# Mapping guide for Optional Papers: Legacy AS Unit 7890 and A Level Unit 7892 to H235 and H245

This mapping guide shows each statement in the optional papers in OCR’s AS and A Level Further Mathematics specifications mapped to the legacy unit in 7890 and 7892 where this content is currently found.

It also gives an indication of the *approximate* number of teaching hours that each statement should be given. Please note that this is not intended to indicate that the statements should be taught separately.

OCR’s AS and A Level Further Mathematics A are linear qualifications, so all assessments are taken in one session and the assumed knowledge for all optional papers includes the Pure Core content.

This guide assumes that you have approximately 72 hours of delivery time per term, so that the total time for AS Level, or Stage 1 of A Level is 144 hours and 180 hours for Stage 2 of   
A Level. There is no official number of teaching hours; this number is chosen to indicate the proportional amount of time spent on each paper, topic and statement.

Within the AS Level or Stage 1 of the A Level, each paper is therefore given 48 hours of delivery time.

Within Stage 2 of A Level, the Pure Core is allocated 120 hours and each optional paper is allocated 30 hours for delivering the new content. This leaves 36 hours within Stage 2 for revisiting the AS Level content to reinforce, learn in greater depth and to develop connections with the full A Level assumed knowledge, or 12 hours for each AS Level paper, including the Pure Core. This time has not been allocated directly in this document, but should be used in a way which is appropriate to your learners.

**Important note**: The unit given in the mapping column does not indicate an exact match, though it often is in practice. A full detailed mapping will be available at a later date. Where content in H235 or H245 is not present in 7890 or 7892 this is indicated by NEW.

**Download specifications, sample assessment materials, teaching and learning resources at** [**ocr.org.uk/alevelfurthermaths**](http://www.ocr.org.uk/qualifications/as-a-level-gce-further-mathematics-a-h235-h245-from-2017/)

**OCR Further Maths A –** Statistics **mapping to legacy   
(Y532 and Y542)**

4732 is Probability and Statistics 1  
4733 is Probability and Statistics 2  
4734 is Probability and Statistics 3  
4735 is Probability and Statistics 4

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| **OCR Ref** | **Subject content** | **Time Stage 1** | **Time Stage 2** | **Mapping** |
| 5.01a | Probability | 2 |  | 4732 |
| 5.01b |  | 3 |  | 4732 |
| 5.02a | Probability distributions | 1 |  | 4732 |
| 5.02b |  | 2 |  | 4732 |
| 5.02c |  | 1 |  | 4732 |
| 5.02d | Binomial distribution | 1 |  | 4732 |
| 5.02e | Discrete uniform | 2 |  | new |
| 5.02f | Geometric | 1 |  | 4732 |
| 5.02g |  | 2 |  | 4732 |
| 5.02h |  | 1 |  | 4732 |
| 5.02i | Poisson | 1 |  | 4733 |
| 5.02j |  | 1 |  | 4733 |
| 5.02k |  | 2 |  | 4733 |
| 5.02l |  | 2 |  | 4733 |
| 5.02m |  | 1 |  | 4733 |
| 5.02n |  | 2 |  | 4734 |
| 5.03a | Continuous RVs |  | 2 | 4733/4734 |
| 5.03b |  |  | 2 | 4733 |
| 5.03c |  |  | 1 | 4733 |
| 5.03d |  |  | 1 | 4734 |
| 5.03e | CDFs |  | 2 | 4734 |
| 5.03f |  |  | 1 | 4734 |
| 5.03g |  |  | 2 | 4734 |
| 5.04a | Linear combinations |  | 1 | 4734 |
| 5.04b |  |  | 1 | 4734 |
| 5.05a | Xbar and CLT |  | 2 | 4733 |
| 5.05b | Unbiased estimates |  | 1 | 4733 |
| 5.05c | Normal hyp tests |  | 2 | 4733 |
| 5.05d | Confidence intervals |  | 2 | 4734 |

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| **OCR Ref** | **Subject content** | **Time Stage 1** | **Time Stage 2** | **Mapping** |
| 5.06a | Contingency tables | 2 |  | 4734 |
| 5.06b | Fitting a distribution | 2 |  | 4734 |
| 5.06c |  |  | 1 | 4734 |
| 5.06d | Goodness of fit | 2 |  | 4734 |
| 5.07a | Non-parametric tests |  | 1 | 4735 |
| 5.07b |  |  | 2 | 4735 |
| 5.07c |  |  | 2 | 4735 |
| 5.07d |  |  | 1 | 4735 |
| 5.07e |  |  | 1 | 4735 |
| 5.07f |  |  | 2 | 4735 |
| 5.08a | Correlation | 2 |  | 4732 |
| 5.08b |  | 1 |  | 4732 |
| 5.08c |  | 1 |  | 4732 |
| 5.08d |  | 2 |  | new |
| 5.08e |  | 2 |  | 4732 |
| 5.08f |  | 2 |  | new |
| 5.08g |  | 1 |  | 4732 |
| 5.09a | Regression | 1 |  | 4732 |
| 5.09b |  | 1 |  | 4732 |
| 5.09c |  | 2 |  | 4732 |
| 5.09d |  | 1 |  | 4732 |
| 5.09e |  | 1 |  | 4732 |
|  | Total number of teaching hours | 48 | 30 (+12) |  |

## OCR Further Maths A – Mechanics mapping to legacy (Y533 and Y543)

4728 is Mechanics 1  
4729 is Mechanics 2  
4730 is Mechanics 3  
4731 is Mechanics 4

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| **OCR Ref** | **Subject content** | **Time Stage 1** | **Time Stage 2** | **Mapping** |
| 6 | Resolving forces (prelim. work not in AS Maths + rev. of trig.) | 4 |  |  |
| 6.01a | dimensions of a quantity | 2 |  | new |
| 6.01b | relationship between units and dimensions | 2 |  | new |
| 6.01c | error check | 1 |  | new |
| 6.01d | determine unknown indices in a formulation | 2 |  | new |
| 6.01e | formulate models and derive eqs of motion | 2 |  | new |
| 6.02a | concept of work done by a force | 1 |  | 4729 |
| 6.02b | work done by a constant force | 2 |  | 4729 |
| 6.02c | work done (vectors or variable force) |  | 1 | new |
| 6.02d | mechanical energy of a body | 1 |  | 4729 |
| 6.02e | gpe and ke of a body | 3 |  | 4729 |
| 6.02f | ke of a body using vectors |  | 1 | new |
| 6.02g | Hooke's law |  | 1 | 4730 |
| 6.02h | elastic potential energy (string or spring) |  | 1 | 4730 |
| 6.02i | cons. of energy and work-energy principle | 4 |  | 4729 |
| 6.02j | extension of 6.02i with epe |  | 2 | 4730 |
| 6.02k | definition of power | 1 |  | 4729 |
| 6.02l | use of power to solve problems | 3 |  | 4729 |
| 6.02m | power of a variable force in two dimensions |  | 1 | new |

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| **OCR Ref** | **Subject content** | **Time Stage 1** | **Time Stage 2** | **Mapping** |
| 6.03a | linear momentum in one dimension | 1 |  | 4728 |
| 6.03b | principle of conservation of linear momentum | 3 |  | 4728 |
| 6.03c | momentum in two dimensions |  | 1 | new |
| 6.04d | principle of conservation of linear momentum in 2D |  | 1 | new |
| 6.03e | impulse of a force | 1 |  | 4729 |
| 6.03f | impulse = change in momentum | 2 |  | 4729 |
| 6.03g | 6.03f in two dimensions (including vector form) |  | 1 | 4730, new |
| 6.03h | impulse - momentum principle for a cst. force or variable force |  | 1 | new |
| 6.03i | definition of coefficient of restitution | 1 |  | 4729 |
| 6.03j | terms 'perfectly elastic' and 'inelastic' | 1 |  | 4729 |
| 6.03k | Newton's experimental law in 1D | 3 |  | 4729 |
| 6.03l | Newton's experimental law in 2D |  | 3 | 4730, new |
| 6.04a | Centre of Mass (principle) |  | 1 | 4729 |
| 6.04b | Position of CoM using symmetry |  | 2 | 4729 |
| 6.04c | Determine CoM for system of particles or composite rigid body |  | 2 | 4729 |
| 6.04d | Use integration to determine CoM of a uniform lamina/solid of rev. |  | 3 | 4731 |
| 6.04e | Equilibrium of a single rigid body under coplanar forces |  | 2 | 4729 |
| 6.05a | Horizontal circular motion (definitions) | 1 |  | 4729 |
| 6.05b | Relationships between angular and linear velocity/speed and accel. | 1 |  | 4729 |
| 6.05c | Problems regarding motion in a horizontal circle | 4 |  | 4729 |
| 6.05d | Motion in a vertical circle | 2 |  | 4730 |
| 6.05e | Motion in a vertical circle (including radial and tang. comp. of accel.) |  | 2 | 4730 |
| 6.05f | Motion in a vertical circle not restricted to circular path |  | 1 | 4730 |
| 6.06a | Linear motion under a variable force |  | 3 | 4730 |
|  |  | 48 | 30 (+12) |  |

## OCR Further Maths A –Discrete Mathematics mapping to legacy (Y534 and Y544)

4732 is Probability and Statistics 1  
4736 is Decision Mathematics 1  
4737 is Decision Mathematics 2

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| **OCR Ref** | **Subject content** | **Time Stage 1** | **Time Stage 2** | **Mapping** |
| 7.01a | Types of problem | 1 |  | new |
| 7.01b | Set notation | 0.5 |  | new |
| 7.01c | The pigeonhole principle | 1 |  | new |
| 7.01d | Multiplicative principle | 1 |  | new |
| 7.01e | Enumerating permutations | 0.5 |  | new/4732 |
| 7.01f | Enumerating combinations | 0.5 |  | new/4732 |
| 7.01g | Arrangements with repetitions | 1 |  | new |
| 7.01h | Arrangements of subsets with repetition |  | 1 | new |
| 7.01i | Solve problems with a constraint | 1 |  | new |
| 7.01j | Solve problems with several constraints |  | 1 | new |
| 7.01k | The inclusion-exclusion principle | 0 |  | new/GCSE |
| 7.01l |  |  | 1 | new |
| 7.01m | Find derangements |  | 1 | new |
| 7.02a | Vertex, node, arc, edge | 0.5 |  | 4736 |
| 7.02b | Trees and simply connected graphs | 1 |  | 4736 |
| 7.02c | Walk, trail, path, cycle, route | 0.5 |  | 4736 |
| 7.02d | Complete graphs | 1 |  | 4736 |
| 7.02e | Bipartite graphs | 0.5 |  | 4737 |
| 7.02f | Colouring arguments |  | 1 | new |
| 7.02g | Eulerian graphs | 1 |  | 4736 |
| 7.02h | Hamiltonian graphs |  | 1 | new |
| 7.02i | Ore's theorem |  | 1 | new |
| 7.02j | Isomorphism | 1 |  | new |
| 7.02k | Digraphs | 1 |  | new |

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| **OCR Ref** | **Subject content** | **Time Stage 1** | **Time Stage 2** | **Mapping** |
| 7.02l | Planarity |  | 1 | new |
| 7.02m | Euler's formula |  | 0.5 | new |
| 7.02n | Kuratowski's theorem |  | 1 | new |
| 7.02o | Concept of thickness |  | 0.5 | new |
| 7.02p | Model with graphs and networks | 1 |  | 4736 |
| 7.02q | Adjacency matrices | 1 |  | new |
| 7.02r | Solve problems modelled as graphs or networks | 1 |  | 4736 |
| 7.03a | Definition of an algorithm | 1 |  | 4736 |
| 7.03b | Awareness of the uses and limitations of algorithms | 1 |  | 4736 |
| 7.03c | Trace through an algorithm | 2 |  | 4736 |
| 7.03d | Order of an algorithm | 2 |  | 4736 |
| 7.03e | Compare efficiency | 1 |  | 4736 |
| 7.03f | Calculate T(n) in simple cases | 1 |  | new |
| 7.03g | Be familiar with O(n) notation in simple cases | 0.5 |  | new |
| 7.03h | Calculate run time as a function of n |  | 1 | new |
| 7.03i | Understand hierarchy of orders |  | 0.5 | new |
| 7.03j | Use and understand bubble sort and shuttle sort | 2 |  | 4736 |
| 7.03k | Use and understand quick sort |  | 1 | new |
| 7.03l | Be familiar with bin packing strategies | 1.5 |  | 4736 |
| 7.03m | Extend bin packing strategies |  | 1 | new |
| 7.04a | Understand and use Dijkstra's algorithm | 2 |  | 4736 |
| 7.04b | Understand and use Prim'sand Kruskal's algorithms | 2 |  | 4736 |
| 7.04c | Use nearest neighbour to find an UB for TSP |  | 1 | 4736 |
| 7.04d | Use MST on reduced network to find a LB for TSP |  | 1 | 4736 |
| 7.04e | Solve simple cases of route inspection |  | 2 | 4736 |
| 7.04f | Choose or adapt an appropriate algorithm | 2 |  | 4736 |

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| **OCR Ref** | **Subject content** | **Time Stage 1** | **Time Stage 2** | **Mapping** |
| 7.05a | Construct and interpret activity networks | 2 |  | 4737 |
| 7.05b | Use and interpret forward and backward passes | 2 |  | 4737 |
| 7.05c | Understand and interpret float | 1 |  | 4737 |
| 7.05d | Latest start and earliest finish times, interfering float |  | 1 | new |
| 7.05e | Cascade charts and scheduling |  | 2 | 4737 |
| 7.06a | Formulate LP problems | 2 |  | 4736 |
| 7.06b | Use slack variables |  | 0.5 | 4736 |
| 7.06c | Investigate constraints | 1 |  | new |
| 7.06d | Graphical solutions, including integer problems | 2 |  | 4736 |
| 7.06e | Discuss how changes to coefficients alter the solution |  | 1 | 4736 |
| 7.06f | Integer programming, including branch and bound |  | 1.5 | new |
| 7.07a | Set up an initial simplex tableau |  | 0.5 | 4736 |
| 7.07b | Perform iterations of simplex |  | 2 | 4736 |
| 7.07c | Interpret a simplex tableau |  | 0.5 | 4736 |
| 7.07d | Basic feasible solution, basic/non-basic variables |  | 0.5 | new |
| 7.07e | Geometric interpretation of iterations |  | 1 | new |
| 7.07f | Algebraic interpretation of iterations |  | 0.5 | new |
| 7.08a | Zero-sum games, pay-off matrix | 1 |  | 4737 |
| 7.08b | Dominance arguments | 1 |  | 4737 |
| 7.08c | Play-safe strategies, stable solutions | 1 |  | 4737 |
| 7.08d | Nash equilibrium |  | 1 | new |
| 7.08e | Optimal mixed strategy using algebra/graphical | 1 |  | 4737 |
| 7.08f | Optimal mixed strategy using simplex |  | 0.5 | 4737 |
|  |  | 48 | 30(+12) |  |

## OCR Further Maths A Additional Pure Mathematics Mapping to legacy (Y535 and Y545)

4725 is Further Pure Mathematics 1  
4726 is Further Pure Mathematics 2  
4737 is Further Pure Mathematics 3

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| **OCR Ref** | **Subject content** | **Time Stage 1** | | **Time Stage 2** | **Mapping** |
| 8.01a | Recurrence relations | 2 |  | | new |
| 8.01b |  | 2 |  | | 4725 |
| 8.01c | Properties of sequences | 1.5 |  | | new |
| 8.01d |  | 0.5 |  | | new |
| 8.01e | Fibonacci & related numbers | 2 |  | | new |
| 8.01f | Solving recurrence relations | 2 | 2 | | new |
| 8.01g |  |  | 1 | | new |
| 8.01h | Modelling | 1 | 1 | | new |
| 8.02a | Number bases | 1 |  | | new |
| 8.02b | Divisibility tests | 0.5 |  | | new |
| 8.02c |  | 0.5 |  | | new |
| 8.02d | The division algorithm | 1 |  | | new |
| 8.02e | Finite (modular) arithmetics | 1 |  | | 4727 |
| 8.02f |  | 2 |  | | new |
| 8.02g |  |  | 1.5 | | new |
| 8.02h |  |  | 1.5 | | new |
| 8.02i | Prime numbers | 0 |  | | new |
| 8.02j |  | 0.5 |  | | new |
| 8.02k | Euclid's lemma | 0.5 |  | | new |
| 8.02l | Fermat's little theorem |  | 1 | | new |
| 8.02m | The order of *a* modulo *p* |  | 1 | | new |
| 8.02n |  |  | 1 | | new |
| 8.02o | Binomial theorem |  | 1 | | new |

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| **OCR Ref** | **Subject content** | **Time Stage 1** | **Time Stage 2** | **Mapping** |
| 8.03a | Binary operations | 1 |  | 4727 |
| 8.03b |  | 2 |  | 4727 |
| 8.03c | Definition of a group | 2 |  | 4727 |
| 8.03d |  | 1 |  | 4727 |
| 8.03e | Orders of elements and groups | 2 |  | 4727 |
| 8.03f | Subgroups | 2 |  | 4727 |
| 8.03g | Cyclic groups | 1 |  | 4727 |
| 8.03h | Generators | 1 |  | 4727 |
| 8.03i | Properties of groups | 2 |  | 4727 |
| 8.03j |  |  | 2 | 4727 |
| 8.03k | Lagrange's theorem |  | 1 | 4727 |
| 8.03l | Isomorphism |  | 2 | 4727 |
| 8.03m | Abstract groups |  | 2 | new |
| 8.04a | Vector product | 0.5 |  | 4727 |
| 8.04b |  | 1 |  | 4727 |
| 8.04c |  | 1 |  | 4727 |
| 8.04d |  | 0.5 |  | 4727 |
| 8.04e | Scalar triple product |  | 1 | 4727 |
| 8.05a | 3-d surfaces | 3 |  | new |
| 8.05b |  |  | 3 | new |
| 8.05c | Sections & contours | 3 |  | new |
| 8.05d | Partial differentiation | 3 |  | new |
| 8.05e | Stationary points | 4 |  | new |
| 8.05f |  |  | 2 | new |
| 8.05g | Tangent planes |  | 1 | new |
| 8.06a | Reduction formulae |  | 3 | 4726 |
| 8.06b | Arc lengths & surface areas |  | 2 | new |
|  |  | 48 | 30(+12) |  |

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