



MathAssess Tools

Maths in QTI V2.1

<http://www.sourceforge.net/qtitools>

MathAssess was a JISC Demonstrator project, completed March
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University of Edinburgh – SnuggleTeX Kingston University - AQuRate
University of Southampton – ASDEL University of Cambridge - Minibix

Question and Test Use Cases

Question Author

- Author questions
- Edit questions
- Store questions

Test Constructor

- Construct tests
- Edit tests
- Store tests

Tutor

- Assign tests
- Administer tests
- Manage results

Student

- Attempt questions
- Get new questions
- Take tests

Special requirements for Maths...

- Compute mathematical values (extend standard QTI)
- Use a Computer Algebra System (CAS)
- Don't (usually) select from "canned" examples
- Set default values and constants as maths expressions
- Compare mathematical variables:
Equal? Equivalent? Greater/Less?
- Compare mathematical expressions:
Functions, Coefficients, Terms
- Target student errors – "coeff of is incorrect"
- Use mathematical variables in feedback

Model for “Maths Variables”

Must have

- **Visual form**
expressions displayed as mathematics
- **Semantic meaning**
expressions can be manipulated
- **Input form for students**
as “natural” as possible
- **Input form for authors**
expresses meaning and hence appearance

- **SnuggleTeX** converts:

LaTeX to XHTML and MathML → PMathML to CMathML → CMathML to CAS code (Maxima)

- **ASCIIMathML** converts string input to (slightly strange) PMathML and displays on screen
- Maxima can output (strange) PMathML

So variable contains fields

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- **Presentation MathML**
 - **Content MathML**
 - **CAS code – Maxima**
- ↓
- **CAS code – Maxima**
used in authoring (if any)



CAS and Input Features

CAS integration - Maxima

For

- Computing groups of maths expressions
- Computing a single maths expression
- Comparing two expressions (variables of baseValues)
- Evaluating a condition

customOperator

- ScriptRule
- CasProcess
- CasCompare
- CasCondition

Students input maths expressions via **MathsInputInteraction** – enter string, display as PMathML via ASCIIMathML

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