# Paper 9MA0/01 Pure Mathematics 1

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| **Topic** | **Textbook Chapter** | **Revision Materials** |
| Formal proof | P1 Ch. 7.4, 7.5P2 Ch. 1.1 | **Proving Identities**<https://youtu.be/redN3pJvd0s>**Proof by Exhaustion and Deduction**<https://youtu.be/HY2Si3CfKvI>**Counterexamples**<https://youtu.be/mxcGpNji4ik>**Proof by Contradiction**<https://youtu.be/8QVWVACNDpU> |
| The factor theorem | P1 Ch. 7.3 | **The Factor Theorem**<https://youtu.be/6G3iAgpK4kA> <https://youtu.be/TPAJVGp5X-s><https://youtu.be/Qoihzd3hbDI> |
| Understand and use graphs of functions | P1 Ch. 2.4P1 Ch. 4 **(All)**P1 Ch. 9.5, 9.6P1 Ch. 14.1, 14.2P2 Ch. 2.1, 2.5, 2.6, 2.7P2 Ch. 6.2P2 Ch. 7.4P2 Ch. 8.2, 8.3 | **Quadratic Graphs**<https://youtu.be/5xp6-nqQXz8> **Cubic Graphs**<https://youtu.be/7DtbMGBO-vk>**Graphs of Modulus Functions**<https://youtu.be/7CAqrUQtssQ> **Sketching Parametric Graphs**<https://youtu.be/0cv8CqEQhY4><https://youtu.be/TYzHYgYfO90> **Trigonometric Graphs**<https://youtu.be/zYXKxvMmHkE> |
| Use intersection points of graphs to solve equations | P1 Ch. 2.4P1 Ch. 4.4P1 Ch. 6.3P2 Ch. 3.8 | **Intersections of Graphs**<https://youtu.be/nJ3DkFrTDbg><https://youtu.be/JrBi9tkiGA4><https://youtu.be/QJUX7d8PjYI> |
| Transformations of a curve | P1 Ch. 4.5, 4.6, 4.7 | **Graph Transformations**<https://youtu.be/HgfzlHR1H5Q><https://youtu.be/fIDSk7Lss-k><https://youtu.be/5Dm4rW96CO4>  |
| Use of functions in modelling | P1 Ch. 2.6P1 Ch. 14.3P2 Ch. 7.7 |  |
| The coordinate geometry of a circle | P1 Ch. 6.2, 6.3, 6.4, 6.5 | **Equation of a Circle**<https://youtu.be/mwffibB3jn4>**Circle Properties**<https://youtu.be/Qvq7OjnaIfM>**Equation of a Tangent**<https://youtu.be/Qvq7OjnaIfM> |
| Arithmetic sequences and series | P2 Ch. 3.1, 3.2 | **Arithmetic Sequences and Series**<https://youtu.be/fyBeKh5Y0_Q><https://youtu.be/Jq7e1h2ztyw>**Arithmetic Series (Proof)**<https://youtu.be/FLD5xrq0rvU> |
| Differentiation: stationary points, minima. Radian measure | P1 Ch. 12.5, 12.8, 12.9P2 Ch. 5.1, 5.2, 5.3 | **Differentiating** $ax^{n}$<https://youtu.be/Px4Ow-1hIlY><https://youtu.be/NpsAg7nR-3Y><https://youtu.be/dhMS_4t8Vno>**Second Order Derivatives**<https://youtu.be/ZkxOLKrFnV4>**Stationary Points**<https://youtu.be/g5_xlL8Ofh8><https://youtu.be/H-XDX7T0ADw><https://youtu.be/V5JEpYuq9uw>**Chain Rule**<https://youtu.be/KKaRHdZ-Qus><https://youtu.be/Xnu1HreBFXE><https://youtu.be/7hT9niGx0_c><https://youtu.be/8CU7YOnw0PU>**Product and Quotient Rules**<https://youtu.be/iOHYuBoWwTY><https://youtu.be/frOJXB0oKrQ> |
| Trigonometric identities and equations | P1 Ch. 10.3, 10.4, 10.5, 10.6P2 Ch. 6.3, 6.4P2 Ch. 7 **(All)** | **Trigonometric Identities**<https://youtu.be/bhQ5CXjxttI><https://youtu.be/X2oZ_Lg5VbY><https://youtu.be/8ZX_9uqqkTQ>**Trigonometric Equations Using Identities**<https://youtu.be/l1fsF3gfcf8><https://youtu.be/IsfPzk9ZoFw><https://youtu.be/iUaxw8pTZwk><https://youtu.be/2gy6hhnh2xQ><https://youtu.be/H-jwZdfzpfM><https://youtu.be/yFWlxK4_AKE> |
| Trigonometric functions and identities: area under a curve | P1 Ch. 10.3P1 Ch. 13.5, 13.6P2 Ch. 6.4P2 Ch. 7.4, 7.5, 7.6P2 Ch. 11.8 | **Integrating Trigonometric Functions**<https://youtu.be/M0WcSCxYl2Y><https://youtu.be/vRBLjaFlCMk><https://youtu.be/mkgOwMD140Y> |
| Exponentials: Solving equations, rates of change | P1 Ch. 14.3, 14.6P2 Ch. 9.10 | **Exponential and Logarithm Equations**<https://youtu.be/Z4jtwG-Esko><https://youtu.be/1D8ZVnPh35Q><https://youtu.be/smyafEB8n_I><https://youtu.be/53r1j0QTNCs>**Connected Rates of Change**<https://youtu.be/BucbEKBz2dY>  |
| Maximum point; iteration | P1 Ch. 12.8, 12.9P2 Ch. 3.7 | **Applications of Stationary Points**<https://youtu.be/GQGB5hhE61Y> **Iteration**<https://youtu.be/D4Bl1bZV9t8> |
| Integration as a limit | P2 Ch. 11.12 (online) |  |
| Methods of integration | P1 Ch. 13.2, 13.3, 13.4P2 Ch. 11.2, 11.3, 11.4, 11.5, 11.6, 11.7 | **Definite Integration**<https://youtu.be/TiaeowRIw68>**Integrals of Trigonometric Functions**<https://youtu.be/M0WcSCxYl2Y>**Integrals with Partial Fractions**<https://youtu.be/D5uthjw0wps>**Reverse Chain Rule**<https://youtu.be/vMo5NFsqacw><https://youtu.be/MTL1yTVtNMQ> <https://youtu.be/0hoL9h4y-LM><https://youtu.be/clsjhZ8nXac>**Integration by Substitution**<https://youtu.be/SgHewYUeAMY><https://youtu.be/_wk1sp4Xu6g><https://youtu.be/Wf5gy3qb_YU>**Integration by Parts**<https://youtu.be/YrDQIqRgksQ><https://youtu.be/QNo2c04q5tM><https://youtu.be/Jmk8ZDYevK8> |
| Use vectors to solve a problem in pure mathematics | P1 Ch. **(All)**P2 Ch. 12 **(All)** | **Vector Geometry Problems**<https://youtu.be/TvK4DtOKTiQ> |

# Paper 9MA0/02 Pure Mathematics 2

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| **Topic** | **Textbook Chapter** | **Revision Materials** |
| Formal proof | P1 Ch. 7.4, 7.5P2 Ch. 1.1 | **Proving Identities**<https://youtu.be/redN3pJvd0s>**Proof by Exhaustion and Deduction**<https://youtu.be/HY2Si3CfKvI>**Counterexamples**<https://youtu.be/mxcGpNji4ik>**Proof by Contradiction**<https://youtu.be/8QVWVACNDpU> |
| The modulus of a linear function | P2 Ch. 2.1, 2.5, 2.7 | **The Modulus Function**<https://youtu.be/z5J2gBf6o9o>**Graphs of Modulus Functions**<https://youtu.be/7CAqrUQtssQ>**Equations with Modulus Functions**<https://youtu.be/chuiqZ6wGUc><https://youtu.be/Df-rF_H6ezI><https://youtu.be/FIv6ltCtsSE> |
| Understand and use function notation | P2 Ch. 2.1, 2.2, 2.3, 2.4 | **Function Notation, Domain and Range**<https://youtu.be/0tEX7RwR3CE><https://youtu.be/f3Br71GRrkE><https://youtu.be/DI3QKWpa3o0>**Composite Functions**<https://youtu.be/n-LwIZkEArE><https://youtu.be/Xjx248NqbWw>**Inverse Functions**<https://youtu.be/vgwPqKkZd_0> |
| The binomial expansion | P1 Ch. 8.3, 8.4, 8.5P2 Ch. 4.1, 4.2, 4.3 | **Binomial Expansion**<https://youtu.be/qVsYE_oq-zQ> |
| Sequence generated by an iterative formula | P2 Ch. 3.7 | **Recurrence Relations**<https://youtu.be/odXPY0_na3w> |
| Geometric sequences and series; trigonometric identities | P1 Ch. 10.3P2 Ch. 3.3, 3.4, 3.5, 3.6P2 Ch. 6.4, 6.5P2 Ch. 7.3, 7.4, 7.5, 7.6 | **Geometric Sequences and Series**<https://youtu.be/IYfoufW9RR0> **Sum to Infinity**<https://youtu.be/MTOKAA8rRA0><https://youtu.be/ADPCQ4bOYQw> |
| Use of a trigonometric function | P1 Ch. 10.3, 10.4, 10.5, 10.6P2 Ch. 6.4P2 Ch. 7.7 |  |
| The function $a^{x}$ and its graph | P1 Ch. 14.1 | **Graphs of Exponential Functions**<https://youtu.be/UQMa5ZSxoYc> |
| Differentiation: roots of equations | P1 Ch. 12.5, 12.6, 12.11P2 Ch. 9.2, 9.3, 9.4, 9.5, 9.6, 9.8 | **Differentiating** $ax^{n}$<https://youtu.be/Px4Ow-1hIlY><https://youtu.be/NpsAg7nR-3Y><https://youtu.be/dhMS_4t8Vno>**Second Order Derivatives**<https://youtu.be/ZkxOLKrFnV4>**Stationary Points**<https://youtu.be/g5_xlL8Ofh8><https://youtu.be/H-XDX7T0ADw><https://youtu.be/V5JEpYuq9uw>**Chain Rule**<https://youtu.be/KKaRHdZ-Qus><https://youtu.be/Xnu1HreBFXE><https://youtu.be/7hT9niGx0_c><https://youtu.be/8CU7YOnw0PU>**Product and Quotient Rules**<https://youtu.be/iOHYuBoWwTY><https://youtu.be/frOJXB0oKrQ> |
| Differentiation from first principles | P1 Ch. 12.2P2 Ch. 9.1 | **Differentiation from First Principles**<https://youtu.be/Ayf9gKwjXlY> **Differentiating sin and cos from First Principles**<https://youtu.be/Qkwr3g1zMz8><https://youtu.be/a2wj_I8TV-Q> |
| Find maximum and minimum points; Newton-Raphson method | P1 Ch. 12.8, 12.9P2 Ch. 9.9P2 Ch. 10.3 | **Newton-Raphson Method**<https://youtu.be/ML-wQKRhP3s><https://youtu.be/PIPiv6gn_Ls> |
| Differentiation of curves defined parametrically | P2 Ch. 9.7 | **Differentiation of Parametric Equations**<https://youtu.be/hljazIjVnz8> |
| Area under a curve | P1 Ch. 13.5, 13.6P2 Ch. 11.8 | **Area Under a Curve**<https://youtu.be/T3McJeGuAiw> |
| Solution of a first order differential equation; partial fractions | P2 Ch. 1.3, 1.4P2 Ch. 11.10, 11.11 | **Differential Equations**<https://youtu.be/nlvr3UyMiQ4><https://youtu.be/TojF0AAOdW0><https://youtu.be/M54Ymxf7ATc> |
| The trapezium rule | P2 Ch. 11.9 | **Trapezium Rule**<https://youtu.be/YAGSOh5Kw1A> |
| Use vectors to solve problems in pure mathematics | P1 Ch. 11 **(All)**P2 Ch. 12 | **Vector Geometry Problems**<https://youtu.be/TvK4DtOKTiQ> |

# Paper 9MA0/31 Statistics

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| **Topic** | **Textbook Chapter** | **Revision Materials** |
| Regression lines (change of variable); hypothesis test for correlation | SM2 Ch. 1.1, 1.2, 1.3 | **Change of Variable Using Logarithms**<https://youtu.be/xH_IWUPUO-g><https://youtu.be/i9mq_pg5is8><https://youtu.be/RrDUvExN-7U>**Product Moment Correlation Coefficient**<https://youtu.be/D0EBJAQ7mUI>**Hypothesis Testing for Zero Correlation**<https://youtu.be/fTh5GnDqZfw> |
| Measures of central tendency and variation | SM1 Ch. 2.1, 2.2, 2.3, 2.4 | **Mean (inc. frequency tables)**<https://youtu.be/qroTJ2LP3nU><https://youtu.be/-BBliGLIx0w><https://youtu.be/MgKIjN7mpqk>**Median and Quartiles**<https://youtu.be/F3WcEAW-M80><https://youtu.be/9QhU2grGU_E>**Standard Deviation**<https://youtu.be/hUaua15QzK4><https://youtu.be/JvaJjjnOkRg> |
| Probability and Venn diagrams | SM1 Ch. 5.1, 5.2SM2 Ch. 2.2, 2.3, 2.4, 2.5 | **Independent and Mutually Exclusive Events**<https://youtu.be/aAcYjQImSg8><https://youtu.be/xLjBVHwQIcY>**Notation and Regions**<https://youtu.be/i90-2GwWoVE>**Conditional Probability and Venn Diagrams**<https://youtu.be/6IG8nGJg81w> |
| Discrete probability distributions; normal approximation | SM1 Ch. 6.1, 6.2, 6.3SM2 Ch. 3.6 | **Discrete Probability Distributions**<https://youtu.be/bxrudsvTUsg>**Binomial Distribution**<https://youtu.be/-U2cR-ErRVc><https://youtu.be/_0tr8Iw0tjA><https://youtu.be/MwNuZgZYBDA><https://youtu.be/CufC_U9iBKM>**Normal Approximation to Binomial Distribution**<https://youtu.be/kOcrXXSluTc><https://youtu.be/z2HoOWn914o> |
| Normal distribution | SM2 Ch. 3.1, 3.2, 3.3, 3.4, 3.5 | **The Normal Distribution**<https://youtu.be/syYwu2Prbt4><https://youtu.be/RPzxs-Hd8s0>**Calculating Mean and Standard Deviation**<https://youtu.be/YUmZTsK8lcs><https://youtu.be/HGGR_pNKmNM><https://youtu.be/KEEvU9P--3c><https://youtu.be/UpfdAe1Q78Y> |
| Hypothesis testing | SM1 Ch. 7.1, 7.2, 7.3, 7.4SM2 Ch. 3.7 | **Binomial Distribution**<https://youtu.be/61Wi04SqF34><https://youtu.be/RLoQH9O2gAE><https://youtu.be/JpiaMkERYC8><https://youtu.be/6CXptC72vyw><https://youtu.be/RKb7WHwIDxA><https://youtu.be/ZJDfLb2zZCg>**Normal Distribution**<https://youtu.be/-sEtIXqFTcc><https://youtu.be/jzJIZaEFjic><https://youtu.be/mLj83bOTXPs> |

# Paper 9MA0/32 Mechanics

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| **Topic** | **Textbook Chapter** | **Revision Materials** |
| Constant acceleration in 2D and Newton’s 2nd law in 2D using vectors | SM1 Ch. 9.3, 9.4, 9.5SM2 Ch. 5.1, 5.2SM2 Ch. 7.5, 7.6 | **Kinematics with Vectors**<https://youtu.be/IK3I_lOWLuU><https://youtu.be/e0mXa6_xN6A><https://youtu.be/vzoB0ZbrpMQ><https://youtu.be/9IhlS9BjA3Q> |
| Variable acceleration, language of kinematics | SM1 Ch. 8.2, 8.4SM1 Ch. 9.1, 9.2, 9.5SM1 Ch. 11.2, 11.3, 11.4SM2 Ch. 8.3, 8.4, 8.5 | **Linear Motion with Variable Acceleration**<https://youtu.be/j3PhvLzmuQI>**Position, Velocity and Acceleration Vectors**<https://youtu.be/FgkYxKXgqd0><https://youtu.be/02EbN_Eu1Qo> |
| Projectiles, constant acceleration | SM2 Ch. 6.1, 6.2, 6.3, 8.2 | **Projectiles**<https://youtu.be/W3iOSOtn7Do><https://youtu.be/Fd46ef5fuNI><https://youtu.be/aIo6kscqnXg>**Projectile Motion Equations**<https://youtu.be/6lVjoth53mQ> |
| Dynamics, resolving forces, friction, equilibrium | SM1 Ch. 10.3, 10.4SM2 Ch. 5.3SM2 Ch. 7.5, 7.6 | **Motion on Horizontal Planes**<https://youtu.be/NQFAjBSKdH4>**Friction**<https://youtu.be/D4VCy9H7duM>**Inclined Planes**<https://youtu.be/Kx2sE1wpWnw><https://youtu.be/4ZR6rMFp91o><https://youtu.be/rb73AYtvA30> |
| Statics, moments, resolving forces, friction | SM1 Ch. 10.4SM2 Ch. 4 **(All)**SM2 Ch. 5.1, 5.2, 5.3SM2 Ch. 7.1, 7.2, 7.3, 7.4 | **Resolving Forces**<https://youtu.be/ffYuVPo9a4w><https://youtu.be/w2WUJHQF6wA>**Equilibrium**<https://youtu.be/37vTDTKbRbM>**Friction**<https://youtu.be/OR4CjWKAKAU>**Moments**<https://youtu.be/izbxpjNg7Q8><https://youtu.be/4SHc_I6SS-k><https://youtu.be/DQqF8PpMsHs><https://youtu.be/P8AFbVt8Wcc><https://youtu.be/wamyHAcPPII> |