FREE RESOURCE · BCAT MATHS

Quantitative Formula Sheet

School-level Maths for business school tests such as IBA, IoBM and SZABIST: arithmetic, algebra, geometry, probability and statistics on two pages.

Percentages and ratios

- x% of N = (x / 100) × N
- % change = (new − old) / old × 100
- Successive change a% then b%: a + b + ab/100 — net %
- a : b = ka : kb
- Profit % = profit / cost price × 100

Averages and interest

- Average = sum ÷ count
- Simple interest = PRT / 100
- Amount (compound) = $P(1 + R/100)^n$
- Compound interest = amount − P

Speed, time and work

- Speed = distance ÷ time
- Average speed = total distance ÷ total time
- km/h × 5/18 = m/s
- Together: 1/T = 1/a + 1/b — a, b = times alone

Exponents and algebra

- $a^m \times a^n = a^{m+n}$
- $a^m \div a^n = a^{m-n}$
- $(a^m)^n = a^{mn}$, $a^0 = 1$, $a^{-n} = 1/a^n$
- $(a + b)^2 = a^2 + 2ab + b^2$
- $a^2 - b^2 = (a - b)(a + b)$
- $x = [-b \pm \sqrt{(b^2 - 4ac)}] / 2a$ — quadratic

Sequences

$a_n = a + (n - 1)d$ — arithmetic

$S_n = (n/2)(\text{first} + \text{last})$ — arithmetic sum

$a_n = ar^{n-1}$ — geometric

Geometry: angles and areas

Angles in a triangle = 180°

Interior angles of n-gon = $(n - 2) \times 180°$

$a^2 + b^2 = c^2$ — Pythagoras

Triangle = ½ × base × height

Rectangle = l × w, square = s^2

Parallelogram = base × height

Trapezium = $\frac{1}{2}(a + b) \times h$

Circle: area πr^2, circumference $2\pi r$

Sector area = $(\theta/360) \times \pi r^2$

Coordinate geometry

Distance = $\sqrt{[(x_2 - x_1)^2 + (y_2 - y_1)^2]}$

Slope = $(y_2 - y_1) / (x_2 - x_1)$

$y = mx + c$

Volume and surface area

Cuboid V = lwh

Cube V = s^3, surface $6s^2$

Cylinder V = $\pi r^2 h$

Cone V = $\frac{1}{3}\pi r^2 h$

Sphere V = $(4/3)\pi r^3$, surface $4\pi r^2$

Counting, probability, statistics

P(event) = favourable ÷ total

P(not A) = 1 - P(A)

${}^nP_r = n! / (n - r)!$ — arrangements

${}^nC_r = n! / [r!(n - r)!]$ — selections

Mean = sum ÷ count

Median = middle value (sorted)

Mode = most frequent value

Range = highest - lowest