

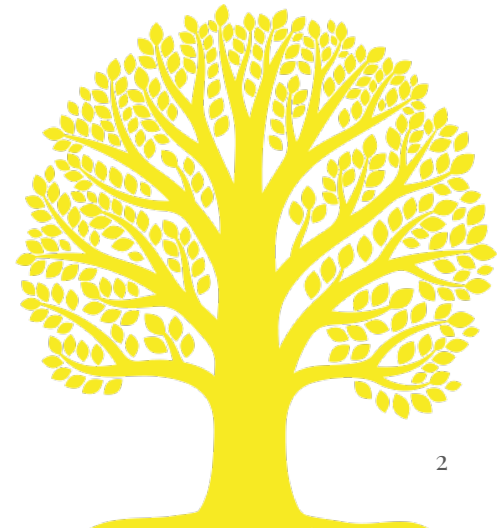
Edexcel International AS/A Level Mathematics Welcome to Pearson: Module 1

First teaching in 2018, first assessment 2019



Session Agenda

- 10:00 Welcome & Introductions. Poll to get to know you.
- 10:10 Introduction to the new Edexcel International AS/A level in mathematics
- 10:20 How the mathematics units are combined to make the A levels
- 10:40 Teaching issues and Activity 1
- 11:05 Break
- 11:10 Assessing Edexcel International A level
- 11: 35 Support, resources and final questions
- 12:00 Finish



The Welcome to Pearson suite of Training Modules

Module 1 – Introduction to Pearson International A levels and AS levels in Mathematics



Module 2 – Assessment objectives and their use in writing mathematics examination papers

Module 3 – Support for centres to prepare students for Edexcel International A level Mathematics examinations



Getting to know you

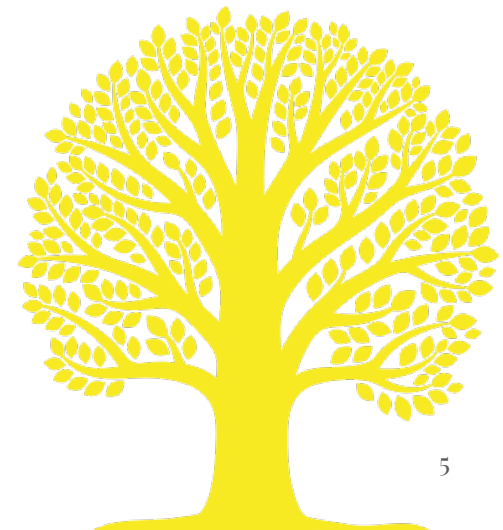
Please complete **the poll** which will be on your screen shortly.

It helps your trainer to understand why you are following the module and what you are hoping to gain from doing it.



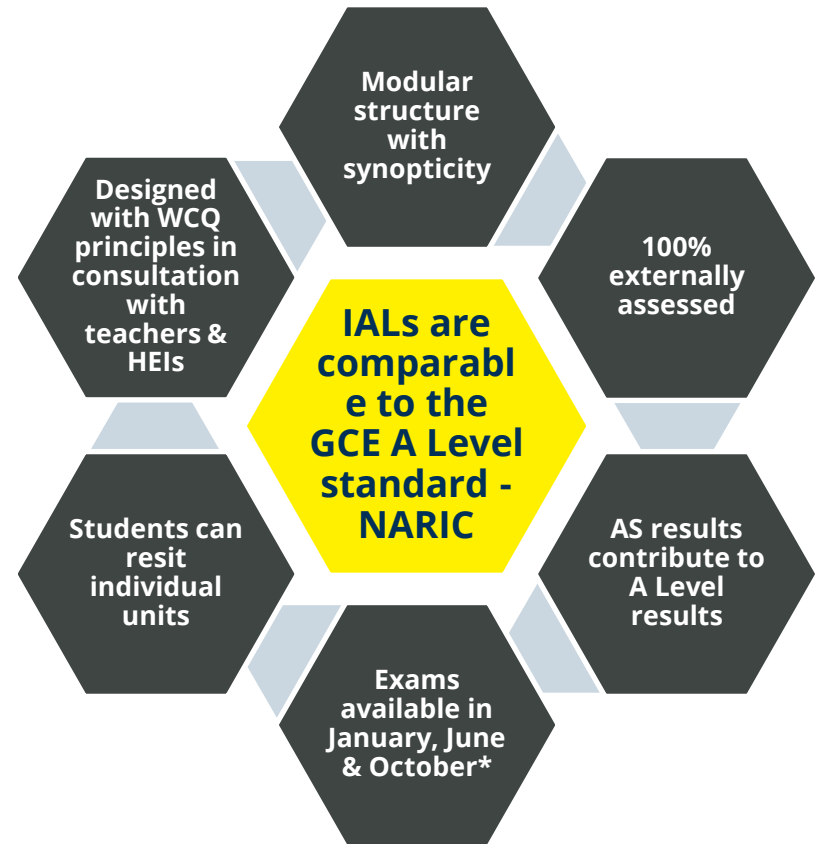
Aims and objectives

- To gain understanding about how the qualifications are devised
- To understand the content of the qualification
- To understand how to plan the course and/or lessons
- To understand the assessment of the qualification and how to prepare students
- To understand the support available from Pearson
- To network and share ideas with other teachers.



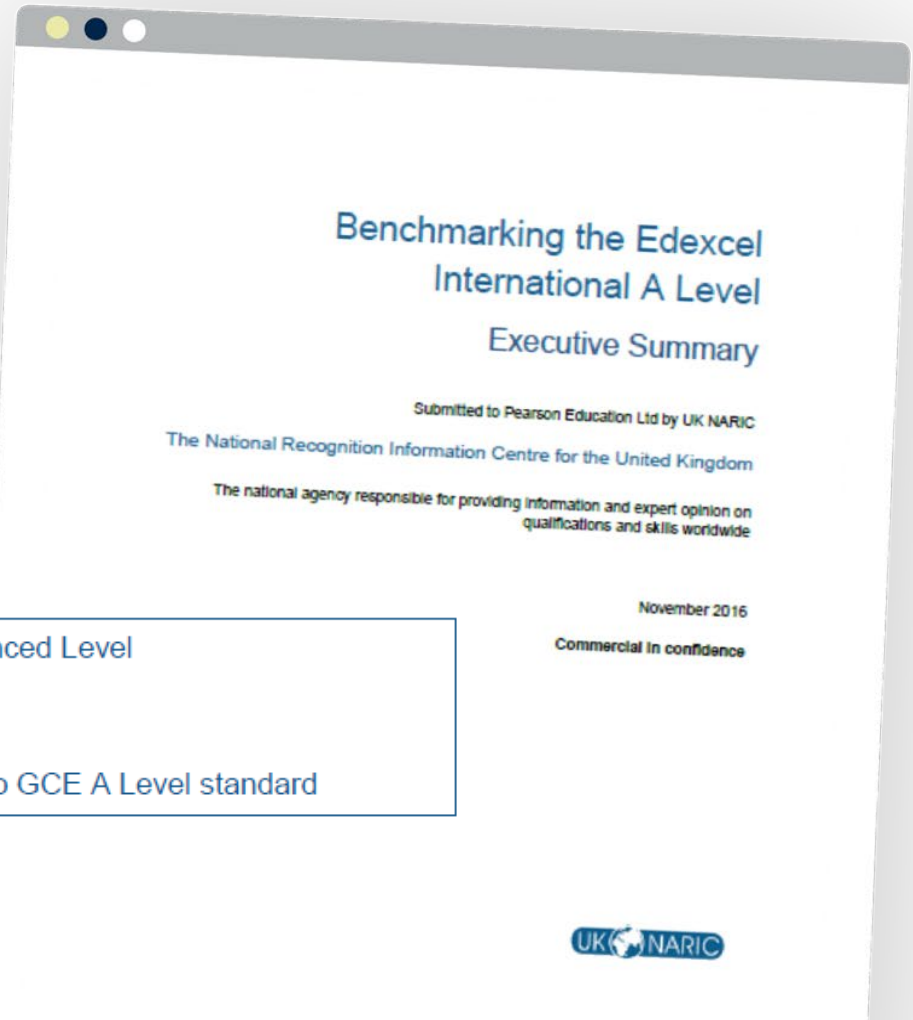
IAL Features

- International A Levels and AS Levels are created for International Students
- Globally recognised.



Updated NARIC report for Edexcel IAL

The executive summary confirms that Edexcel IALs are considered comparable to the GCE A Level standard following reforms to the UK regulated qualifications.



Qualification:	Edexcel International Advanced Level
Awarding Institution:	Pearson Education Ltd
Comparability:	Is considered comparable to GCE A Level standard

IAS & IAL subjects

Biology	Chemistry	Physics	Mathematics	Further Mathematics
Pure Mathematics	Information Technology	Business	Economics	Accounting
English Language	English Literature	History	Geography	Psychology
Arabic	French	German	Greek	Spanish
		Law (IAL only)		



World-class qualifications

All Edexcel qualifications are developed to meet Pearson's **World Class Qualification design principles**

Endorsement of educational **thought-leaders and assessment experts** from across the globe



Developed using an understanding and benchmarking of **all educational systems**

Qualifications that support young people to **develop the capabilities** they need to **progress** and prosper in their lives

IAL 2018 Mathematics

Mathematics | Further Mathematics | Pure Mathematics

Reviewed and
updated in light
of GCE A level
changes

Pure Mathematics
content in 4 units
(Plus 3 units of
Further Pure
Mathematics)

5 optional routes
to achieve
qualification

14 equally
weighted units

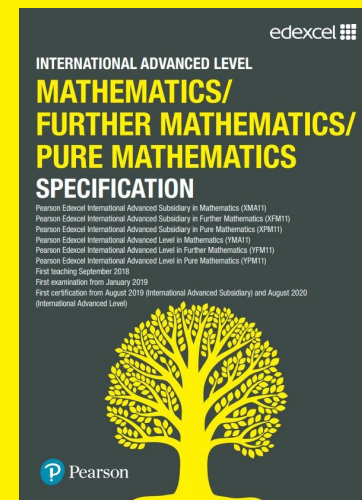
Transferable Skills
embedded

Fully modular
examinations
three times a year
AS contributes to
A level

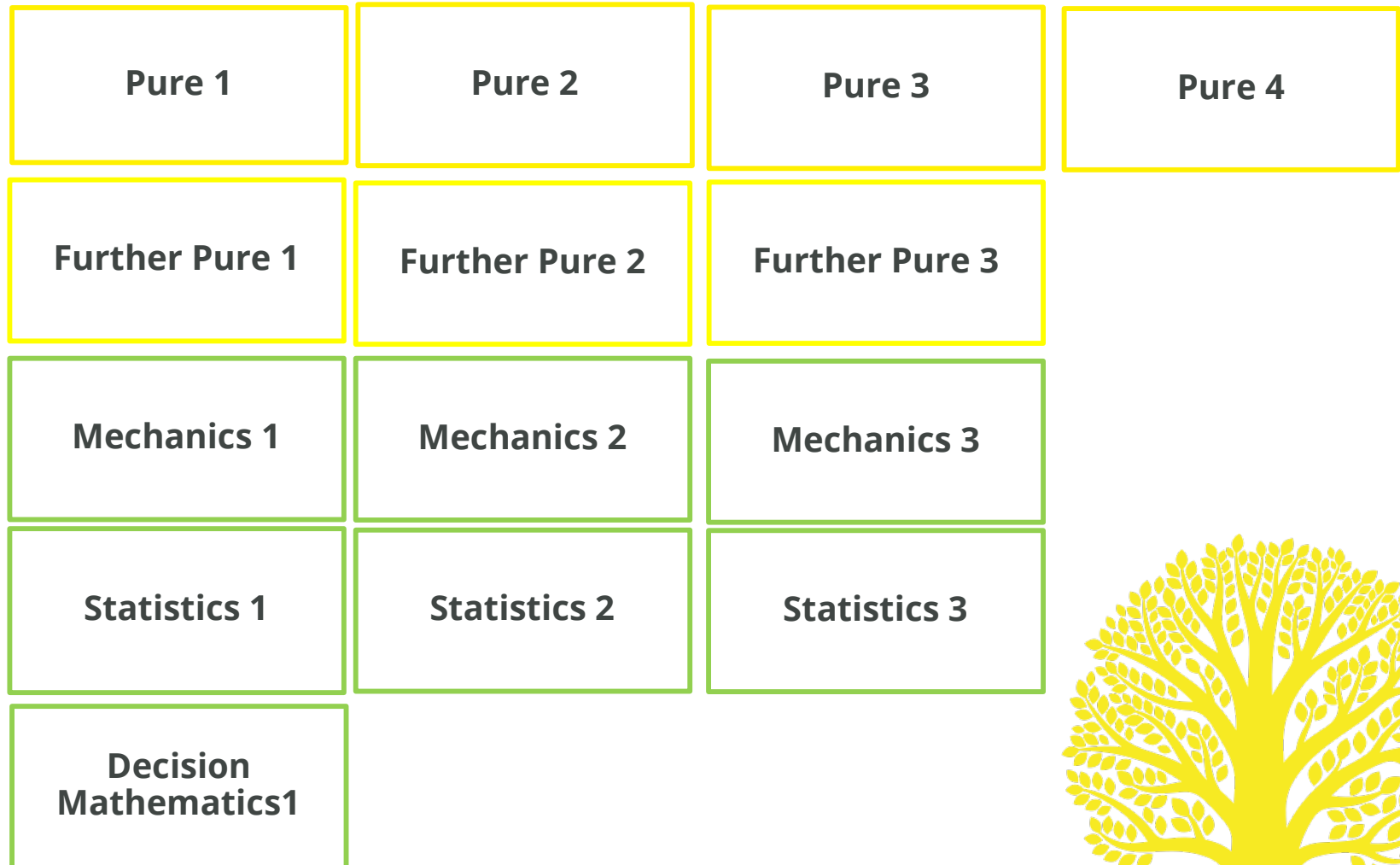
Dedicated
textbooks are
available

Suitable
preparation for
AEA Mathematics

[TeachingMaths](https://www.teachingmaths.com)
[@pearson.com](https://www.pearson.com)



The Edexcel IAL mathematics units



What is International AL Mathematics?

Pure 1

Pure 2

Pure 3

Pure 4

Algebra
Calculus
Trigonometry

and Mechanics 1 and Statistics 1 or Mechanics 1 and Decision Mathematics

or Statistics 1 and Decision Mathematics

Or

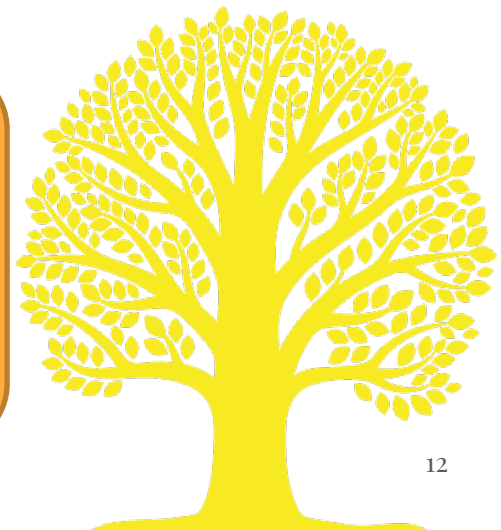
Mechanics I and II

Or

Statistics 1 and II

Each unit is assessed by a 90 minute
75 mark examination

Each unit accounts for one sixth of the
final award



What is International AL Pure Mathematics?

Pure 1

Pure 2

Pure 3

Pure 4

Algebra

Calculus

Trigonometry

And

Further Pure 1

And either

Further Pure 2

or

Further Pure 3



What is International AL Further Mathematics?

Further Pure 1

And either

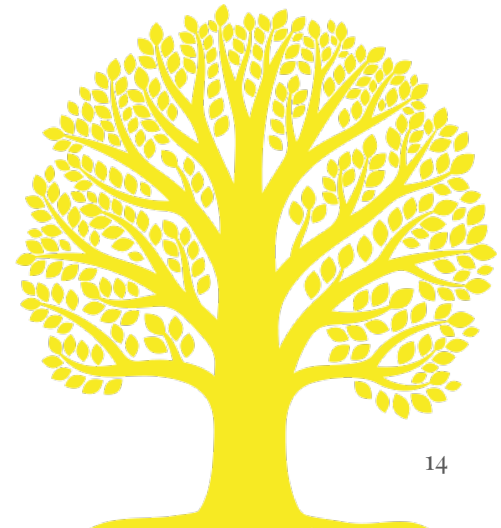
Further Pure 2

or

Further Pure 3

And a further 4 units from the applied units and the remaining FP unit

Each unit is assessed by a 90 minute
75 mark examination



What is International AS Mathematics?

This is a course which consists of Pure 1, Pure 2 and one of the applied courses.

There are similar arrangements for AS Pure mathematics and AS Further mathematics.

Full details are available on the Edexcel website and in the Specification document.



International AL Mathematics: the details

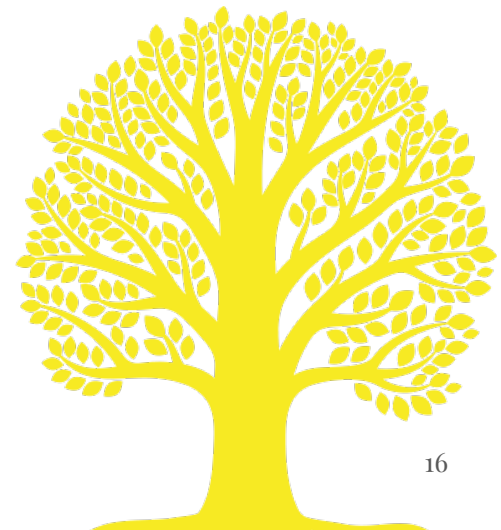
The details of the content can be found in the **specification**

The details of the assessment model can be found in the **specification**

Examples of examination papers and mark schemes can be found in the **sample assessment materials (SAMS)**

All available on the Pearson Edexcel site

<https://qualifications.pearson.com/en/qualifications/edexcel-international-advanced-levels/mathematics-2018.html>



International AL Mathematics: the details

The Pure units: P1, P2, P3 and P4

P1 follows on naturally from Edexcel International GCSE

P2 assumes knowledge of P1

P3 assumes knowledge of P1 and P2

P4 assumes knowledge of P1 and P2 and P3

The Applied units: M1, M2, S1, S2, D1

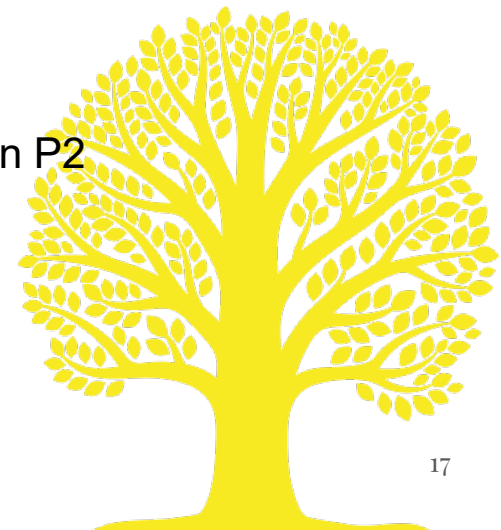
M1 assumes knowledge of P1, P2 and 2 dimensional vectors

M2 assumes knowledge of P1, P2, P3, P4 and M1

S1 follows on naturally from Edexcel International GCSE

S2 assumes knowledge of S1, P1 and the definite integration found in P2

D1 follows on naturally from Edexcel International GCSE



International AL Mathematics: the details

The Pure units all have a similar structure.
For example:

Pure1

Algebra and functions

Co-ordinate geometry in the (x, y) plane

Trigonometry

Differentiation

Integration

The assessment of Pure 1 is by an externally set and externally marked examination consisting of about 10 questions.

Other units, both pure and applied, have similar assessments.

These are the main headings

Algebra and functions has 12 sections



International AL Mathematics: the details

The examination of any unit consists of a combination of short and long questions.

Here is an example of a short question from a Pure 1 paper:

2. (a) Given that $3^{-1.5} = a\sqrt{3}$ find the exact value of a (2)

(b) Simplify fully $\frac{(2x^{\frac{1}{2}})^3}{4x^2}$ (3)



International AL Mathematics: the details

The examination of any unit consists of a combination of short and long questions.

Here is an example from Mechanics 1:

3. A block A of mass 9 kg is released from rest from a point P which is a height h metres above horizontal soft ground. The block falls and strikes another block B of mass 1.5 kg which is on the ground vertically below P . The speed of A immediately before it strikes B is 7 m s^{-1} . The blocks are modelled as particles.

(a) Find the value of h .

(2)

Immediately after the impact the blocks move downwards together with the same speed and both come to rest after sinking a vertical distance of 12 cm into the ground. Assuming that the resistance offered by the ground has constant magnitude R newtons,

(b) find the value of R .

(8)

International AL Mathematics: the details

Activity 1

You need a copy of the Pure 1 Section from the International AL specification and a copy of the International GCSE specification.

Use both copies to write down any topics which you feel would be completely new to a student doing the P1 course if they had previously followed the International GCSE course.



Teaching IAL Mathematics

Issues you have to consider when teaching (some of which are culture specific).

- Classroom layout – can you arrange the tables/desks to suit your style of teaching?
- Do you have a smart screen?
- Do you have access to the internet?
- What type of exercise books do you use – or do you want students to work on file paper?
- Assuming English is the language of instruction, how well do your students understand the spoken word and the written word?

Learning culture –
competitive/cooperative

Using paper and files
enables students to be more
responsible for their own
work in preparation for H.E.



Teaching IAL Mathematics

Issues on content coverage:

- how much prior learning can you assume?
- what textbook should you use?
- how often should you test learning?
- should you write your own tests ?

Some of these have
resource implications and
are covered later.

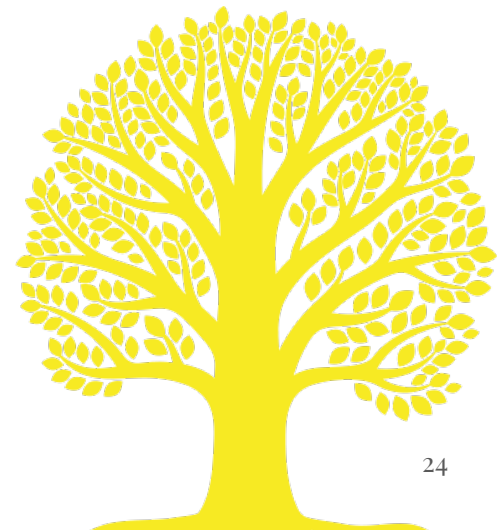


Teaching IAL Mathematics

Organisational issues:

- how often should you set homework and how much?
- does your school/college have an examination week?
- when sharing a course between two teachers, how do you split the content?

For example if P1 and M1 are being taught first, how is P2 going to be split?



Teaching IAL Mathematics

Organisational issues:

- Sharing the first year of the course between two teachers

One possible model:

- Term 1 Share P1: Teacher A does Algebra and Functions, Coordinate geometry
Teacher B does Trigonometry, Differentiation and Integration
- Term 2 Teacher A does Mechanics 1
Teacher B does Pure 2
- Term 3 Revision – Pure 1, 2 and Mechanics 1 past papers



Teaching IAL Mathematics

Organisational issues:

- We want you to let us know if you share the first year of the course between two teachers
- Please complete the poll
- Results will be shared anonymously
- Add anything further in Chat



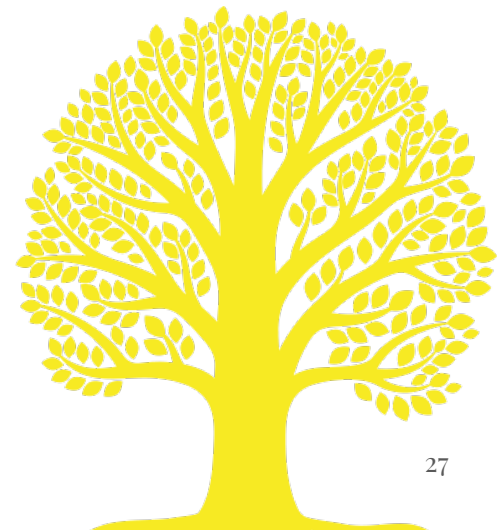
Teaching IAL Mathematics

Activity 2

This asks you to consider the issues raised in three previous slides (they are repeated on the Activity 2 sheet).

Look at each of the slides in turn and consider what other points you would have to think about when teaching the course.

Use Chat to add anything you feel has been omitted from the slides.



Teaching IAL Mathematics

Schemes of Work (SOWs)

Whether a single teacher is taking all the lessons or whether the teaching is shared, an SOW is essential:

- it enables progression, so that ideas are presented in the correct order
- it enables the course to be taught in a timely manner, so that no topic is rushed
- it enables cooperation between teachers if the course is shared
- it enables testing to take place in a methodical way



Teaching IAL Mathematics

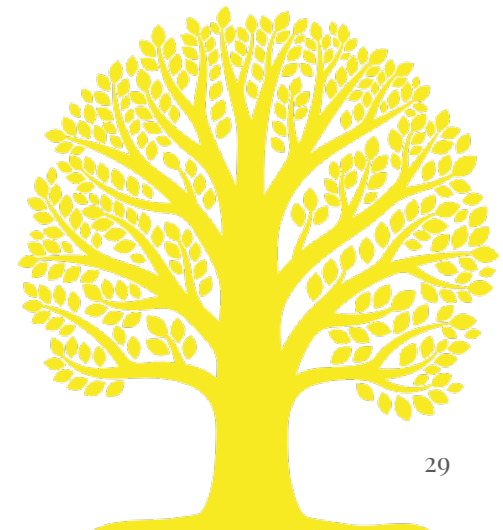
Some teachers prefer to design their own schemes of work or to use a maths department one to reflect local priorities.

Edexcel has produced an SOW as a guide for teachers:

General

- Teaching time for each topic - 4 hours for powers and surds
- Prior knowledge needed - collect like terms and factorise
- keywords - irrational

The examples relate to the
Algebra and Functions
section of Pure 1



Teaching IAL Mathematics

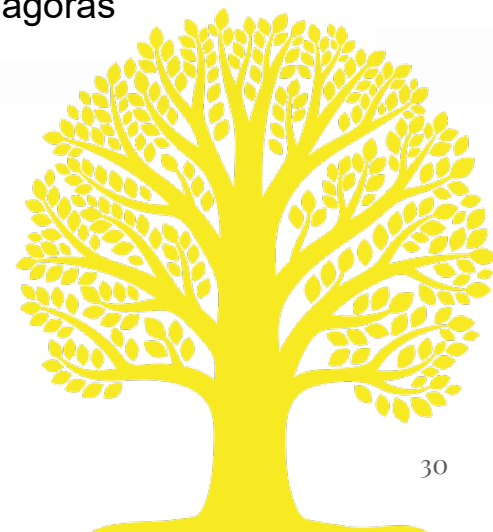
Some teachers prefer to produce their own schemes of work or to use a maths department one to reflect local priorities.

Edexcel has produced an SOW as a guide for teachers:

Specific

- Teaching objectives - use and manipulate surds; rationalise the denominator
- Teaching points - Make sure students can square $2\sqrt{3}$ correctly
- Opportunities for reasoning/problem solving - exact answers involving Pythagoras
- Common misconceptions - writing $\frac{1}{3x}$ as $3x^{-1}$

The examples relate to surds
in the Algebra and Functions
section of Pure 1



Assessing IAL Mathematics

Each unit is assessed through a 90-minute examination paper.

The examination paper is constructed by the senior examining team – experienced examiners, most of whom are practising or retired teachers or lecturers.

The rules for constructing examination papers are strict:

- Sufficient content must be present in each paper
- All content must be examined over a period of papers
- No content can be set which is NOT in the specification
- The five Assessment Objectives must all be tested
- The demand of successive papers should be roughly the same.



Assessing IAL Mathematics

Assessment Objectives

These describe how the content is to be examined.

In IAL Mathematics there are five assessment objectives:

AO1 Recall, select and use knowledge of facts, concepts and techniques

AO2 Construct rigorous arguments and proofs

AO3 Recall, select and use knowledge of mathematical models

AO4 Comprehend translations of realistic contexts into mathematics

AO5 Use calculator technology and other permitted resources accurately.

The marks assigned to each assessment objective are different in some units.
More details in module 2 of the course



Assessing IAL Mathematics

Ensuring consistency

The examination paper marking team consists of experienced practising or retired teachers managed by team leaders who themselves are responsible to a senior examiner.

To ensure fairness of marking each examination script is scanned and electronically split so that each question is marked by different examiner.

Each examiner must adhere to a detailed mark scheme; their marking is monitored and corrected if necessary by a senior examiner.



Assessing IAL Mathematics

Here is an example of a question taken from June 2019 Pure 1.....

5. (a) Find, using algebra, all real solutions of

$$2x^3 + 3x^2 - 35x = 0$$

(3)

(b) Hence find all real solutions of

$$2(y - 5)^6 + 3(y - 5)^4 - 35(y - 5)^2 = 0$$

(4)

Before we go on to the next slide think for a minute how the 3 marks could be allocated in (a) and the 4 marks in (b)

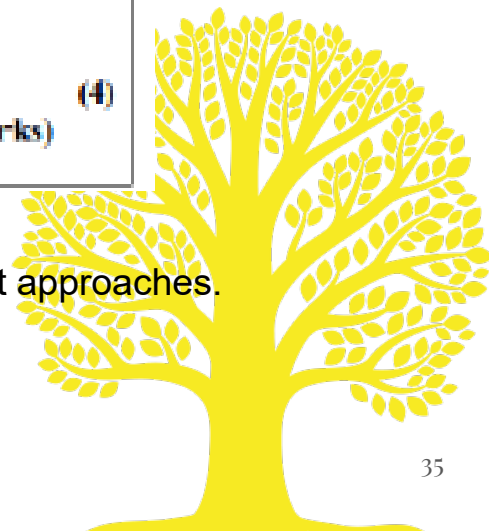


Assessing IAL Mathematics

....and here is the mark scheme

Question Number	Scheme	Marks
5.(a)	$2x^3 + 3x^2 - 35x = 0 \Rightarrow x(2x^2 + 3x - 35) = 0$ $(2x - 7)(x + 5) = 0 \Rightarrow x = \dots$ $x = -5, 0, \frac{7}{2}$	M1 dM1 A1 (3)
(b)	$2(y - 5)^5 + 3(y - 5)^4 - 35(y - 5)^2 = 0$ <p>States that $y = 5$ is a solution</p> $(y - 5)^2 = \frac{7}{2} \Rightarrow y = \dots$ $y = 5 + \sqrt{\frac{7}{2}} \text{ or } y = 5 - \sqrt{\frac{7}{2}} \text{ or exact equivalent}$ <p>Both $y = 5 + \sqrt{\frac{7}{2}}$ and $y = 5 - \sqrt{\frac{7}{2}}$ or exact equivalent.</p>	B1 M1 A1ft A1 (4) (7 marks)

There are also additional notes for each section on how to mark other correct approaches.



Assessing IAL Mathematics

Activity 3 Marking

Use the mark scheme provided to mark two student responses to question 5.

When you have completed marking each response, record the mark in the online poll.



Assessing IAL Mathematics

Arriving at a final grade

The raw mark for each of the 6 units is converted to a mark on the Uniform Mark Scale (UMS).

The purpose of the UMS is to take into account the relative difficulty of each unit as evidenced by the distribution of raw marks on that unit.

So a difficult paper (say paper 1) may have a grade A boundary at 63 marks, whereas an easier one (say paper 3) may have the grade A boundary at 60 marks.

A student who got 63 on paper 1 and 60 on paper 3 would have the same UMS (80) on each paper.

The final grade is found by adding all six UMS (grade A is 480 out of a possible 600)



Supporting IAL Mathematics

Edexcel provides a multitude of support features for centres to help prepare students for exams.

- Regional Pearson support staff – can advise especially on upcoming courses, and published material
- Online and face to face courses – enable teachers to get to know the qualification (and count towards teacher professional development)
- Pearson paid-for publications – student text books to cover each unit and teacher books to support classroom work
- Schemes of work for each unit
- and.....



Supporting IAL Mathematics teaching

Examination preparation

Edexcel provides a multitude of support features to help prepare students for exams. These include:

- past papers and mark schemes
- a results analysis service
- a dedicated site where centres can easily select their own questions on a particular topic (for example, geometric sequences)
- a dedicated member of Edexcel permanent staff
- detailed examiner reports.

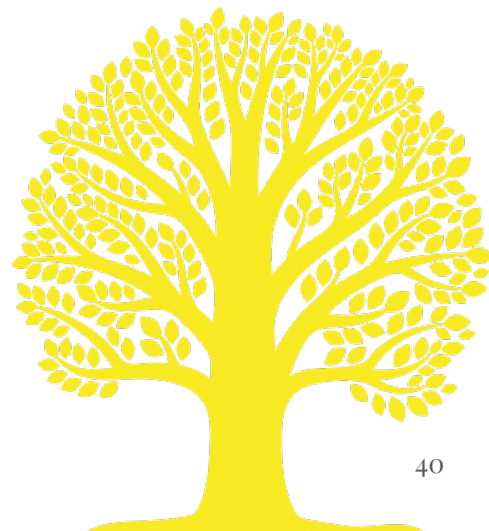
There will be further information on these in the next slides and in a following module



Supporting IAL Mathematics

Specifically for examinations

- ResultsPlus - analysis of student performance for own centre
- examWizard – enables a teacher to produce own worksheets based on examination questions
- ‘ Maths Emporium - easy access to past papers, mark schemes, grade boundaries and examiner reports
- easy access to a student’s exam papers



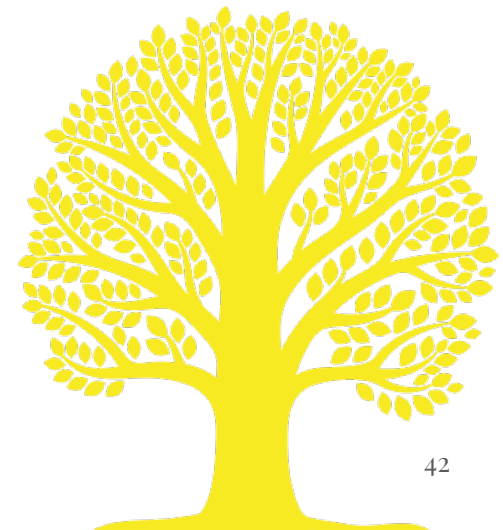
- Free online results analysis tool for teachers
- Provides a detailed breakdown of student performance in Edexcel exams.
- Identify topics and questions where the student could benefit from further learning
- Use this knowledge to inform teaching strategies and approaches
- Provides a comparison of student performance at regional level.
- Allows centres to view their country's results compared to the total Edexcel cohort.
- Mock exams results can also be fed into the system to produce an analysis
- Schools can sign up for free ResultsPlus account in just a few quick and easy steps:

<https://qualifications.pearson.com/en/support/Services/ResultsPlus.html>



- Free tool for teachers containing a bank of past paper questions to help create their own bespoke mock exams and tests to focus on particular topic areas as needed
- Use existing mark schemes for accurate marking
- Use existing examiner report for insight
- Use the results to understand where students need more support, informing teaching strategies.

https://qualifications.pearson.com/en/support/Services/examwizard.html?utm_source=guide&utm_medium=print&utm_campaign=GBSEMA0618GQA16&utm_content=makingastart



Mathematics Emporium

- Free resource for teachers containing all past papers
- See complete mark schemes for each paper
- See grade boundaries for each paper
- Specification and practice papers
- Examiner reports for each paper

https://www.mathsemporium.com/mathematics-emporium/?redirect_to=https%3A%2F%2Fwww.mathsemporium.com%2F



Contact your dedicated Subject Advisor

Subject Advisor details

Your subject advisor is **Graham Cumming**

Phone: **+44 (0)20 70102174**

Twitter: **@EmporiumMaths**

Email: TeachingMaths@pearson.com

Sign up for monthly newsletters from Graham to stay on top of qualification updates, training, course materials and industry news.



Support Overview

Free Support

Getting Started
Guide & Scheme of
Work

Getting Ready to
Teach Events

Subject
interpretation of
transferable skills

Subject Advisor

Results Plus

Regional Support
Manager

Additional support for selected subjects

Curriculum
Matched
Publishing

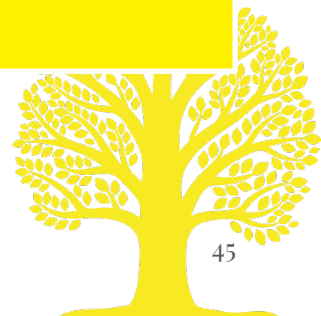
Lesson plans

Exemplar Marked
Responses

Topic booklets &
Subject guides

Additional SAMs

Exam Wizard



Other useful links

[1. Grade Boundaries](#)

This page shows the minimum marks needed to achieve a certain grade for all UK and international examinations. Also refer to the examiners report which is available for download with other documents.

[2. Examination Results Statistics](#)

Results statistics summarise the overall grade outcomes of candidates sitting Pearson Edexcel examinations.

[3. Progress to University](#)

Here you can find information and guidance about how to progress to universities worldwide with Pearson Edexcel qualifications.



ALWAYS LEARNING