WESTERN SYDNEY
UNIVERSITY

Is Numbas the best thing since sliced bread?

Don Shearman & Jim Pettigrew
Western Sydney University
EAMS
29 June 2021

Introduction

WESTERN SYDNEY UNIVERSITY

The Mathematics Education Support Hub (MESH) at Western Sydney University (WSU) had been investigating the use of Numbas for mathematics support for some time but the onset of COVID-19 and enforced online education has meant that the platform has become a central part of our support offerings and is being included in several mainstream subjects.

Introduction

WESTERN SYDNEY UNIVERSITY

To date Numbas has been used to

- provide over 90 formative and summative assessments in the online version of our Maths Start workshops providing refresher material in algebra, trigonometry, calculus and statistics for incoming students;
- assist nursing students in the mastery of basic numeracy;
- provide a hurdle assessment on basic mathematics in a first year programming subject;
- deliver questions for class tests in a discrete mathematics unit.

In this talk we will discuss some of the features of the system that have been of particular use and some of the pitfalls we have had to overcome in writing this material.

Benefits of using Numbas

WESTERN SYDNEY UNIVERSITY

Numbas has a range of benefits over native LMS quiz systems.
Numbas:

- is free! (open source)
- uses the MathJax LaTeX rendering engine for mathematical type
- employs an innovative numerical answer checking mechanism
- enables randomisation of many question components
- enables the creation of customised, interactive questions, feedback and marking algorithms
- enables the use of extensions to third party applications such as GeoGebra and JSXGraph
- is delivered via an elegant, user-friendly design, both at the front end in terms of look and feel and at the back end in terms of question development functionality

Pattern matching

WESTERN SYDNEY UNIVERSITY

To include a square root sign in your answer use `sqrt()`. For example, to write $\sqrt{3}$, type `sqrt(3)` into the answer box. If you are entering a number multiplied by the square root of some other number, for example $3\sqrt{5}$, type `3sqrt(5)` into the answer box.

b)

Simplify $3\sqrt{2}+\sqrt{50}-\sqrt{32}$.

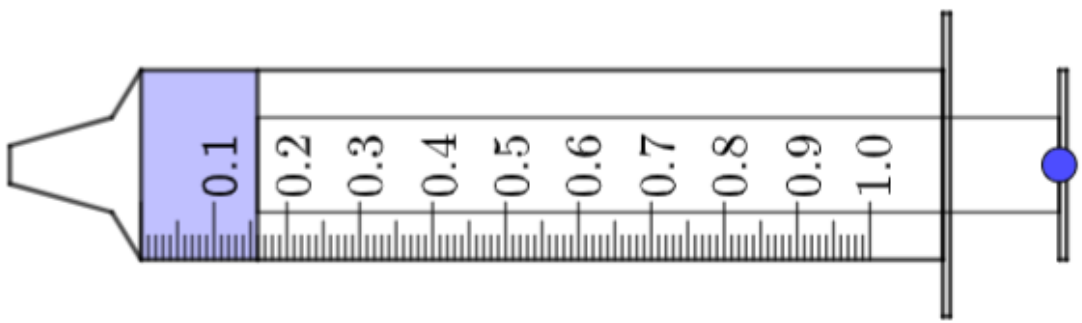
$3\sqrt{2}+\sqrt{50}-\sqrt{32}=$ [ ] .

Adding and subtracting surds

Geogebra extension

WESTERN SYDNEY UNIVERSITY

Use the 1 mL syringe below to draw up a volume of 0.73 mL.



Move the plunger to the required graduation

Non-equal binary responses

WESTERN SYDNEY UNIVERSITY

Dr Lee has ordered Largactil 90 mg for a patient. Stock syrup contains 40 mg per 2 mL. Your colleague Euan has calculated the volume required as 4.5 mL.

Is this calculation correct?

- ○ Yes
- ○ No

Check a drug dosage calculation

Variable variable names

WESTERN SYDNEY UNIVERSITY

Distributive law: expanding brackets general

Distributatative Rule

The expression $-8\,(7-6y)$ is factorised (written as a product), we can expand the expression (so it is written as a sum) to get

Distributive law: expanding brackets general

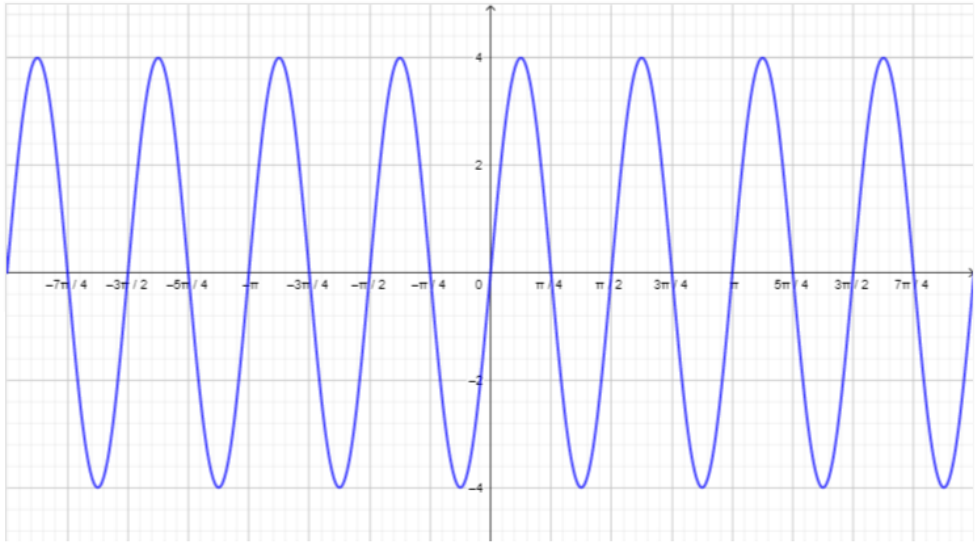
Distributatative Rule

The expression $6\,(4a-6t)$ is factorised (written as a product), we can expand the expression (so it is written as a sum) to get

Expanding brackets using the distributive law

Rendering of mathematical constants

WESTERN SYDNEY UNIVERSITY



The graph above is of a function whose definition is either $f(x) = a\sin(nx)$ or $f(x) = a\cos(nx)$. What are the period and amplitude of this function?

To enter a fraction use / and to enter π, type pi.

Period is ✖ Expected answer: pi/2 $\frac{\pi}{2}$

Amplitude is ✖ Expected answer: 4

Graphing trigonometric functions

Challenges of using Numbas

WESTERN SYDNEY UNIVERSITY

Despite its excellent functionality, the system does have a few challenges. Some of these are:

- documentation for advanced uses is still in development
- a small number of (mostly manageable) glitches in the Numbas system plus its LTI integration
- heavy reliance on one person for trouble-shooting/bug fixing (the user community is growing but is still relatively small)

Thank you

WESTERN SYDNEY
UNIVERSITY

Questions?