

Addition of Rational Numbers

Unit: Integers and Rationals - Student Practice Worksheet

Overview: Kabir added $\frac{2}{3}$ and $\frac{3}{4}$ by just adding the tops and the bottoms: $\frac{5}{7}$. Zara said that was wrong before he'd even finished writing it. "But it worked for whole numbers," Kabir protested. Zara asked him to check $\frac{5}{7}$ against a number line. It wasn't even close to right.

Practice Questions (30 Total)

Section A - Easy

Q1. Two teal plus three maroon sevenths. What is $\frac{2}{7} + \frac{3}{7}$?



- ☐ A. $\frac{5}{7}$
- ☐ B. $\frac{5}{14}$
- ☐ C. $\frac{6}{7}$
- ☐ D. $\frac{1}{7}$

Q2. Why can't $\frac{1}{2}$ and $\frac{1}{3}$ be added directly without converting first?

- ☐ A. They have different-sized denominator pieces
- ☐ B. One of them is negative
- ☐ C. They are already exactly equal
- ☐ D. Fractions can never be added at all

Q3. What is the LCM of the denominators in $\frac{1}{4} + \frac{1}{6}$?

- ☐ A. 10
- ☐ B. 12
- ☐ C. 24
- ☐ D. 6

Q4. Eight of twelve teal. Equivalent fraction for $\frac{2}{3}$ with denominator 12?



$\frac{2}{3}$ of twelfths

- ☐ A. $\frac{6}{12}$
- ☐ B. $\frac{9}{12}$
- ☐ C. $\frac{8}{12}$
- ☐ D. $\frac{4}{12}$

Q5. Is $\frac{2}{3} + \frac{3}{4} = \frac{5}{7}$ a valid way to add fractions?

- ☐ A. No, this shortcut is never valid
- ☐ B. Yes, always
- ☐ C. Only when denominators are equal
- ☐ D. Only for negative fractions

Q6. Add $-\frac{1}{2}$ and $\frac{1}{3}$.

- ☐ A. $\frac{1}{6}$
- ☐ B. $-\frac{1}{6}$
- ☐ C. $-\frac{1}{5}$
- ☐ D. $\frac{2}{5}$

Q7. One teal fifth plus two maroon fifths. What is $\frac{1}{5} + \frac{2}{5}$?



- ☐ A. $\frac{3}{10}$
- ☐ B. $\frac{3}{25}$
- ☐ C. $\frac{2}{25}$
- ☐ D. $\frac{3}{5}$

Q8. What is the additive inverse of $\frac{4}{9}$?

- ☐ A. $\frac{9}{4}$
- ☐ B. $\frac{4}{9}$
- ☐ C. 0
- ☐ D. $-\frac{4}{9}$

Q9. What does $a/b + (-a/b)$ always equal?

- ☐ A. 1
- ☐ B. a/b
- ☐ C. 0
- ☐ D. $2a/b$

Q10. Write $17/12$ as a mixed number, then say why 12 goes in once.

- ☐ A. 1 and $7/12$
- ☐ B. 1 and $5/12$
- ☐ C. 2 and $5/12$
- ☐ D. $17/12$ cannot be simplified

Section B - Medium

Q11. $3/8$ and $5/12$ with LCM 24. What is the sum?

$$3/8 + 5/12$$

LCM 24

- ☐ A. $19/24$
- ☐ B. $8/20$
- ☐ C. $15/24$
- ☐ D. $1/3$

Q12. Kabir added $5/6 + 1/4$ as $6/10$ by adding numerators and denominators. Which method actually gives the correct sum?

- ☐ A. $6/10$ is already correct
- ☐ B. Multiply the fractions instead
- ☐ C. $5/6 + 1/4$ cannot be added
- ☐ D. Find LCM 12, giving $10/12 + 3/12 = 13/12$

Q13. Add $-3/4$ and $-1/6$.

- ☐ A. $-4/10$
- ☐ B. $-11/12$
- ☐ C. $11/12$

☐ D. $-\frac{2}{3}$

Q14. Three plus five eighths fill the bar. Exact sum?



$\frac{3}{8} + \frac{5}{8}$ fills the bar

☐ A. $\frac{8}{16}$

☐ B. $\frac{8}{8}$, which is undefined

☐ C. $\frac{15}{8}$

☐ D. 1

Q15. If $\frac{a}{b} + \frac{c}{d} = 0$, what must be true about $\frac{c}{d}$?

☐ A. $\frac{c}{d} = \frac{a}{b}$

☐ B. $\frac{c}{d} = -\frac{a}{b}$

☐ C. $\frac{c}{d} = 0$

☐ D. $\frac{c}{d} = \frac{b}{a}$

Q16. Which fraction, added to $\frac{2}{5}$, gives a sum of 1?

☐ A. $\frac{2}{5}$

☐ B. $\frac{1}{5}$

☐ C. $\frac{3}{5}$

☐ D. $\frac{5}{2}$

Q17. Four, then three, then two twelfths. What is $\frac{1}{3} + \frac{1}{4} + \frac{1}{6}$?



$4 + 3 + 2$ twelfths

☐ A. $\frac{3}{13}$

☐ B. $\frac{1}{2}$

☐ C. $\frac{9}{12}$

☐ D. $\frac{7}{12}$

Q18. What is the fastest way to check whether a computed sum of two positive fractions greater than $\frac{1}{2}$ each is reasonable?

- ☐ A. Confirm the result is less than 1
- ☐ B. Confirm the result is greater than 1
- ☐ C. Confirm the result is negative
- ☐ D. Confirm the result equals one of the original fractions

Q19. Add $\frac{7}{10}$ and $-\frac{2}{5}$.

- ☐ A. $\frac{3}{10}$
- ☐ B. $\frac{5}{15}$
- ☐ C. $\frac{9}{10}$
- ☐ D. $\frac{1}{2}$

Q20. Add $-\frac{5}{9}$ and $\frac{2}{3}$, converting to ninths.

- ☐ A. $\frac{1}{9}$
- ☐ B. $-\frac{3}{12}$
- ☐ C. $\frac{7}{9}$
- ☐ D. $-\frac{1}{9}$

Section C - Challenge

Q21. Tank: $\frac{3}{8}$ teal plus $\frac{5}{12}$ maroon. What fraction stays empty?



$\frac{3}{8} + \frac{5}{12}$ filled, rest empty

- ☐ A. $\frac{1}{6}$
- ☐ B. $\frac{3}{24}$
- ☐ C. $\frac{5}{24}$
- ☐ D. $\frac{19}{24}$

Q22. Which pair of rational numbers has a sum equal to their own difference?

- ☐ A. Any pair of equal numbers
- ☐ B. Any pair of additive inverses
- ☐ C. No such pair exists
- ☐ D. Any pair where the second number is 0

Q23. If $x + \frac{2}{5} = -\frac{1}{10}$, find x .

- ☐ A. $1/2$
- ☐ B. $-1/2$
- ☐ C. $3/10$
- ☐ D. $-3/10$

Q24. Halves, thirds, and sixths stacked to a whole. Is $1/2 + 1/3 + 1/6 = 1$?



$$1/2 + 1/3 + 1/6$$

- ☐ A. False: the sum is $3/11$
- ☐ B. False: the sum is $5/6$
- ☐ C. True: $3/6 + 2/6 + 1/6 = 6/6 = 1$
- ☐ D. True, but only because all denominators are even

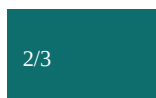
Q25. If a/b is a rational number in lowest terms, what is true about $(a/b) + (-a/b)$ regardless of the values of a and b ($b \neq 0$)?

- ☐ A. It depends on lowest terms
- ☐ B. It always equals exactly 0
- ☐ C. It equals double a/b
- ☐ D. It stays undefined

Q26. Simplify $(2/3 + 3/4) - (1/3 + 1/4)$ using the LCM of all denominators involved.

- ☐ A. $5/6$
- ☐ B. $5/12$
- ☐ C. 2
- ☐ D. $7/12$

Q27. $2/3$ cup plus $3/4$ cup flour. Simplified total?



flour cups

- ☐ A. 1 and $5/12$ cups
- ☐ B. 1 and $1/12$ cups
- ☐ C. $17/7$ cups

☐ D. $\frac{5}{7}$ cups

Q28. For which value of y does $\frac{3}{5} + \frac{y}{5} = 0$?

☐ A. $y = 3$

☐ B. $y = -3$

☐ C. $y = 0$

☐ D. $y = -5$

Q29. Simplify $-\frac{7}{15} + \frac{4}{15} + \frac{1}{3}$ using a single common denominator throughout.

☐ A. $\frac{2}{15}$

☐ B. $\frac{8}{15}$

☐ C. $-\frac{2}{15}$

☐ D. $\frac{3}{5}$

Q30. Two rationals sum to $\frac{7}{12}$; one is $\frac{1}{4}$. Find the other, and why subtract.

☐ A. $\frac{5}{12}$

☐ B. $\frac{1}{2}$

☐ C. $\frac{7}{16}$

☐ D. $\frac{1}{3}$

Answer Key

- Q1:** (A) (a) $\frac{5}{7}$. Same denominator, so just add the numerators: $2+3=5$, keeping the denominator 7.
- Q2:** (A) (a) They have different-sized denominator pieces. You must convert to a common denominator before combining.
- Q3:** (B) (b) 12. 12 is the smallest number that both 4 and 6 divide into evenly.
- Q4:** (C) (c) $\frac{8}{12}$. Multiply top and bottom by 4: $2 \times 4 = 8$, $3 \times 4 = 12$.
- Q5:** (A) (a) No, this shortcut is never valid. Numerators and denominators cannot be added separately across different fractions.
- Q6:** (B) (b) $-\frac{1}{6}$. Common denominator 6: $-\frac{3}{6} + \frac{2}{6} = -\frac{1}{6}$.
- Q7:** (D) (d) $\frac{3}{5}$. Same denominator, so add numerators: $1+2=3$, keep denominator 5.
- Q8:** (D) (d) $-\frac{4}{9}$. Adding $\frac{4}{9}$ and $-\frac{4}{9}$ gives exactly 0.
- Q9:** (C) (c) 0. This is the additive inverse property, true for every rational number a/b .
- Q10:** (B) (b) 1 and $\frac{5}{12}$. 12 goes into 17 once with remainder 5, giving 1 whole and $\frac{5}{12}$ left over.
- Q11:** (A) (a) $\frac{19}{24}$. LCM of 8 and 12 is 24: $\frac{9}{24} + \frac{10}{24} = \frac{19}{24}$.
- Q12:** (D) (d) Find LCM 12, giving $\frac{10}{12} + \frac{3}{12} = \frac{13}{12}$. The shortcut Kabir used is never a valid method for adding fractions.
- Q13:** (B) (b) $-\frac{11}{12}$. LCM of 4 and 6 is 12: $-\frac{9}{12} + -\frac{2}{12} = -\frac{11}{12}$.
- Q14:** (D) (d) 1. Same denominator: $\frac{3}{8} + \frac{5}{8} = \frac{8}{8} = 1$, matching the rough estimate.
- Q15:** (B) (b) $c/d = -a/b$. Only the additive inverse of a/b will cancel it to give a sum of zero.
- Q16:** (C) (c) $\frac{3}{5}$. $\frac{2}{5} + \frac{3}{5} = \frac{5}{5} = 1$.
- Q17:** (C) (c) $\frac{9}{12}$. LCM 12: $\frac{4}{12} + \frac{3}{12} + \frac{2}{12} = \frac{9}{12}$ (which simplifies to $\frac{3}{4}$, but the raw sum is $\frac{9}{12}$).
- Q18:** (B) (b) Confirm the result is greater than 1. Two numbers each bigger than a half must sum to more than 1, the exact check Zara used on Kabir's wrong answer.
- Q19:** (A) (a) $\frac{3}{10}$. Convert $-\frac{2}{5}$ to $-\frac{4}{10}$, then $\frac{7}{10} + -\frac{4}{10} = \frac{3}{10}$.
- Q20:** (A) (a) $\frac{1}{9}$. Convert $\frac{2}{3}$ to $\frac{6}{9}$, then $-\frac{5}{9} + \frac{6}{9} = \frac{1}{9}$.
- Q21:** (C) (c) $\frac{5}{24}$. Filled = $\frac{9}{24} + \frac{10}{24} = \frac{19}{24}$, so empty = $\frac{24}{24} - \frac{19}{24} = \frac{5}{24}$.
- Q22:** (D) (d) Any pair where the second number is 0. If $b=0$, then $a+b=a$ and $a-b=a$, so sum equals difference exactly when the second number is zero.
- Q23:** (B) (b) $-\frac{1}{2}$. $x = -\frac{1}{10} - \frac{2}{5} = -\frac{1}{10} - \frac{4}{10} = -\frac{5}{10} = -\frac{1}{2}$.
- Q24:** (C) (c) True: $\frac{3}{6} + \frac{2}{6} + \frac{1}{6} = \frac{6}{6} = 1$. Using LCM 6 for all three fractions confirms the claim exactly.
- Q25:** (B) (b) It always equals exactly 0. The additive inverse property holds for every rational number, regardless of whether it is written in lowest terms.

Q26: (A) (a) $5/6$. $(2/3+3/4)=17/12$ and $(1/3+1/4)=7/12$, so $17/12-7/12=10/12=5/6$.

Q27: (A) (a) 1 and $5/12$ cups. This is exactly the $2/3+3/4=17/12=1\ 5/12$ computation from the story, applied to a real recipe.

Q28: (B) (b) $y = -3$. With a common denominator already shared, $3 + y = 0$ requires $y = -3$, the additive inverse of 3.

Q29: (A) (a) $2/15$. Convert $1/3$ to $5/15$: $-7/15+4/15+5/15 = 2/15$.

Q30: (D) (d) $1/3$. $7/12 - 1/4 = 7/12 - 3/12 = 4/12 = 1/3$.

You've got this! Keep learning and shining! - Ruchi Math Coaching