SSC GD Constable Exam: Fractions Syllabus Summary

Overview:
The Fractions topic is an essential component of the Mathematics section in the SSC GD Constable Exam, contributing approximately 2–4 questions (4–8 marks out of 160 total marks) in the Computer-Based Examination (CBE). The syllabus focuses on understanding, manipulating, and applying fractions (numbers expressed as a/b, where a and b are whole numbers, b ≠ 0) in arithmetic operations, simplifications, and word problems. Questions test computational accuracy, simplification skills, and practical applications at a 10th-grade level. The exam includes 80 questions (2 marks each, 0.50 negative marking per wrong answer) to be completed in 60 minutes.

Key Topics in Fractions:

1. Types of Fractions: Proper, improper, mixed, like, unlike, and equivalent fractions.
2. Arithmetic Operations: Addition, subtraction, multiplication, and division of fractions.
3. Simplification: Reducing fractions to lowest terms and simplifying expressions using BODMAS.
4. Comparison: Comparing and ordering fractions.
5. Conversion: Converting fractions to decimals and mixed fractions to improper fractions (and vice versa).
6. Word Problems: Real-world applications involving fractions (e.g., sharing quantities, ratios, costs).
7. Equivalent Fractions: Generating fractions with the same value.
8. HCF and LCM in Fractions: Using Highest Common Factor (HCF) and Lowest Common Multiple (LCM) for operations.

Important Formula and Techniques:

1. Types of Fractions:
   - Proper Fraction: Numerator < Denominator (e.g., 3/5).
   - Improper Fraction: Numerator ≥ Denominator (e.g., 7/4).

- Mixed Fraction: Whole number + fraction (e.g., 1 3/4 = (1×4 + 3)/4 = 7/4).
- Like Fractions: Same denominators (e.g., 2/7, 5/7).
- Unlike Fractions: Different denominators (e.g., 2/3, 1/4).
- Equivalent Fractions: Fractions with same value (e.g., 1/2 = 2/4 = 3/6).

2. Arithmetic Operations with Fractions:
- Addition/Subtraction:
  - For like fractions: Add/subtract numerators, keep denominator same.
    - Example: 2/5 + 3/5 = (2 + 3)/5 = 5/5 = 1.
  - For unlike fractions: Convert to common denominator using LCM, then add/subtract.
    - Example: 1/3 + 1/4 = (1×4 + 1×3)/(3×4) = (4 + 3)/12 = 7/12.
- Multiplication: Multiply numerators and denominators.
  - Example: 2/3 × 3/5 = (2×3)/(3×5) = 6/15 = 2/5.
- Division: Multiply by the reciprocal of the second fraction.
  - Example: 2/3 ÷ 1/4 = 2/3 × 4/1 = 8/3.

3. Simplification of Fractions:
- Reduce to lowest terms: Divide numerator and denominator by their HCF.
  - Example: 12/18 = (12÷6)/(18÷6) = 2/3 (HCF = 6).
- BODMAS Rule: Apply Bracket, Order, Division/Multiplication, Addition/Subtraction in order.
  - Example: Simplify (1/2 + 1/3) × 6 = (3/6 + 2/6) × 6 = 5/6 × 6 = 5.

4. Conversion of Fractions:
- Fraction to Decimal: Divide numerator by denominator.
  - Example: 3/4 = 3 ÷ 4 = 0.75.
- Mixed to Improper Fraction: (a b/c) = (a×c + b)/c.
  - Example: 2 3/5 = (2×5 + 3)/5 = 13/5.
- Improper to Mixed Fraction: Divide numerator by denominator; quotient is whole number, remainder is numerator.
  - Example: 13/5 = 2 3/5 (13 ÷ 5 = quotient 2, remainder 3).

5. Comparing Fractions:
- For unlike fractions: Convert to common denominator or use cross-multiplication (ad > bc for a/b > c/d).
  - Example: Compare 2/3 and 3/4: Cross-multiply (2×4) vs (3×3) = 8 vs 9, so 2/3 < 3/4.
- For like fractions: Compare numerators directly.
  - Example: 2/5 < 3/5.

6. Equivalent Fractions:
- Multiply/divide numerator and denominator by the same number.
  - Example: 1/3 = (1×2)/(3×2) = 2/6 = (2×2)/(6×2) = 4/12.

7. HCF and LCM for Fractions:
- Addition/Subtraction: Use LCM of denominators to find common denominator.
  - Example: LCM of 3 and 4 is 12 for adding 1/3 + 1/4.
- Simplification: HCF of numerator and denominator to reduce fractions.
  - Example: HCF of 12 and 18 is 6 for reducing 12/18 to 2/3.

8. Word Problem Applications:
- Example: If 2/3 of a tank is filled in 4 hours, time for full tank = 4 ÷ (2/3) = 4 × 3/2 = 6 hours.

Key Points for SSC GD Preparation:

- Focus Areas: Arithmetic operations, simplification, conversions, and word problems involving fractions are frequently tested.
- Question Types: Direct operations (e.g., 2/3 + 1/4), simplification using BODMAS, conversions (e.g., 5/8 to decimal), and word problems (e.g., dividing quantities or costs).
- Difficulty Level: 10th-grade level, requiring accurate calculations and understanding of fraction properties.
- Practice Tips: Master fraction operations, memorize HCF/LCM techniques, practice BODMAS-based simplifications, and solve word problems from past SSC GD papers.

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