [3] Gretton H W and Challis N V, (2000), "What is doing mathematics now that technology is here?", *Proc 5th Asian Technology Conference in Mathematics*, ATCM Inc, pp 285 - 293
- [4] MathSoft (2001), Math in Action, <<http://www.mathsoft.com/free.html>> (accessed 23 October 2001)
- [5] StudyWorks! Online (2001), <<http://www.studyworksonline.com/>> (accessed 23 October 2001)

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Supplier comments from Diane Ashfield, MathSoft International Marketing Manager

Download a StudyWorks GCSE Maths module free of charge at:

http://www.studyworksonline.com/cda/content/article/0,1034,NAV5-46_SAR1270,00.html

By providing the GCSE Maths content module free of charge to StudyWorks users, we hope to provide GCSE maths students of all abilities the chance to succeed in this very important subject...Although it is very easy to use, we hope StudyWorks will encourage students to aim higher than a pass grade at maths, thereby increasing the understanding of the subject. A better grade in maths might also increase a student's options when deciding what course to take after GCSEs.

Introduction to Groups

Understanding Groups

These are CD-Rom tutorials on university-level pure maths. They are self-study packages based on audio-led tutorials and each disk also contains a hyper-linked glossary and sets of exercises (with solutions). Study time for *An Introduction to Groups* is 7-10 hours, and for *Understanding Groups*, 20-30 hours.

'*An introduction to groups*' is the core of a first course in abstract algebra up to Lagrange's Theorem. It could be used in the first year of a university pure maths course, but is also appropriate for A-level studies. For example, it deals with material in the section on groups in the Oxford/Cambridge/RSA A-level paper (Paper 6) on Pure Maths (25% of the paper), and so covers part of the A-level Pure Maths and A-level Further Maths syllabus. It also covers the equivalent paper in the OCR MEI syllabus. At school / college level, this disk might be particularly suitable as an aid for teachers whose main expertise is in more traditional and concrete areas of mathematics.

The follow-up disk *Understanding Groups* leads on directly from this, but is definitely university level. It is suitable for 1st and 2nd Year courses. It includes Sylow's Theorem, the Jordan-Hölder Theorem and the structure theorems for finitely-generated abelian groups.

The disks work on PCs (not Macs). No complicated installation; just stick them in the slot and they go.

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