

# Adding and Subtracting Rational Numbers

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Score: \_\_\_\_\_ / 17

This is where everything you have learned about fractions, decimals, and integer signs comes together! To add or subtract rational numbers, the first step is to get the numbers into a form you can combine—find the LCD for fractions, or line up decimal points for decimals. When subtraction gets confusing, remember the trick: rewrite it as *adding the opposite*. Apply the sign rules carefully and you will get both the correct value *and* the correct sign every time.

## Key Concepts & Quick Review

**Same signs:** add absolute values; keep common sign. **Example:**  $-\frac{3}{4} + (-\frac{1}{4}) = -\frac{4}{4} = -1$

**Different signs:** subtract absolute values; keep sign of larger. **Subtraction:**  $a - b = a + (-b)$  (add the opposite) **LCD first** when denominators differ.

### Examples

① Find  $-\frac{3}{4} + (-\frac{1}{3})$ .

**Think It Through:** Both numbers are negative, so they have the same sign. That means we add their absolute values and keep the negative sign at the end. To add  $\frac{3}{4}$  and  $\frac{1}{3}$ , first use the LCD 12. Rewrite them as  $\frac{9}{12}$  and  $\frac{4}{12}$ , then add to get  $\frac{13}{12}$ . Finally put the negative back:  $-\frac{13}{12} = -1\frac{1}{12}$ . Same signs means the movement goes in the same direction on the number line.

**Answer:**  $-1\frac{1}{12}$

② The temperature changed  $-2.5^\circ\text{F}$  in the morning and  $-1.75^\circ\text{F}$  in the afternoon. What was the total temperature change for the day?

**Think It Through:** Since both changes are negative, add the absolute values:  $2.5 + 1.75 = 4.25$ . Then keep the negative sign because both changes were drops. So the total change is  $-4.25^\circ\text{F}$ . In words, the temperature fell by  $4.25^\circ\text{F}$  during the day. A negative result here makes sense because every change in the problem was a drop.

**Answer:**  $-4.25^\circ\text{F}$

### Practice Problems

Add or subtract each rational number expression. Simplify your answer.

1.  $-\frac{3}{4} + \frac{1}{4} =$  \_\_\_\_\_

3.  $-\frac{7}{8} - \frac{1}{8} =$  \_\_\_\_\_

2.  $\frac{5}{6} + (-\frac{1}{6}) =$  \_\_\_\_\_

4.  $-\frac{2}{3} + \frac{1}{2} =$  \_\_\_\_\_



5.  $\frac{3}{4} - \left(-\frac{1}{3}\right) =$  \_\_\_\_\_

6.  $-\frac{5}{6} + \frac{3}{4} =$  \_\_\_\_\_

7.  $-0.8 + (-0.5) =$  \_\_\_\_\_

8.  $-2.75 + 1.5 =$  \_\_\_\_\_

9.  $3.6 - (-1.4) =$  \_\_\_\_\_

10.  $-4.2 - (-3.7) =$  \_\_\_\_\_

11.  $-\frac{3}{5} + \left(-\frac{7}{10}\right) =$  \_\_\_\_\_

12.  $1\frac{1}{4} + \left(-\frac{3}{4}\right) =$  \_\_\_\_\_

13.  $-2\frac{1}{3} - \frac{2}{3} =$  \_\_\_\_\_

14.  $-1\frac{5}{6} + \frac{5}{6} =$  \_\_\_\_\_

15.  $\frac{7}{8} - \left(-\frac{3}{8}\right) - \frac{5}{4} =$  \_\_\_\_\_

### Study Tips

-  When mixing fractions and decimals, convert everything to the same form before adding or subtracting.
-  For subtraction, always rewrite as addition of the opposite *first*:  $-\frac{5}{6} - \left(-\frac{1}{4}\right) = -\frac{5}{6} + \frac{1}{4}$ .
-  Watch for zero pairs:  $-\frac{3}{4} + \frac{3}{4} = 0$ . Spotting them early simplifies multi-step problems dramatically.

### Word Problems

16. A mountain climber's elevation changes by  $-\frac{7}{8}$  km in the morning (descending into a valley) and  $+\frac{5}{6}$  km in the afternoon (ascending). Find the net elevation change for the day. Did the climber end up higher or lower than the starting point, and by how many kilometers? \_\_\_\_\_

17. A scientist records these temperature changes over five days:  $-2\frac{1}{4}$  °F,  $+1.75$  °F,  $-\frac{3}{8}$  °F,  $+0.5$  °F, and  $-1\frac{1}{8}$  °F. Convert all values to fractions with a common denominator and find the total temperature change. Then find the average daily change by dividing the total by 5. \_\_\_\_\_



## Answer Keys

- |                     |   |
|---------------------|---|
| 1) $-\frac{1}{2}$   | 10) $-\frac{1}{2}$  |
| 2) $\frac{2}{3}$    | 11) $-\frac{13}{10}$  |
| 3) -1               | 12) $\frac{1}{2}$   |
| 4) $-\frac{1}{6}$   | 13) -3  |
| 5) $\frac{13}{12}$  | 14) -1  |
| 6) $-\frac{1}{12}$  | 15) 0   |
| 7) $-\frac{13}{10}$ | 16) $-\frac{1}{24}$ km lower  |
| 8) $-\frac{5}{4}$   | 17) Total $-1.5^{\circ}\text{F}$ ; average $-0.3^{\circ}\text{F}$ per day |
| 9) 5                |   |

### Step-by-Step Explanations

*Tutoring notes not found for this topic.*



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