

# How to Revise for Mathematics

## **Be Prepared**

Ensure you have all of the correct equipment (and bring it to every lesson!)

- ✓ Pen, pencil, ruler, rubber, protractor, compass
- ✓ Scientific Calculator (we recommend the Casio fx-85GTx ClassWiz)
- ✓ Revision guide (available for £5 from L7 on a Tuesday lunchtime)

## **Resources**

- ✓ <https://hegartymaths.com/> watch videos and complete quizzes on specific topics. Use the Memri quiz function to test yourself on a wider selection of topics. The more quizzes you complete, the more questions the Memri quiz has to use.

Watch the videos and make notes to aid your revision. Use a pen and paper to answer the questions – do not try and do it all in your head.

Please see the end of the guide for a list of topics covering Foundation and Higher. Remember, students taking the higher papers need to have all of the foundation skills too.

As well as Hegarty Maths and your revision guide, there are plenty of resources online to help you practice your maths.

- ✓ <https://www.mathsgenie.co.uk/gcse.html> has exam booklets grouped by Grades.

Students taking the:

- Foundation papers – do not neglect grade 1/2/3 work – this is still important.
- Higher papers – do not neglect grade 4/5 work – this is the start of your exam.

- ✓ <https://corbettmaths.com/> has worksheets on ALL topics, plus 5-a-day short tests (solutions are there too)

Students taking the:

- Foundation papers – remember to practice your numeracy skills (5-a-day)
- Higher papers – Foundation Plus 5-a-day is perfect practice for skills needed in the first half of the paper.

- ✓ <https://mathsbot.com/gcse/formulae> - Learn the key formulae that you will need. Copy these out and practice re-writing them without looking at your notes.

**Students taking the foundation papers** – you do not need to know Sine Rule, Cosine Rule, Area of Triangle (using SinC) or Quadratic Formula

### In School Support

- ✓ Make the most of every maths lesson – ask questions and always try your hardest
- ✓ Complete homework to the best of your ability and on time (factor this in to your revision)
- ✓ Help and support (including use of laptops) is available in L1 on a Friday lunchtime

### Planning

Now you have all the resources you need, plan your revision schedule. Small chunks are better than one long session every week. Identify areas you struggle on (use the Hegarty checklists below) and use the resources above to help you.

#### **Avoid distractions when revising – leave your mobile phone in a different room**

The best way to revise for maths is to practice answering questions and to actually ‘do’ maths.

Mathematics is broken down into 5 main topics – Number, Algebra, Shape and Space, Statistics and Probability, Ratio and Proportion.

Do not rush to use Past Papers – these will be given to you by your teacher as and when appropriate.

A potential timetable for Mathematics Revision could look like this:

**It is important you decide what you want to revise before you start. For example, pick the topic of the Maths Genie booklet before you begin your allotted time.**

Monday	Hegarty Videos/Test	30 minutes
Tuesday	Corbett Maths 5-a-day	30 minutes
Wednesday		
Thursday	Hegarty Memri Quiz	30 minutes
Friday		
Saturday	Maths Genie Booklet	30 minutes
Sunday		

Below is an **example** of Hegarty Clips you could use in the run up to the December mocks.

Grade 3 (Foundation)

	Number	Algebra	Shape and Space	Statistics and Probability	Ratio and Proportion
Week 1	HCF/LCM (31/34)	Expanding Brackets (160)	Angles on a straight line (477)	Probability of an event (351)	Simplify Ratios (329)
Week 2	Adding Fractions (66)	Factorise (168)	Angles in a Triangle (485)	Frequency Trees (368)	Share in a ratio (332)
Week 3	Percentage Increase Decrease (88)	Solving Equations (179/180)	Perimeter (548)	Venn Diagrams (372)	Direct Proportion (339)
Week 4	Rounding (130)	Inequalities (269)	Area (555)	Averages (404, 405, 409)	Recipes (739)

Grade 4/5 (Foundation or Higher)

	Number	Algebra	Shape and Space	Statistics and Probability	Ratio and Proportion
Week 1	Standard form (122/123)	Solving Equations (185)	Pythagoras (498, 499)	Relative Frequency (356)	Share in a Ratio (333)
Week 2	Percentages (98)	Simultaneous Equations (191)	Right Angled Trigonometry (509-512)	Venn Diagrams (383)	Direct Proportion (340)
Week 3	Fractions (80)	Linear Sequences (198)	Area of a circle (541)	Mean from a frequency table (318)	Scale Diagrams (864)
Week 4	Index Laws (105, 106, 107)	Solving Quadratics by Factorising (230)	Angles in Polygons (565)	Frequency Trees (369)	Best Buy (767)

Grade 6/7 (Higher)

	Number	Algebra	Shape and Space	Statistics and Probability	Ratio and Proportion
Week 1	Standard Form (127)	Simultaneous Equations (192)	Angles in Polygons using Algebra (565)	Tree Diagrams (362)	Harder ratio problems (335)
Week 2	Surds (115)	Straight Line Graphs (Parallel and Perpendicular) (214, 215)	Arcs and Sectors (544 – 547)	Product Rule for Counting (671)	Direct Proportion (343)
Week 3	Reverse Percentages (96)	Quadratic Formula (241)	Sine Rule (521-524)	Mean from a Frequency Table (418)	Inverse Proportion (346)
Week 4	Bounds (139)	Completing the square (235)	Cosine Rule (527 – 530)	Scatter Diagrams (453)	Harder Problems (336)

Grade 7-9 (Higher)

	Number	Algebra	Shape and Space	Statistics and Probability	Ratio and Proportion
Week 1	Standard Form (127)	Algebraic Fractions (172)	Sine and Cosine Rule (532)	Conditional Probability (389)	Harder Problems (336)
Week 2	Surds (118)	Rearranging Formulae (286)	Circle Theorems (604)	Histograms (442)	Direct Proportion (345)
Week 3	Bounds (139)	Completing the Square (238)	Vectors (636)	Cumulative Frequency (437)	Ratio in algebra (338)
Week 4	Reverse Percentages (96)	Graphical Simultaneous Equations (259)	Congruence (684)	Venn Diagrams (388)	Inverse Proportion (346, 347)

# Foundation Skills List

## Number

Topics	Clip Number	R	A	G
Ordering positive integers	13, 14			
Ordering negative integers	37			
Ordering decimals	45, 46			
Ordering fractions	60			
Addition and subtraction of positive integers	18, 19, 20			
Multiplication and division of positive integers	21, 22, 23, 144, 145			
Addition and subtraction of negative integers	38, 39, 40, 41			
Multiplication and division of negative numbers	42, 43			
Addition and subtraction of decimals	47			
Multiplication and division of decimals	48, 49, 50, 51, 135, 136			
Addition and subtraction of fractions	65, 66			
Multiplication and division of fractions	67, 68, 69, 70, 71, 72			
Place value: multiplying and dividing by 10	15, 16			
Order of operations	24, 44, 120, 150			
Prime numbers, prime factorisation	28, 29, 30			
Factors, multiples, HCF and LCM	27, 31, 32, 33, 34, 35, 36			
Powers and roots	99, 100, 101			
Using standard form	121, 122, 123, 124			
Calculating with standard form	125, 126, 127, 128			
Converting decimals to/from fractions	52, 73, 74, 149			
Converting percentages to/from fractions	75, 76, 82, 149			
Converting percentages to/from decimals	55, 83			
Simplifying fractions	59, 61			
Mixed numbers and improper fractions	63, 64			
Fractions of amounts	62, 77			
Increasing/decreasing by fractions	78, 79			
Fraction problems	80			
Percentages of amounts	84, 85, 86, 87			
Percentage increase/decrease	88, 89, 90			
Percentage change	97			
Reverse percentages	96			
Simple interest	93			
Percentage problems	98			
Rounding	17, 56, 134			
Rounding to significant figures	130			
Estimating answers	129, 131, 132, 133			
Working with money	747, 748, 749, 750, 751			
Money problems	752, 753, 754			
Financial statements	757			
Income and rates of pay	755, 756			
Profit and loss	759, 760, 761, 762			
Best buys	763, 764, 765, 766, 767			

## Algebra

Topics	Clip Number	R	A	G
Algebraic expressions	151, 152, 153			
Collecting like terms	156, 157			
Multiplying and dividing algebra	158, 159			
Substitution	155, 780, 781			
Algebra terminology	154			
Expanding brackets	160, 161			
Factorising expressions	167, 168, 169, 170, 171			
Index laws	173, 174			
Changing the subject	280, 281, 282, 283, 284			
Coordinates	199			
Midpoints	200			
Plotting straight line graphs	205, 206, 207			
Gradient	201, 202			
Distance-time graphs	874, 875			
Sketch quadratic graphs	251, 257			
Linear equations	176, 177, 178, 179, 180, 181, 182, 183, 188, 189			
Linear equations on graphs	217			
Quadratic expressions	222			
Linear sequences	196, 197, 198			
Other sequences	261			

## Ratio and proportion

Topics	Clip Number	R	A	G
Scale diagrams	864, 865, 866, 867, 868, 869			
Simplifying ratios	328, 329, 331			
Dividing in a ratio	332, 333, 334			
Fractions and ratio	330			
Direct proportion	339, 340, 341, 343			
Inverse proportion	342, 346			
Proportion graphs	348			
Recipes	739, 740, 741, 742			

## Geometry and measures

Topics	Clip Number	R	A	G
Geometric notation	456			
Points and lines	821			
Properties of 2D shapes	822, 823, 824, 825, 826, 827, 828			
Angle on a line	477, 478			
Complementary angles	815			
Angles around a point	812, 813, 814, 479, 480			
Angles on parallel lines	481, 482, 483			
Angles in a triangle	484, 485, 486, 487			
Angles in polygons	560, 561, 562, 563, 564			
Translations	637, 638			
Reflections	639, 640, 641			
Enlargements	642, 643			
Rotations	648, 649			
Describing transformations	650, 651, 652, 653, 654			
Congruence	680, 681			
Properties of 3D shapes	829, 830, 831, 832			
Nets of 3D shapes	833, 834, 835, 836			
Metric units	691			
Units of measure: Length	692, 693, 694			
Units of measure: Mass	695, 696, 697			
Units of measure: Volume/capacity	698, 699, 702, 703, 704			
Units of measure: Time	709, 710, 711			
Units of measure: Area	700, 701			
Imperial units	705, 706			
Currency conversion	707, 708			
Conversion graphs	712, 713			
Compound units: Speed	716, 717, 718, 719, 720, 724			
Angles: Recognising and Estimating	455, 457			
Angles: Measuring and Drawing	458, 459, 460, 461			
Bearings	492, 493, 494, 495			
Calculating perimeter	549, 550, 551, 552			
Calculating area	554, 555, 556, 557, 558, 559			
Circles	592			
Circumference	534, 535, 536			
Circle area	539, 540, 541			
Surface area	584, 585, 586			
Volume of cuboids	568, 569			
Volume of prisms and cylinders	570, 571, 572, 573, 574, 575			
Similar shapes	608, 609, 610, 611			

## Probability

Topics	Clip Number	R	A	G
Probability scale	349, 350			
Probability of single events	351, 352, 353, 354			
Experimental probability	355, 356			
Multiple event probability	358, 359, 360			
Listing elements in a set	370, 371			
Venn diagrams	372, 373, 374, 375, 376, 377, 378, 379, 380			
Probability from Venn diagrams	383, 384			
Frequency trees	368, 369			
Listing systematically	670			

## Statistics

Topics	Clip Number	R	A	G
Collecting data, frequency tables	401, 402, 403			
Two-way tables	422, 423, 424			
Bar charts	425			
Pictograms	426			
Pie charts	427, 428, 429			
Mode	404, 415			
Mean	405, 406, 407, 408, 417			
Median	409, 416			
Range	410, 414			
Choosing averages	413			
Averages problems	419, 420			
Scatter graphs	453, 454			



## Crossover Skills List

### Number

Topics	Clip Number	R	A	G
Calculating with roots and indices	102, 103, 104, 105, 106, 107			
Repeated percentage change	91, 92			
Compound interest and depreciation	94, 95			
Error intervals	774, 775, 776			
Financial statements	758			
Best buys	768, 769, 771, 772			

### Algebra

Topics	Clip Number	R	A	G
Substitution	782, 783, 278			
Manipulating algebraic expressions	175			
Changing the subject	285, 286, 287			
Identities	154			
Expanding double brackets	162, 163, 164, 165			
Factorising quadratic expressions: $x^2+bx+c$	221, 223, 224			
Gradient	203, 204			
Equation of a straight line	208, 209, 210, 211, 212, 213			
Equation of a straight line: Parallel lines	214			
Distance-time and speed-time graphs	876, 877, 878, 879, 880			
Speed-time graphs	880			
Sketch graphs	898, 899, 900, 901, 902			
Tariff graphs	897			
Quadratic graphs	252, 253, 254, 255			
Cubic graphs	298, 299			
Reciprocal graphs	300, 301			
Linear equations in one variable	184, 185, 186			
Quadratic equations	230, 234			
Simultaneous equations	190, 191, 192, 193, 194, 195			
Simultaneous equations on graphs	218, 219, 220			
Representing linear inequalities	265, 266, 267, 268			
Solving linear inequalities	269, 270, 271, 272			
Writing algebraic expressions and equations	151, 152, 153, 155, 188			
Fibonacci sequences	263			
Geometric sequences	264			
Quadratic sequences	247			

## Ratio and proportion

Topics	Clip Number	R	A	G
Ratio problems	335, 336, 337, 338			
Scale drawings	870, 871			
Direct proportion	344, 345			
Inverse proportion	347			
Proportion graphs	348			

## Geometry and measures

Topics	Clip Number	R	A	G
Angle problems	488, 489, 490, 491			
Angles in polygons	565			
Constructions	660, 661, 662, 663, 664, 665, 666, 667, 668, 669			
Loci	674, 675, 676, 677, 678, 679			
Congruence criteria	682, 683			
Enlargements	644, 645			
Plans and elevations of 3D shapes	837, 838, 839, 840, 841, 842, 843, 844			
Conversion problems	714, 715			
Compound units: Speed	721, 722, 723			
Compound units: Density	725, 726, 727, 728, 729, 731			
Compound units: Pressure	734, 735, 736, 737			
Other compound units	738			
Bearings	496			
Circumference	537, 538			
Circle area	542, 543			
Surface area	587, 588, 589, 590, 591			
Volume	576, 577, 579, 580, 581, 582			
Arc length	544, 545			
Sector area	546, 547			
Pythagoras' theorem	497, 498, 499, 501, 502			
Trigonometry	508, 509, 510, 511, 512, 513, 514, 515			
Similar shapes	612, 613, 614			
Vectors	622, 623, 624, 625, 626			

## Probability

Topics	Clip Number	R	A	G
Experimental probability	357			
Independent events and probability trees	361, 362, 363			

## Statistics

Topics	Clip Number	R	A	G
Types of data	392, 393			
Sampling	394, 395, 396, 397, 398			
Time series	450, 451, 452			
Scatter graphs	453, 454			

## Higher Skills List

### Number

Topics	Clip Number	R	A	G
Calculating with roots and fractional indices	108, 109, 110			
Converting recurring decimals to fractions	53, 54			
Surds: Definition and estimating	111, 112			
Surds: Simplifying, multiplying and dividing	113, 114, 115			
Surds: Expanding brackets	116, 117			
Surds: Rationalising the denominator	118, 119			
Upper and lower bounds	137, 138, 139			
Error intervals	777			
Best buys	770			

### Algebra

Topics	Clip Number	R	A	G
Substitution	784, 785, 786, 787			
Substitution: Equations of motion	788, 789			
Substitution: Important formulae	279			
Expanding triple brackets	166			
Expressions with algebraic fractions	172			
Linear equations with algebraic fractions	187			
Factorising quadratic expressions: $ax^2+bx+c$	225, 226, 227, 228			
Quadratic expressions: Algebraic fractions	229			
Quadratic expressions: Completing the square	235, 236, 237			
Quadratic equations: Factorising	231, 232, 233			
Quadratic equations: Quadratic formula	241, 242			
Quadratic equations: Completing the square	238, 239			
Quadratic equations: Algebraic fractions	244			
Quadratic equations in context	245			
Simultaneous equations: Quadratic/linear	246			
Manipulating powers	790, 791, 792, 793, 794, 795			
Exponential equations	796, 797, 798, 799			
Equation of a straight line: Perpendicular lines	215, 216			
Quadratic graphs: Turning points and discriminant	256, 243, 258			
Simultaneous equations on graphs: Quadratic/ linear	259, 260			
Exponential graphs	302, 800, 801, 802, 803			
Exponential growth problems	804, 805, 806, 807			
Exponential decay problems	808, 809, 810, 811			
Trigonometric graphs	303, 304, 305, 306			

Graph transformations	307, 308, 309, 310, 311, 312, 313			
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## Algebra (continued)

Topics	Clip Number	R	A	G
Speed-time graphs	881, 882, 883, 884, 885, 886			
Rate of change graphs	894, 895, 896			
Estimating gradient from a curve	887, 888, 889, 890			
Estimating area under a curve	891, 892, 893			
Equation of a circle	778, 779, 314, 315, 316, 317			
Circles and straight lines	318, 319, 320			
Linear inequalities as graph regions	273, 274, 275, 276			
Quadratic inequalities	277			
Function notation	288, 289			
Composite functions	293, 294			
Inverse functions	295, 296			
Functions: Problem solving	297			
Other sequences: Recurrence relations	262			
Quadratic sequences	247, 248, 249, 250			
Iteration and numerical methods	322, 323			
Proof and counter-examples	324			
Direct algebraic proof	325, 326, 327			

## Ratio, proportion and rates of change

Topics	Clip Number	R	A	G
Algebraic direct proportion	344, 345			
Algebraic inverse proportion	347			

## Geometry and measures

Topics	Clip Number	R	A	G
Congruence proofs	684, 685, 686, 687, 688, 689, 690			
Enlargements	646, 647			
Invariance	655			
Describe combined transformations	656, 657			
Circle theorems: Angles inside a circle	593, 594, 595, 596, 597			
Circle theorems: Tangents and chords	598, 599, 600, 601			
Circle theorems multi-step	603, 604, 605, 606			
Prove circle theorems	816, 817, 818, 819, 820			
Compound units: Density problem solving	730, 732, 733			
Volume of frustrums	578			
Volume: Problem solving	583			
Similar Shapes: Area	615, 616, 617			
Similar Shapes: Volume	618, 619, 620, 621			
Pythagoras' Theorem: Problem solving	503, 504			
Right-angled trigonometry: Non-calculator	306, 845, 846, 847, 848, 849, 850, 851, 852, 853			
Right-angled trigonometry: Problem solving	513, 514			
3D Pythagoras	505, 506, 507			
3D trigonometry	854, 855, 856, 857, 858, 859, 860, 861, 862, 863			
Sine rule for area	517, 518, 519			
Sine rule	521, 522, 523, 524, 525			
Cosine rule	527, 528, 529, 530			
Non-right-angled trigonometry: Problem solving	532, 533			
Bearings: Sine and cosine rule	531			
Vectors: Magnitude	627			
Vectors: Geometry problems	628, 629, 630, 631, 632, 633, 634, 635, 636			

## Probability

Topics	Clip Number	R	A	G
Product rule for counting	671, 672, 673			
Conditional probability	364, 365, 366, 367, 389, 390			
Probability from Venn diagrams	385, 386, 387, 388, 391			

## Statistics

Topics	Clip Number	R	A	G
Quartiles and interquartile range	411, 412			
Mean from grouped frequency tables	418			
Averages problems	421			
Cumulative frequency diagrams	437, 438, 439			
Box plots	434, 435, 436, 440			
Frequency polygons	441			
Histograms	442, 443, 444, 445, 446, 447, 448, 449			