# Paper 9MA0/01 Pure Mathematics 1

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| **Topic** | **Textbook Chapter** | **Revision Materials** |
| Formal proof | P1 Ch. 7.4, 7.5  P2 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. 2.4  P1 Ch. 4 **(All)**  P1 Ch. 9.5, 9.6  P1 Ch. 14.1, 14.2  P2 Ch. 2.1, 2.5, 2.6, 2.7  P2 Ch. 6.2  P2 Ch. 7.4  P2 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. 2.4  P1 Ch. 4.4  P1 Ch. 6.3  P2 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. 2.6  P1 Ch. 14.3  P2 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, 12.9  P2 Ch. 5.1, 5.2, 5.3 | **Differentiating**  <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, 10.6  P2 Ch. 6.3, 6.4  P2 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. 10.3  P1 Ch. 13.5, 13.6  P2 Ch. 6.4  P2 Ch. 7.4, 7.5, 7.6  P2 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, 14.6  P2 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, 12.9  P2 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, 13.4  P2 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, 7.5  P2 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, 8.5  P2 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. 10.3  P2 Ch. 3.3, 3.4, 3.5, 3.6  P2 Ch. 6.4, 6.5  P2 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, 10.6  P2 Ch. 6.4  P2 Ch. 7.7 |  |
| The function 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, 12.11  P2 Ch. 9.2, 9.3, 9.4, 9.5, 9.6, 9.8 | **Differentiating**  <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. 12.2  P2 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, 12.9  P2 Ch. 9.9  P2 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, 13.6  P2 Ch. 11.8 | **Area Under a Curve**  <https://youtu.be/T3McJeGuAiw> |
| Solution of a first order differential equation; partial fractions | P2 Ch. 1.3, 1.4  P2 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, 5.2  SM2 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, 6.3  SM2 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, 7.4  SM2 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, 9.5  SM2 Ch. 5.1, 5.2  SM2 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, 8.4  SM1 Ch. 9.1, 9.2, 9.5  SM1 Ch. 11.2, 11.3, 11.4  SM2 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, 10.4  SM2 Ch. 5.3  SM2 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. 10.4  SM2 Ch. 4 **(All)**  SM2 Ch. 5.1, 5.2, 5.3  SM2 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> |