

## Reference Sheet

### Geometric series identities

$$\sum_{i=0}^k c^i = \frac{c^{k+1} - 1}{c - 1} \quad \sum_{i=0}^{\infty} c^i = \frac{1}{1 - c} \text{ if } |c| < 1$$

### Sums of polynomials

$$\sum_{i=0}^n i = \frac{n(n+1)}{2} \quad \sum_{i=0}^n i^2 = \frac{n(n+1)(2n+1)}{6} \quad \sum_{i=0}^n i^3 = \frac{n^2(n+1)^2}{4}$$

### Log identities

$$b^{\log_b(a)} = a \quad \log_b(x^y) = y \cdot \log_b(x) \quad a^{\log_b(c)} = c^{\log_b(a)} \quad \log_b(a) = \frac{\log_d(a)}{\log_d(b)}$$