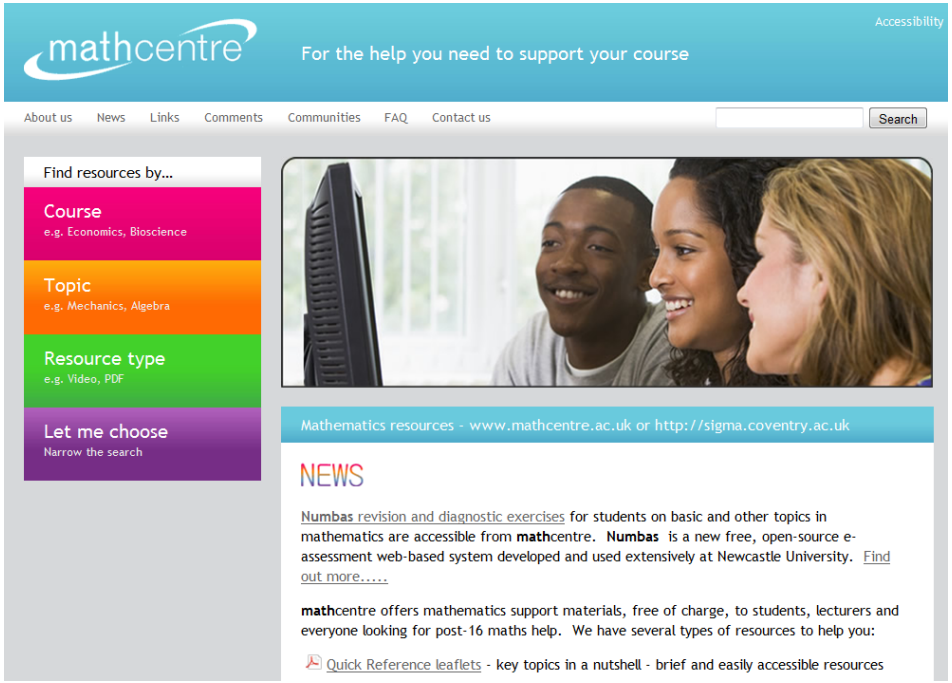
mathcentre

Online open access mathematics learning resources



Janette Matthews

www.mathcentre.ac.uk

- 2003 established
  - Consortium – Loughborough, Leeds and Coventry Universities; MSOR Network ; EBS Trust
  - Components developed through **math**tutor project (HEFCE and Gatsby Charitable Foundation)
- 2010 enhanced
  - Upgrade to website (JISC)
  - mathcentre Communities (FETLAR)

mathcentre in 2013

- Insights into users
- Content
- New resources
- mathcentre Community project

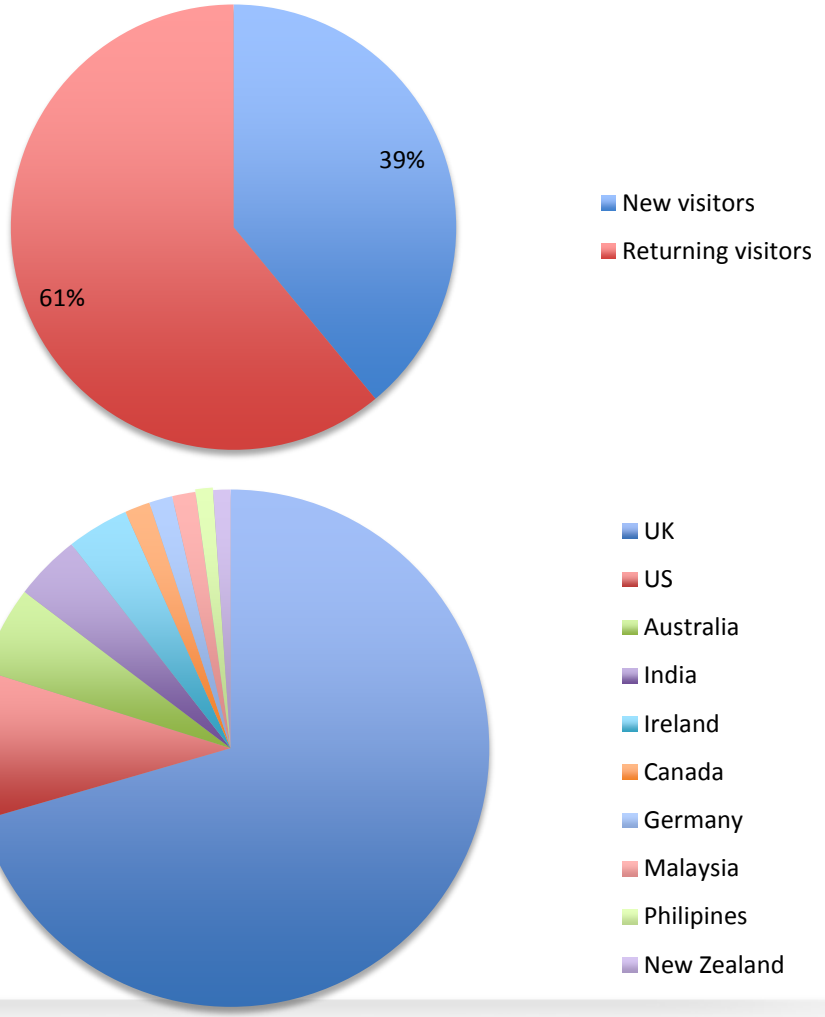
September 2012 – August 2013

250,000 visits

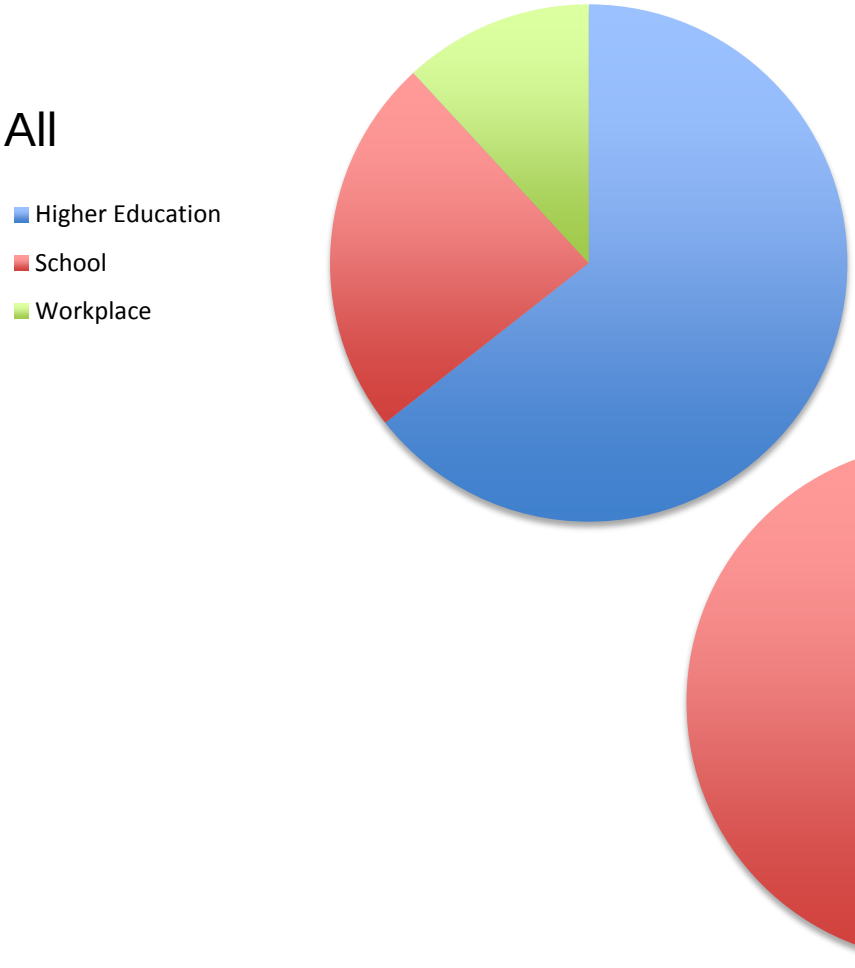
130,000 visitors

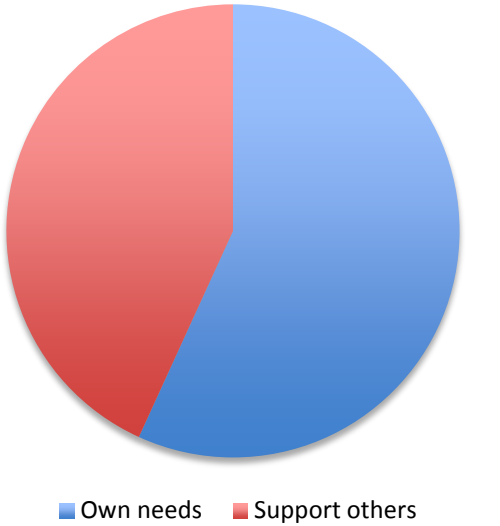
Visits per year	
201+	6900
101 - 200	3600
51 - 100	4300
26 - 50	6100

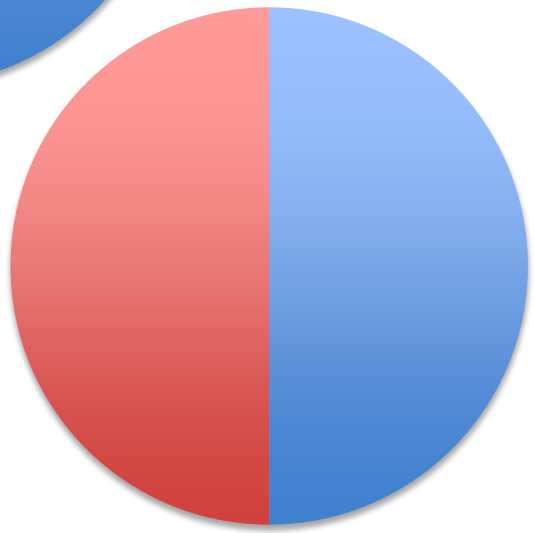
4:13 minutes

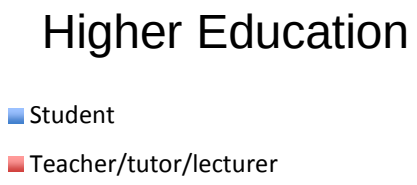


Regular Users (once a week)









Accessing mathcentre

Google	93.20%

Chrome	32%
Internet Explorer	28%
Safari	20%
Firefox	15%

Desktop	90%
Mobile	5%
Tablet	5%

49% access landing page

Most accessed resource types

RESOURCE TYPE	No of Resources
Video	66
Teach Yourself Booklet	57
Community Project	7
Refresher Booklet	5
Quick reference	3
External link	1
Fact & Formulae leaflet	1
Total	140

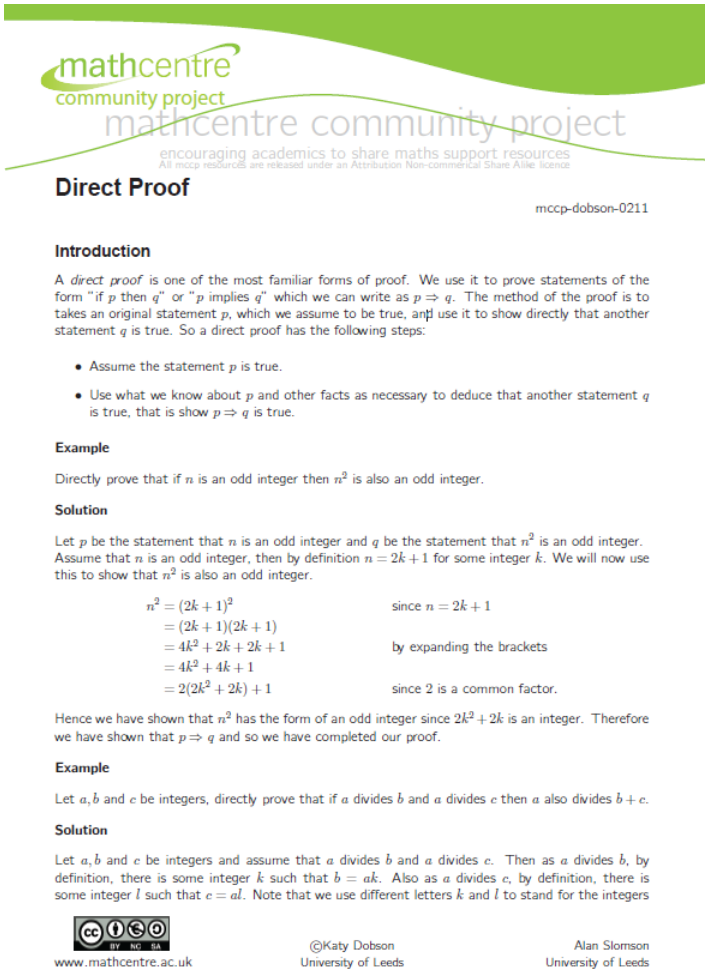
Most accessed resources

1	Algebra Refresher
2	Calculus Refresher
3	Maths EG
4	Arithmetic and Geometic Progressions (video)
5	Logarithms (video)
6	Completing the Square (video animation)
7	Tangents and Normals (video)
8	Arithmetic and Geometric Progressions (pdf)
9	Solving Differential Equations by Separating Variables (pdf)
10	Algebra Refresher (interactive version)
11	Maths EG Teacher
12	Completing the Square by Inspection (video)
13	The Chain Rule (video)
14	Force and Motion (motivating mathematics video)
15	Factorising Quadratic Equations (video)
16	Completing the Square (pdf)
17	Numeracy Refresher
18	Logarithms (pdf)
19	Tangents and Normals (pdf)
20	Integration by Substitution (video)

mathcentre Communities Project

- Mechanism to contribute resources
- Peer reviewed
- Templates
- Metadata
- Creative Commons
- Wish list

mathcentre Communities resources



mathcentre community project

mathcentre community project

encouraging academics to share maths support resources

Direct Proof

mccp-dobson-0211

Introduction

A *direct proof* is one of the most familiar forms of proof. We use it to prove statements of the form "if p then q" or "p implies q" which we can write as $p \Rightarrow q$. The method of the proof is to takes an original statement p, which we assume to be true, and use it to show directly that another statement q is true. So a direct proof has the following steps:

- Assume the statement p is true.
- Use what we know about p and other facts as necessary to deduce that another statement q is true, that is show $p \Rightarrow q$ is true.

Example

Directly prove that if n is an odd integer then n^2 is also an odd integer.

Solution

Let p be the statement that n is an odd integer and q be the statement that n^2 is an odd integer. Assume that n is an odd integer, then by definition $n = 2k + 1$ for some integer k. We will now use this to show that n^2 is also an odd integer.

$$\begin{aligned} n^2 &= (2k+1)^2 && \text{since } n = 2k+1 \\ &= (2k+1)(2k+1) \\ &= 4k^2 + 2k + 2k + 1 && \text{by expanding the brackets} \\ &= 4k^2 + 4k + 1 \\ &= 2(2k^2 + 2k) + 1 && \text{since 2 is a common factor.} \end{aligned}$$

Hence we have shown that n^2 has the form of an odd integer since $2k^2 + 2k$ is an integer. Therefore we have shown that $p \Rightarrow q$ and so we have completed our proof.

Example

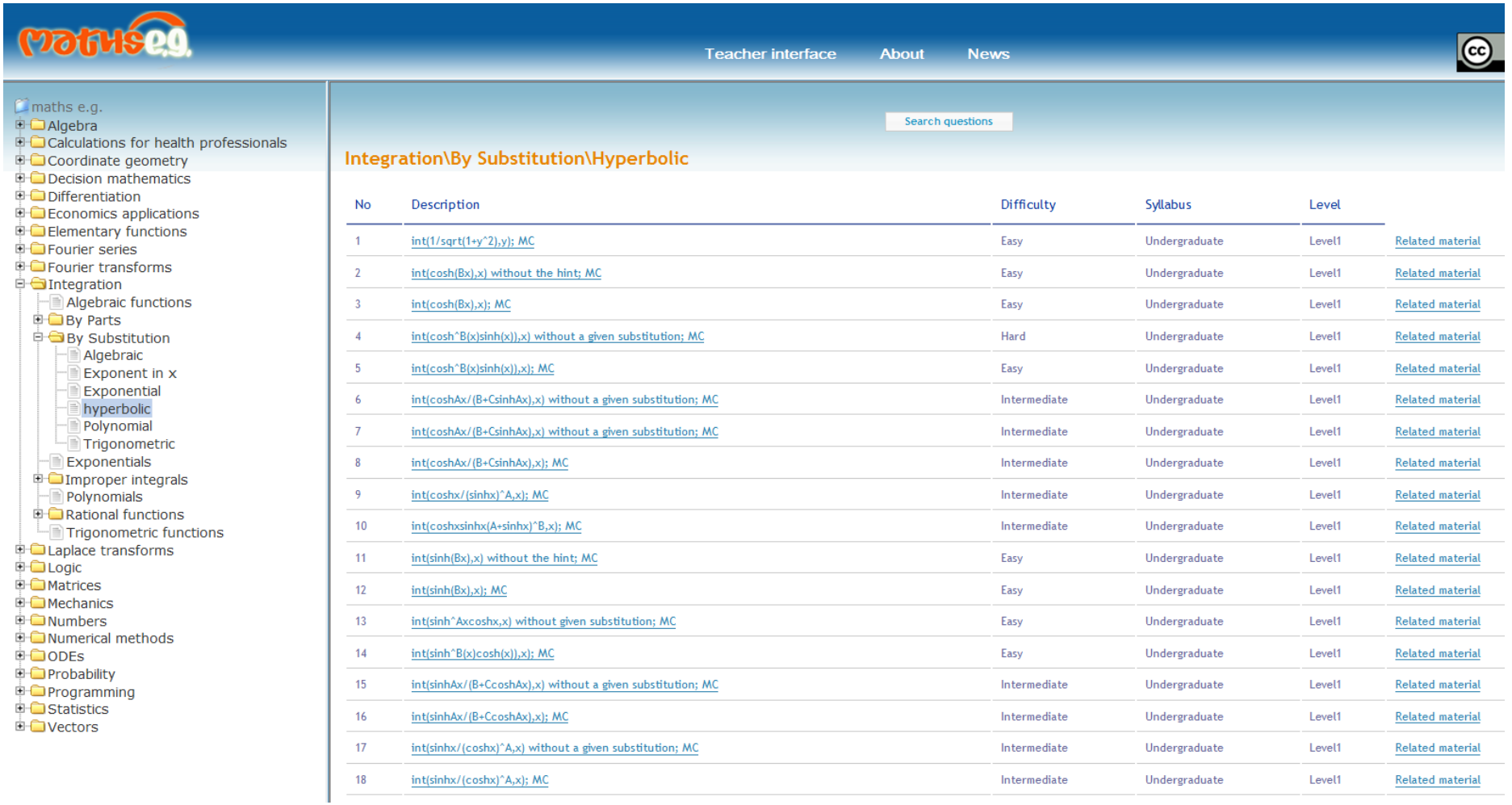
Let a, b and c be integers, directly prove that if a divides b and a divides c then a also divides $b + c$.

Solution

Let a, b and c be integers and assume that a divides b and a divides c. Then as a divides b, by definition, there is some integer k such that $b = ak$. Also as a divides c, by definition, there is some integer l such that $c = al$. Note that we use different letters k and l to stand for the integers

- Quick reference leaflet – 2 x A4
- mathcentre communities project logo
- author
- reviewer
- creative Commons
- metadata
  - title
  - description
  - keywords
  - topics
  - course
- source files
  - LaTeX/Word etc
  - diagrams

Maths e.g - Martin Greenhow, Brunel University



No	Description	Difficulty	Syllabus	Level	
1	int(1/sqrt(1+y^2),y); MC	Easy	Undergraduate	Level1	Related material
2	int(cosh(Bx),x) without the hint; MC	Easy	Undergraduate	Level1	Related material
3	int(cosh(Bx),x); MC	Easy	Undergraduate	Level1	Related material
4	int(cosh^B(x)sinh(x)),x) without a given substitution; MC	Hard	Undergraduate	Level1	Related material
5	int(cosh^B(x)sinh(x)),x); MC	Easy	Undergraduate	Level1	Related material
6	int(coshAx/(B+CsinhAx),x) without a given substitution; MC	Intermediate	Undergraduate	Level1	Related material
7	int(coshAx/(B+CsinhAx),x) without a given substitution; MC	Intermediate	Undergraduate	Level1	Related material
8	int(coshAx/(B+CsinhAx),x); MC	Intermediate	Undergraduate	Level1	Related material
9	int(coshx/(sinhx)^A,x); MC	Intermediate	Undergraduate	Level1	Related material
10	int(coshxsinhx(A+sinhx)^B,x); MC	Intermediate	Undergraduate	Level1	Related material
11	int(sinh(Bx),x) without the hint; MC	Easy	Undergraduate	Level1	Related material
12	int(sinh(Bx),x); MC	Easy	Undergraduate	Level1	Related material
13	int(sinh^Axcoshx,x) without given substitution; MC	Easy	Undergraduate	Level1	Related material
14	int(sinh^B(x)cosh(x)),x); MC	Easy	Undergraduate	Level1	Related material
15	int(sinhAx/(B+CcoshAx),x) without a given substitution; MC	Intermediate	Undergraduate	Level1	Related material
16	int(sinhAx/(B+CcoshAx),x); MC	Intermediate	Undergraduate	Level1	Related material
17	int(sinhx/(coshx)^A,x) without a given substitution; MC	Intermediate	Undergraduate	Level1	Related material
18	int(sinhx/(coshx)^A,x); MC	Intermediate	Undergraduate	Level1	Related material

Maths e.g. Teachers interface

questions in test

No	Description	Difficulty	Syllabus	Level	Included
1	(a+b)(a-b), random a,b; MC	Easy	GCSE	Intermediate	✓
2	(ax+b)(cx+d) a,c -ve ,b,d +ve; MC	Hard	GCSE	Intermediate	✓
3	y^a divsign y^b; a, b +ve; MC	Intermediate	GCSE	Higher	✓

Back to tests

Delete selected questions

Numbas – Bill Foster, Newcastle University

Complex Roots of Polynomials - Numbas

2 questions finding roots of real polynomials. Numbas resources have been made available under a Creative Commons licence by the School of Mathematics & Statistics at Newcastle University.

Diagnostic Test in Differentiation - Numbas

26 questions: Product Rule, Quotient Rule and Chain Rule. For those that want a thorough testing of their basic differentiation using the standard rules. Numbas resources have been made available under a Creative Commons licence by the School of Mathematics & Statistics at Newcastle University.

Diagnostic Test: Indefinite Integration - Numbas

16 questions: Inverse of differentiation, substitution, inverse trig functions, partial fractions and by parts. For those that want a thorough testing of their basic techniques in integration. Numbas resources have been made available under a Creative Commons licence by the School of Mathematics & Statistics at Newcastle University.

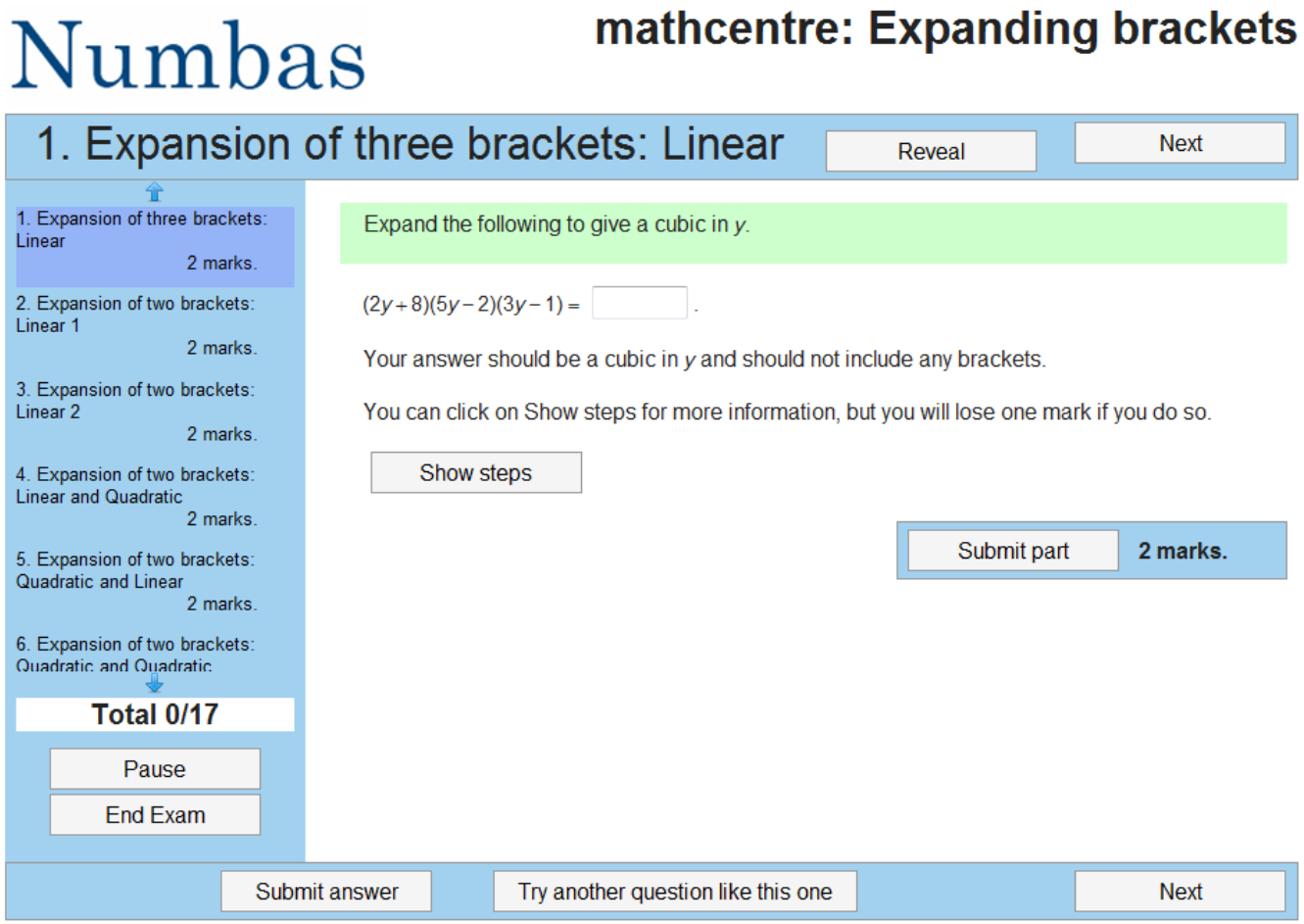
Expanding Brackets - Numbas

9 questions: Expanding out expressions such $(ax+b)(cx+d)$ etc. Numbas resources have been made available under a Creative Commons licence by the School of Mathematics & Statistics at Newcastle University.

Factorising quadratics - Numbas

3 questions on factorising quadratics. The second question also asks for the roots of the quadratic. The third question involves factorising quartic polynomials but which are quadratics in x^2. Numbas resources have been made available under a Creative Commons licence by the School of Mathematics & Statistics at Newcastle University.

Numbas


Numbas
mathcentre: Expanding brackets
1. Expansion of three brackets: Linear
Reveal
Next
1. Expansion of three brackets: Linear
2 marks.
2. Expansion of two brackets: Linear 1
2 marks.
3. Expansion of two brackets: Linear 2
2 marks.
4. Expansion of two brackets: Linear and Quadratic
2 marks.
5. Expansion of two brackets: Quadratic and Linear
2 marks.
6. Expansion of two brackets: Quadratic and Quadratic
Total 0/17
Pause
End Exam
Expand the following to give a cubic in y.
(2y+8)(5y−2)(3y−1) =
Your answer should be a cubic in y and should not include any brackets.
You can click on Show steps for more information, but you will lose one mark if you do so.
Show steps
Submit part
2 marks.
Submit answer
Try another question like this one
Next

Statistics resources - statstutor

statstutor

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Topic
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Resource type
e.g. Video, Paper based

Let me choose
See all

Statistics support for students - www.statstutor.ac.uk

statstutor offers statistics support materials, free of charge, to students, lecturers and everyone looking for post-16 statistics help. We have several types of resources to help you:

Case Study Videos - watch and listen as a tutor helps students handle projects involving real data;

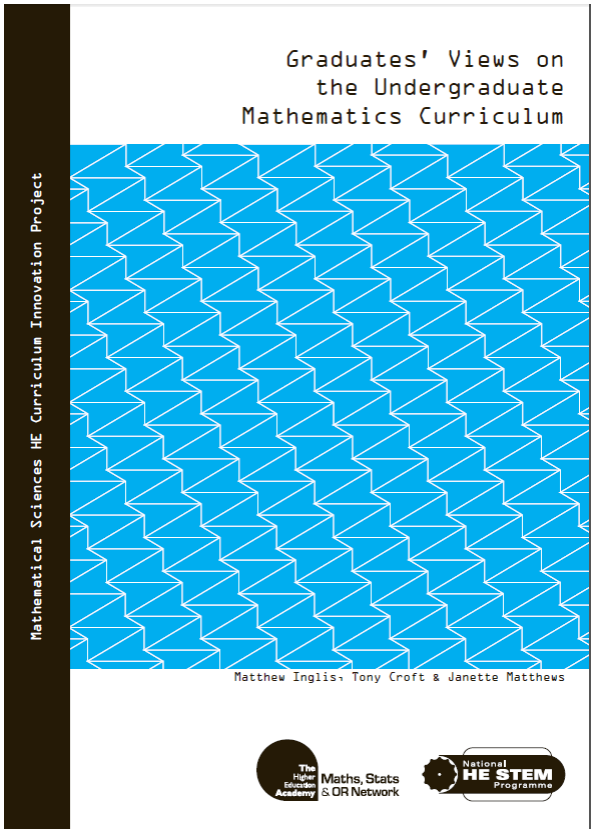
Video Tutorials - watch and listen to a tutor working through important topics in statistics;

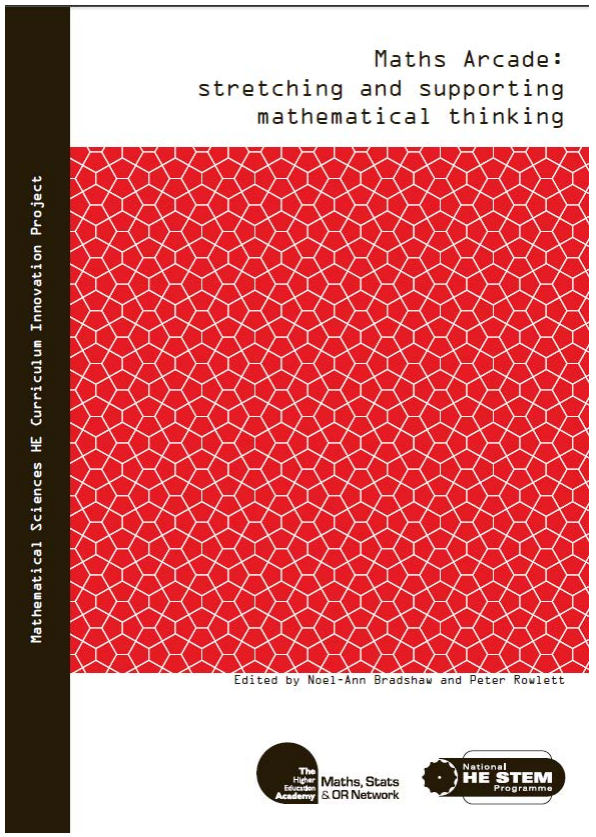
Teach Yourself - these paper based resources provide in-depth treatment of important topics, with theory and worked examples (sometimes written to accompany the video tutorials above);

mathcentre for staff

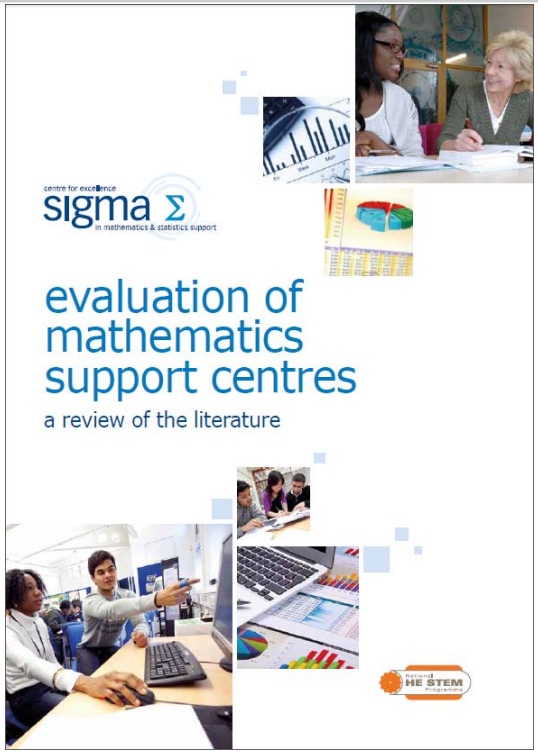
- Key reports
- sigma guides
- Research publications
- links

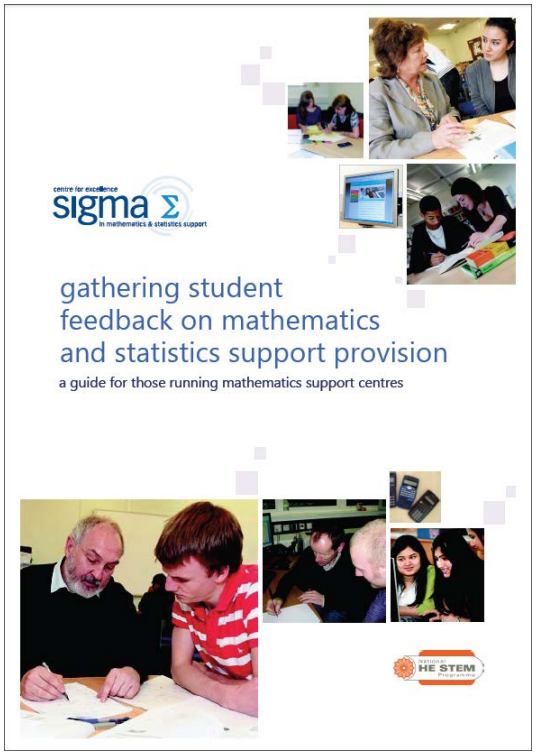
HE STEM – HE Curriculum Innovation

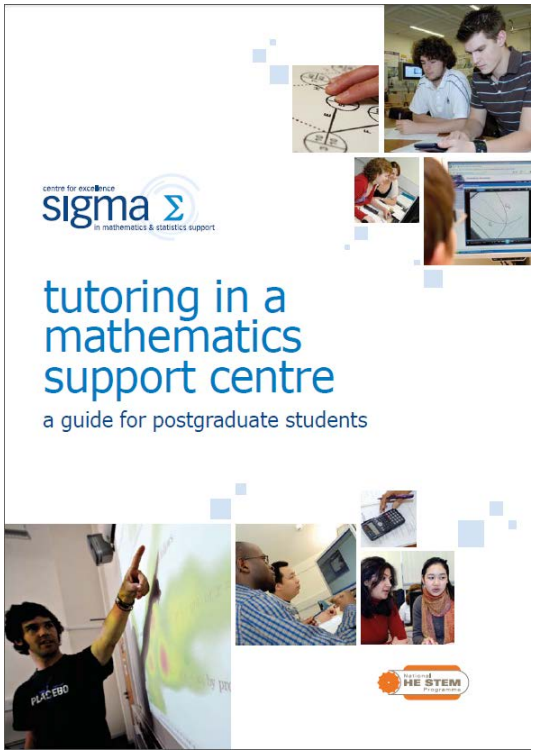




sigma Guides







mathematics learning support in UK higher education

Coming soon

- Facts & Formulae leaflets in Welsh
  - Dr Tudur Davies (Coleg Cymraeg Cenedlaethol)
- DEWIS algorithmic e-assessment questions
  - Dr Rhys Gwynllyw (University of the West of England)
- sigma Annual Report 2012/13
- sigma Resource workshop 18 September

mathcentre in 2013

- Well used repository of open access resources
  - Mathematics learners
  - Academics
  - Mathematics support practitioners
- Well regarded by the community
- Expanding through **math**centre Community Project

Contact mathcentre

- Sign up to mathcentre mailing list
- community@mathcentre.ac.uk
- J.Matthews@lboro.ac.uk