Unit 5 · Operations with Fractions Cheat Sheet

Unit 5 focus: comparing rational numbers, fractions and decimals, the four operations

1 COMPARING AND ORDERING

Use a common denominator or change to decimals.

Example: Order $\frac{2}{3}$, 0.6, $\frac{5}{8}$ from least to greatest.
Decimals: $0.\overline{6}$, 0.6, 0.625
Answer: $0.6,\ \frac{5}{8},\ \frac{2}{3}$

2 FRACTIONS AND DECIMALS

Fraction	Decimal
$\frac{3}{8}$	0.375 (terminating)
$\frac{2}{9}$	$0.\overline{2}$ (repeating)
$\frac{7}{20}$	0.35

Fraction → decimal: divide the numerator by the denominator.

3 ADDING AND SUBTRACTING FRACTIONS

Use a common denominator; add or subtract numerators only.

Example: $\frac{5}{6} - \frac{3}{8}$
LCD 24: $\frac{20}{24} - \frac{9}{24}$
Answer: $\frac{11}{24}$

4 MIXED NUMBERS

Rename as improper fractions (or regroup), then add or subtract.

Example: $3\frac{1}{4} - 1\frac{2}{3}$
Improper: $\frac{13}{4} - \frac{5}{3} = \frac{39}{12} - \frac{20}{12}$
Answer: $\frac{19}{12} = 1\frac{7}{12}$

5 MULTIPLYING AND DIVIDING

Multiply straight across. To divide, multiply by the reciprocal.

Example: $-\frac{4}{5} \div \frac{2}{3}$
Reciprocal: $-\frac{4}{5} \cdot \frac{3}{2} = -\frac{12}{10}$
Answer: $-\frac{6}{5}$

6 QUICK REMINDERS & COMMON MISTAKES

✔ Do remember

- Add numerators only; keep the common denominator.
- Simplify your final answer.
- Signs follow the integer rules.

✘ Common mistakes

- $\frac{1}{2} + \frac{1}{3} = \frac{2}{5}$: common denominator: $\frac{5}{6}$
- Flipping the first fraction to divide: flip the divisor
- Multiplying mixed numbers part by part: convert first

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More practice: customary units, fraction equations and powers of quotients

1 CUSTOMARY UNITS

Unit	Equivalent
1 ft	12 in
1 yd	3 ft
1 mi	5,280 ft
1 lb	16 oz
1 gal	4 qt = 8 pt = 16 c

2 CONVERTING CUSTOMARY UNITS

Multiply by a conversion fraction so units cancel.

Example: Convert $2\frac{1}{2}$ gallons to quarts.
Multiply: $\frac{5}{2} \times 4$
Answer: 10 quarts

3 ADDING OR SUBTRACTING FRACTIONS TO SOLVE

Use the inverse operation; find common denominators.

Example: $x + \frac{2}{3} = \frac{5}{6}$
Subtract: $\frac{5}{6} - \frac{4}{6}$
Answer: $x = \frac{1}{6}$

4 MULTIPLYING FRACTIONS TO SOLVE

Multiply both sides by the reciprocal of the coefficient.

Example: $\frac{3}{4}y = 12$
Multiply by $\frac{4}{3}$: $y = 12 \cdot \frac{4}{3}$
Answer: y = 16

5 POWERS OF PRODUCTS AND QUOTIENTS

Rule	Example
$(ab)^n = a^n b^n$	$(2x)^3 = 8x^3$
$(\frac{a}{b})^n = \frac{a^n}{b^n}$	$(\frac{2}{3})^2 = \frac{4}{9}$
$(a^m)^n = a^{mn}$	$(x^2)^4 = x^8$

6 CHECK YOURSELF

- Did I follow the order of operations?
- Did I do the same thing to both sides?
- Did I check my answer in the original problem?
- Does my answer have the right sign and units?