

*This sheet covers what BC adds to AB – series, parametric, polar and the language of convergence – because those are where BC-only points are won and lost. The shared calculus vocabulary is on the AB sheet. Convergence answers are marked on NAMING the test and CHECKING its conditions. 本册只列 BC 相较 AB 新增的内容; 收敛性题目必须写出所用判别法并核对条件。*

## Sequences and series

**Sequence** 数列 — an ordered list of terms indexed by the positive integers

**Series** 级数 — the sum of the terms of a sequence; its value is defined as the limit of the partial sums

**Convergence** 收敛 — a series converges when its sequence of PARTIAL SUMS approaches a finite limit – not when its terms approach zero

**nth-term test** 通项判别法 — if the terms do not approach zero, the series diverges; if they do, the test is INCONCLUSIVE

**Geometric series** 几何级数 — a series with constant ratio  $r$ , convergent exactly when  $|r| < 1$ , with sum  $a/(1 - r)$

**p-series**  $p$  级数 — the series  $\sum 1/n^p$ , convergent exactly when  $p > 1$ ;  $p = 1$  is the harmonic series and diverges

**Absolute convergence** 绝对收敛 — convergence of the series of absolute values; it implies convergence of the original series

**Conditional convergence** 条件收敛 — convergence of a series whose absolute-value series diverges, as for the alternating harmonic series

**Alternating series error bound** 交错级数误差界 — for a convergent alternating series, the error after  $n$  terms is at most the magnitude of the first omitted term

**Radius of convergence** 收敛半径 — half the length of the interval on which a power series converges, found with the ratio test; the ENDPOINTS must be tested separately

**Taylor series** 泰勒级数 — a power series representing a function about a point, whose coefficients are its derivatives there divided by  $n$  factorial

**Lagrange error bound** 拉格朗日余项 — a bound on the error of a Taylor polynomial, using a maximum of the next derivative on the interval

## Parametric, polar and vector functions

**Parametric equations** 参数方程 — a curve given by  $x(t)$  and  $y(t)$ , where  $dy/dx$  is  $(dy/dt)/(dx/dt)$

**Speed (parametric)** 速率 — the magnitude of the velocity vector,  $\sqrt{(dx/dt)^2 + (dy/dt)^2}$  – a scalar, unlike velocity

**Arc length** 弧长 — the integral of speed with respect to the parameter over the interval

**Polar coordinates** 极坐标 — a point located by its distance  $r$  from the origin and the angle  $\theta$  from the polar axis

**Area in polar form** 极坐标面积 — the region swept by a radius is  $\int \frac{1}{2}r^2 d\theta$ , and the  $\frac{1}{2}$  is the mark most often lost

## Additional integration

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**Integration by parts** 分部积分 — the reverse of the product rule,  $\int u dv = uv - \int v du$

**Improper integral** 反常积分 — an integral with an infinite limit or an unbounded integrand, evaluated as a limit; it converges only if that limit is finite

**Logistic differential equation** 逻辑斯谛微分方程 —  $dP/dt = kP(1 - P/L)$ , whose solution approaches the carrying capacity  $L$  and grows fastest at  $L/2$

**Euler's method** 欧拉法 — approximating a solution curve by stepping along tangent lines from an initial condition