

QUANTITATIVE APTITUDE FORMULA SHEET

Symbiosis Entrance Test (SET) General Prep Companion

An exhaustive, high-yield reference guide tailored specifically for the **Symbiosis SET** exam. This sheet covers core formulas, quick shortcuts, and crucial conceptual relations across Arithmetic, Algebra, Geometry, Mensuration, and Modern Mathematics to maximize speed and accuracy.

1. ARITHMETIC (CORE PILLARS)

CONCEPT	KEY FORMULAS	SHORTCUTS & RULES
Percentages	Percentage Increase = $(\text{Change} / \text{Original}) \times 100$ Product Constancy: If $A \times B = \text{Constant}$, and A increases by $x\%$, then B must decrease by $[(x / (100 + x)) \times 100]\%$.	Use fraction equivalents: $1/6 = 16.67\%$, $1/8 = 12.5\%$, $1/11 = 9.09\%$, $1/12 = 8.33\%$.
Profit, Loss & Discount	Profit % = $(P / CP) \times 100$ SP = $CP \times [1 + (P\%/100)]$ Discount % = $(\text{Discount} / MP) \times 100$ MP / CP = $(100 + \text{Profit}\%) / (100 - \text{Discount}\%)$	Discount is always calculated on Marked Price (MP). Successive discounts d_1 and d_2 equivalent to $d_1 + d_2 - (d_1 d_2 / 100)\%$.
Interest (SI & CI)	SI = $(P \times R \times T) / 100$ CI Amount = $P(1 + R/100)^T$ Diff (2 Yrs) = $P(R/100)^2$ Diff (3 Yrs) = $P(R/100)^2 \times (3 + R/100)$	Rule of 72: Money doubles in approximately $72 / R$ years under compound interest.
Ratio & Partnership	If $a/b = c/d$, then: Componendo & Dividendo: $(a+b)/(a-b) = (c+d)/(c-d)$ Profit Share = $\text{Investment} \times \text{Time Period}$	If capitals C_1, C_2 are invested for times T_1, T_2 , profits are shared in ratio $C_1 T_1 : C_2 T_2$.

2. TIME, SPEED, DISTANCE & WORK

CONCEPT	KEY FORMULAS	SHORTCUTS & RULES
Speed, Distance & Time	$Speed = Distance / Time$ Conversion: $1 \text{ km/h} = 5/18 \text{ m/s} \mid 1 \text{ m/s} = 18/5 \text{ km/h}$ $Avg. Speed (equal dist) = 2xy / (x + y)$	If distance is constant, $Speed \propto 1/Time$. If time is constant, $Distance \propto Speed$.
Trains, Boats & Streams	$Relative Speed (Same Dir.) = u - v$ $Relative Speed (Opp. Dir.) = u + v$ $Downstream Speed (d) = u + v$ $Upstream Speed (u) = u - v$ $Boat Speed in still water = (d + u) / 2$	u = speed of boat in still water; v = speed of stream. Crossing a platform: $Dist = Length_{Train} + Length_{Platform}$
Time & Work	If A does work in x days, 1 day work = $1/x$. A & B together: $Time = (x \times y) / (x + y)$ $Work Equivalence: (M_1 \times D_1 \times H_1) / W_1 = (M_2 \times D_2 \times H_2) / W_2$	Efficiency is inversely proportional to time taken: $E_1 / E_2 = T_2 / T_1$.

3. ALGEBRA & NUMBER SYSTEM

CONCEPT	KEY FORMULAS	SHORTCUTS & RULES
Progressions (AP / GP)	AP: $t_n = a + (n - 1)d$ $S_n = (n/2)[2a + (n - 1)d] = (n/2)(a + l)$ GP: $t_n = a \times r^{(n-1)} \mid S_\infty = a / (1 - r)$ where $ r < 1$	For 3 terms in AP, assume: $a-d, a, a+d$. For 3 terms in GP, assume: $a/r, a, ar$.
Quadratic Equations	For $ax^2 + bx + c = 0$: $Roots: x = [-b \pm \sqrt{b^2 - 4ac}] / 2a$ $Sum of Roots (\alpha + \beta) = -b/a$ $Product of Roots (\alpha\beta) = c/a$	Discriminant $D = b^2 - 4ac$: If $D > 0$ (Real & Distinct), $D = 0$ (Real & Equal), $D < 0$ (Imaginary).
Logarithms	$\log_a(xy) = \log_a x + \log_a y$ $\log_a(x/y) = \log_a x - \log_a y$ $\log_a(x^k) = k \log_a x \mid \log_a b = (\log_c b) / (\log_c a)$	Always note base conditions: $a > 0, a \neq 1$. $\log_a a = 1$ and $\log_a 1 = 0$.

4. GEOMETRY & MENSURATION

SHAPE	AREA / PERIMETER (2D)	VOLUME / SURFACE AREA (3D)
Circle / Sphere	$Area = \pi r^2$ $Circumference = 2\pi r$ $Length\ of\ Arc = (\theta/360) \times 2\pi r$	Sphere: $Volume = (4/3)\pi r^3$ $Surface\ Area = 4\pi r^2$ Hemisphere: $Volume = (2/3)\pi r^3$ $Total\ SA = 3\pi r^2$
Triangle	$Area = \frac{1}{2} \times Base \times Height$ $Equilateral\ Area = (\sqrt{3}/4) \times a^2$ $Heron's\ Formula = \sqrt{s(s-a)(s-b)(s-c)}$	$s = (a + b + c) / 2$ (semi-perimeter). Inradius of equilateral triangle = $a / (2\sqrt{3})$. Circumradius = $a / \sqrt{3}$.
Cylinder & Cone	-	Cylinder: $Volume = \pi r^2 h$ $Curved\ SA = 2\pi r h$ $Total\ SA = 2\pi r(h + r)$ Cone: $Volume = (1/3)\pi r^2 h$ $Curved\ SA = \pi r l$ (where $l = \sqrt{r^2 + h^2}$)

5. MODERN MATH & PROBABILITY

CONCEPT	KEY FORMULAS	SHORTCUTS & RULES
Permutations & Combinations	$nPr = n! / (n - r)!$ (Arrangement) $nCr = n! / [r!(n - r)!]$ (Selection) $nCr = nC(n-r)$ $Circular\ Permutation = (n - 1)!$	Use nCr when order doesn't matter (e.g. choosing team members), nPr when order matters (e.g. word formations).
Probability	$P(A) = \text{Favorable Outcomes} / \text{Total Outcomes}$ $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ If independent: $P(A \cap B) = P(A) \times P(B)$	Odds in favor of event = a : b $\Rightarrow$ $P(A) = a / (a + b)$. Odds against event = b : a .

Symbiosis SET Quant Test-Taking Tips

- **Elimination via Unit Digit:** Before solving heavy calculations, multiply the unit digits to match with multiple-choice options.
- **Approximation:** When choices are far apart, round off decimals to the nearest whole number to evaluate values quickly.
- **Ratio Method:** For TSD (Time, Speed, Distance) and Time & Work problems, avoid traditional variables. Use LCM-based efficiency methods and ratio constant properties.
- **No Negative Marking:** Attempt all questions. If stuck, make an educated guess using option substitution.