Based on the provided source regarding Section A of the CDAC entrance exam (C-CAT), here is a summary of the essential formulas and key points for Quantitative Aptitude and Reasoning.

Quantitative Aptitude

1. Number System

- **Prime Numbers:** Numbers divisible only by 1 and themselves (e.g., 2, 3, 7). They have exactly two factors 1.
- **Composite Numbers:** Numbers with more than two factors (e.g., 4, 15, 16) 1, 2.
- **Co-prime Numbers:** Two numbers (prime or composite) that have no common factor other than 1 (e.g., 2 and 3) 2, 3.
- **Checking for Primes:** To check if a number (e.g., 17) is prime, find the nearest square root that is smaller than the number (e.g., 4, since $4^2=16 < 17$). Divide the number by all prime numbers smaller than that square root. If none divide it, the number is prime 3, 4.
- **HCF and LCM Formula:** For two numbers n_1 and n_2, the product of the numbers equals the product of their HCF and LCM:$$n_1 \times n_2 = \text{HCF} \times \text{LCM}$$ 4.
- **Unit Digit:** To find the unit digit of a number with a large power (e.g., 3^{12}), divide the power by 4. If it is fully divisible, calculate the unit digit of the base to the power of 4 5.
- **Remainders:** To find the **largest** n-digit number divisible by a value, subtract the remainder from the largest n-digit number. To find the **smallest**, add the remainder to the smallest n-digit number 6.

2. Profit and Loss

- **Basic Formula:** $\text{Profit} = \text{Selling Price (SP)} - \text{Cost Price (CP)}$ 7.
- **Percentage Profit:** Profit percentage is always calculated on the Cost Price:$$\% \text{Profit} = \left(\frac{\text{SP} - \text{CP}}{\text{CP}} \right) \times 100$$ 7.

3. Interest

- **Simple Interest (SI):**$$\text{SI} = \frac{P \times R \times T}{100}$$Where P is principal, R is annual rate, and T is time in years 8.
- **Compound Interest (CI):**$$A = P \left(1 + \frac{R}{100}\right)^n$$Where A is the aggregate (total) amount and n is the number of years. The interest is $A - P$ 8.

4. Ratio, Proportion and Partnership

- **Ratio:** a/b can be written as $a:b$ 8.
- **Partnership:** Profit is distributed based on the product of investment and time period.$$\text{Profit Ratio} = (\text{Investment}_1 \times \text{Time}_1) : (\text{Investment}_2 \times \text{Time}_2)$$ 9.

5. Mixtures and Alligation

- To determine the ratio in which two items (one cheaper, one dearer/costlier) should be mixed to achieve a target mean price (M):$$\frac{\text{Quantity of Cheaper (A)}}{\text{Quantity of Dearer (B)}} = \frac{\text{Price of B} - M}{M - \text{Price of A}}$$ 10.

6. Time, Speed and Distance

- **Basic Formula:** $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$ 11.
- **Average Speed:** Never simply average the speeds ($S_1 + S_2 / 2$). Instead use:$$\text{Average Speed} = \frac{\text{Total Distance}}{\text{Total Time}}$$ 11.

- **Boats and Streams:**
- **Upstream (against flow):** $\text{Speed}*{\text{boat}} - \text{Speed}*{\text{stream}}$ 12.
- **Downstream (with flow):** $\text{Speed}*{\text{boat}} + \text{Speed}*{\text{stream}}$ 12.

7. Time and Work

- If person A finishes work in x days and person B in y days, calculate their combined work rate to find how long they take together 13. This concept also applies to **Pipes and Cisterns** (filling tanks) 13.

Reasoning

1. Clocks

- The total angle of a clock is 360° 12.
- **Minute Hand:** Moves 6° per minute 12.
- **Hour Hand:** Covers 30° per hour 14.
- **Key Questions:** Be prepared to calculate how many times hands are at right angles (90°) or parallel (0° or 180°) within 24 hours 14.

2. Calendar

- **Odd Days:**
- 1 Ordinary Year = 1 Odd Day 14.
- 1 Leap Year = 2 Odd Days 14.
- **Day Codes:** When calculating the day of the week, 0 represents Sunday, 1 represents Monday, ..., and 6 represents Saturday 14.

3. Syllogism

- Use **Venn Diagrams** to visualise statements (e.g., "All tables are chairs").
- **Strict Logic:** Do not use real-world logic; rely only on the given statements (even if they say "Fans are tables") to draw conclusions 15, 16.

Analogy to solidify understanding: Preparing for the C-CAT Section A is like packing a toolkit for a specific repair job.

- **Formulas (like SI, Profit%)** are your **screwdrivers and wrenches**: precise tools you must carry and know exactly how to turn to get the right answer.
- **Concepts (like Syllogism and Number Theory)** are your **diagnostic manual**: they teach you how to look at a messy problem (a broken machine) and identify exactly which part is faulty so you know which tool to reach for. Without the manual, the tools are useless; without the tools, the manual is just theory. You need both to pass the exam.