A Level Mathematics 9709 formula sheet

Exams in 2026 and 2027 · From the official Cambridge syllabus · Paper 3 / 4 / 6 = only on that paper

In the formula booklet (MF19): pure mathematics

Arc length (θ in radians)	$s = r\theta$
Sector area (θ in radians)	$A = \frac{1}{2}r^2\theta$
Quadratic formula	$x = (-b \pm \sqrt{(b^2 - 4ac)}) \div 2a$
Arithmetic series	$u_n = a + (n - 1)d$, $S_n = \frac{1}{2}n\{2a + (n - 1)d\}$
Geometric series	$u_n = ar^{n-1}$, $S_n = a(1 - r^n) \div (1 - r)$
Sum to infinity, $\lvert r\rvert < 1$	$S_\infty = a \div (1 - r)$
Binomial coefficient	${}^nC_r = n! \div (r!(n - r)!)$
Binomial series, rational n, $\lvert x\rvert < 1$ Paper 3	$(1 + x)^n = 1 + nx + n(n - 1)x^2/2! + \ldots$
Pythagorean identities	$\sin^2\theta + \cos^2\theta \equiv 1$, $1 + \tan^2\theta \equiv \sec^2\theta$
Compound angles Paper 3	$\sin(A \pm B) \equiv \sin A\cos B \pm \cos A\sin B$
Double angles Paper 3	$\sin 2A \equiv 2\sin A\cos A$, $\cos 2A \equiv 1 - 2\sin^2 A$
Product rule Paper 3	$d(uv)/dx = v\,du/dx + u\,dv/dx$
Quotient rule Paper 3	$d(u/v)/dx = (v\,du/dx - u\,dv/dx) \div v^2$
Parametric differentiation Paper 3	$dy/dx = (dy/dt) \div (dx/dt)$
Integration by parts Paper 3	$\int u\,dv/dx\,dx = uv - \int v\,du/dx\,dx$
Logarithmic integral Paper 3	$\int f'(x)/f(x)\,dx = \ln\lvert f(x)\rvert + c$
Scalar product Paper 3	$\mathbf{a}\cdot\mathbf{b} = a_1b_1 + a_2b_2 + a_3b_3 = \lvert\mathbf{a}\rvert\lvert\mathbf{b}\rvert\cos\theta$

In the formula booklet: mechanics

Constant acceleration	$v = u + at$, $s = ut + \frac{1}{2}at^2$
Constant acceleration	$v^2 = u^2 + 2as$, $s = \frac{1}{2}(u + v)t$

In the formula booklet: probability & statistics

Mean and standard deviation	$\bar{x} = \Sigma x/n$, $\sigma = \sqrt{(\Sigma x^2/n - \bar{x}^2)}$
Discrete random variable	$E(X) = \Sigma xp$, $\mathrm{Var}(X) = \Sigma x^2p - \{E(X)\}^2$
Binomial B(n, p)	$P(X = r) = {}^nC_r\,p^r(1 - p)^{n-r}$, mean np, variance $np(1 - p)$
Geometric Geo(p)	$P(X = r) = p(1 - p)^{r-1}$, mean $1/p$
Poisson Po(λ) Paper 6	$P(X = r) = e^{-\lambda}\lambda^r \div r!$, mean λ, variance λ
Unbiased variance estimate Paper 6	$s^2 = (\Sigma x^2 - (\Sigma x)^2/n) \div (n - 1)$
Sample mean (Central Limit Theorem) Paper 6	$\bar{X} \sim N(\mu, \sigma^2/n)$

Not in the booklet: learn these

Friction	$F \le \mu R$ ($F = \mu R$ when sliding)
Weight	$W = mg$, with $g = 10\ \mathrm{m\,s^{-2}}$
Newton's second law	$F = ma$
Work done	$W = Fd\cos\theta$
Kinetic and potential energy	$KE = \frac{1}{2}mv^2$, $PE = mgh$
Power	$P = Fv$
Momentum	$p = mv$ (conserved in collisions)
Standardising	$Z = (X - \mu) \div \sigma$
Normal approximation to binomial	use when $np > 5$ and $nq > 5$
Trapezium rule Paper 3	$\frac{1}{2}h\{y_0 + 2(y_1 + \ldots + y_{n-1}) + y_n\}$
Linear transformation Paper 6	$E(aX + b) = aE(X) + b$, $\mathrm{Var}(aX + b) = a^2\mathrm{Var}(X)$

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