# Fractions Learning Guide

For Grade 7 Students

**What you will learn**
Types of fractions, adding and subtracting fractions, multiplying fractions, dividing fractions using the KCF rule, handling mixed numbers, and solving practice worksheet problems.

**Big idea**
A fraction shows a part of a whole. For example, 3/4 means 3 parts out of 4 equal parts. The top number is the numerator. The bottom number is the denominator.

## How to use this PDF

- Read one topic at a time.
- Copy the worked examples in a notebook.
- Try the practice problems without looking at the answers.
- After solving, check the answer key and correct your mistakes.

## Contents



## 1. What is a Fraction?

A fraction is a number that represents a part of a whole or a part of a group.

| Term | Meaning |
|---|---|
| Numerator | The top number. It tells how many parts we have. |
| Denominator | The bottom number. It tells how many equal parts the whole is divided into. |
| Fraction bar | The line between numerator and denominator. It also means division. |

**Example 1: Understanding a fraction**
Problem: In 5/8, what are the numerator and denominator?

9. Look at the top number. It is 5, so the numerator is 5.
10. Look at the bottom number. It is 8, so the denominator is 8.
11. Meaning: 5/8 means 5 parts out of 8 equal parts.

**Answer:** Numerator = 5, Denominator = 8

## 2. Types of Fractions

Fractions can be grouped into different types. Understanding the type helps us choose the correct method for solving problems.

| Type | Meaning | Example | Important Note |
|---|---|---|---|
| Proper Fraction | Numerator is smaller than denominator. | 3/5 | Value is less than 1. |
| Improper Fraction | Numerator is equal to or greater than denominator. | 7/4 | Value is 1 or more. |
| Mixed Number | A whole number and a proper fraction together. | 2 1/3 | Means 2 + 1/3. |
| Like Fractions | Fractions with the same denominator. | 2/7 and 5/7 | Easy to add or subtract. |
| Unlike Fractions | Fractions with different | 1/3 and 1/4 | Need common |

| | | | |
|---|---|---|---|
| | denominators. | | denominator. |
| Equivalent Fractions | Different-looking fractions with the same value. | 1/2 = 2/4 | Multiply or divide top and bottom by same number. |

**Example 2: Identify fraction types**
Problem: Classify 4/9, 9/4, 3 1/2, and 2/5 & 4/5.

12. 4/9 is proper because 4 is smaller than 9.
13. 9/4 is improper because 9 is greater than 4.
14. 3 1/2 is a mixed number because it has a whole number and a fraction.
15. 2/5 and 4/5 are like fractions because the denominators are the same.

**Answer:** 4/9 proper, 9/4 improper, 3 1/2 mixed number, 2/5 and 4/5 like fractions

**Tip**
A fraction is in simplest form when the numerator and denominator have no common factor except 1. Example: 6/8 can be simplified to 3/4.

## 3. Adding and Subtracting Fractions

The most important rule: add or subtract only after the denominators are the same.

### A. Like Fractions

**Rule**
When denominators are the same, add or subtract only the numerators. Keep the denominator the same.

**Example 3: Add like fractions**
Problem: 2/7 + 3/7

16. The denominators are the same: 7.
17. Add the numerators: 2 + 3 = 5.
18. Keep the denominator as 7.

**Answer:** 5/7

**Example 4: Subtract like fractions**
Problem: 6/11 - 2/11

19. The denominators are the same: 11.
20. Subtract the numerators: 6 - 2 = 4.
21. Keep the denominator as 11.

**Answer:** 4/11

### B. Unlike Fractions

**Rule**
When denominators are different, find a common denominator first. A common denominator is often the LCM of the denominators.

**Example 5: Add unlike fractions**
Problem: 1/3 + 1/4

22. Find the LCM of 3 and 4. LCM = 12.
23. Change 1/3 to denominator 12: 1/3 = 4/12.
24. Change 1/4 to denominator 12: 1/4 = 3/12.
25. Add: 4/12 + 3/12 = 7/12.

**Answer:** 7/12

**Example 6: Subtract unlike fractions**
Problem: 5/6 - 1/4

26. Find the LCM of 6 and 4. LCM = 12.
27. Change 5/6 to denominator 12: 5/6 = 10/12.
28. Change 1/4 to denominator 12: 1/4 = 3/12.
29. Subtract: 10/12 - 3/12 = 7/12.

**Answer:** 7/12

**Common mistake to avoid**
Do not add denominators. For example, 1/3 + 1/4 is not 2/7. First make the denominators the same.

## 4. Multiplying Fractions

**Rule**
To multiply fractions: multiply numerator by numerator and denominator by denominator. Then simplify.

**Example 7: Multiply two fractions**
Problem: 2/3 x 4/5

30. Multiply the numerators: 2 x 4 = 8.
31. Multiply the denominators: 3 x 5 = 15.
32. Write the answer: 8/15.

33. Check if it can be simplified. 8/15 is already simplest.

**Answer:** 8/15

**Example 8: Multiply and simplify**
Problem: 3/4 x 8/9

34. Multiply: (3 x 8)/(4 x 9) = 24/36.
35. Simplify 24/36 by dividing numerator and denominator by 12.
36. 24/36 = 2/3.

**Answer:** 2/3

**Shortcut: Cancel before multiplying**
In 3/4 x 8/9, you can cancel 8 and 4 first: 8/4 = 2/1. Then 3/1 x 2/9 = 6/9 = 2/3.

## 5. Dividing Fractions - The "KCF" Rule

**KCF means Keep - Change - Flip**
Keep the first fraction. Change division to multiplication. Flip the second fraction. Then multiply and simplify.

**Example 9: Divide fractions using KCF**
Problem: 2/3 ÷ 4/5

37. Keep the first fraction: 2/3.
38. Change ÷ to x.
39. Flip the second fraction: 4/5 becomes 5/4.
40. Multiply: 2/3 x 5/4 = 10/12.
41. Simplify: 10/12 = 5/6.

**Answer:** 5/6

**Example 10: Divide and simplify**
Problem: 3/8 ÷ 9/16

42. Keep: 3/8.
43. Change: ÷ becomes x.
44. Flip: 9/16 becomes 16/9.
45. Multiply: 3/8 x 16/9.
46. Cancel 16 and 8: 16/8 = 2/1.
47. Now multiply: 3 x 2 / 1 x 9 = 6/9 = 2/3.

**Answer:** 2/3

**Why flip?**
Division asks, "How many groups fit?" Flipping the second fraction turns the division into an equivalent multiplication problem.

## 6. Handling Mixed Numbers

A mixed number has a whole number and a fraction, such as 2 3/5. Before multiplying or dividing mixed numbers, convert them to improper fractions.

### A. Convert Mixed Number to Improper Fraction

**Rule**
Multiply the whole number by the denominator. Add the numerator. Keep the same denominator.

**Example 11: Convert mixed number to improper fraction**
Problem: 2 3/5

48. Multiply whole number and denominator: 2 x 5 = 10.
49. Add the numerator: 10 + 3 = 13.
50. Keep the denominator 5.

**Answer:** 2 3/5 = 13/5

### B. Convert Improper Fraction to Mixed Number

**Rule**
Divide the numerator by the denominator. Quotient becomes the whole number. Remainder becomes the numerator. Denominator stays the same.

**Example 12: Convert improper fraction to mixed number**
Problem: 17/5

51. Divide 17 by 5: 5 goes into 17 three times.
52. Remainder = 2.
53. Write the mixed number as 3 2/5.

**Answer:** 17/5 = 3 2/5

### C. Operations with Mixed Numbers

**Example 13: Add mixed numbers**
Problem: 1 1/2 + 2 1/3

54. Convert to improper fractions: 1 1/2 = 3/2 and 2 1/3 = 7/3.
55. Find common denominator for 2 and 3: LCM = 6.
56. Change fractions: 3/2 = 9/6 and 7/3 = 14/6.
57. Add: 9/6 + 14/6 = 23/6.
58. Convert 23/6 to mixed number: 3 5/6.

**Answer:** 3 5/6

**Example 14: Multiply mixed numbers**
Problem: 2 1/4 x 1 1/3

59. Convert to improper fractions: 2 1/4 = 9/4 and 1 1/3 = 4/3.
60. Multiply: 9/4 x 4/3.
61. Cancel 4 and 4.
62. Now multiply: 9/3 = 3.

**Answer:** 3

**Mixed number strategy**
For multiplication and division, always convert mixed numbers to improper fractions first. For addition and subtraction, you may use improper fractions or add whole parts and fraction parts separately.

## 7. Practice Worksheet Problems

Solve these problems in your notebook. Show your steps. Simplify every answer.

### A. Types of Fractions

1. Identify the type: 5/8

   Answer: _____

2. Identify the type: 11/6

   Answer: _____

3. Identify the type: 4 2/7

   Answer: _____

4. Are 3/10 and 7/10 like fractions?

   Answer: _____

5. Write one equivalent fraction for 2/3.

   Answer: _____

### B. Adding and Subtracting Fractions

6. 3/8 + 2/8

   Answer: _____

7. 9/13 - 4/13

Answer: _____

8. 1/4 + 2/3

Answer: _____

9. 5/6 - 1/3

Answer: _____

10. 7/10 + 3/5

Answer: _____

## C. Multiplying Fractions

11. 2/5 x 3/4

Answer: _____

12. 7/9 x 3/14

Answer: _____

13. 5/6 x 12/25

Answer: _____

14. 4/7 x 21/8

Answer: _____

15. 3/10 x 5/6

Answer: _____

## D. Dividing Fractions - KCF

16. 1/2 ÷ 3/4

Answer: _____

17. 5/6 ÷ 10/9

Answer: _____

18. 7/8 ÷ 14/16

Answer: _____

19. 3/5 ÷ 6/25

Answer: _____

20. 4/9 ÷ 2/3

Answer: _____

## E. Mixed Numbers

21. Convert 3 2/5 to an improper fraction.

Answer: _____

22. Convert 19/4 to a mixed number.

Answer: _____

23. 1 1/2 + 2 1/4

Answer: _____

24. 4 1/3 - 1 2/3

Answer: _____

25. 2 2/5 x 1 1/4

Answer: _____

26. 3 1/2 ÷ 1 3/4

Answer: _____

## F. Word Problems

27. A cake is cut into 8 equal pieces. Riya eats 3 pieces and Arun eats 2 pieces. What fraction of the cake did they eat together?

Answer: _____

28. A bottle has 3/4 litre of juice. You drink 1/3 litre. How much juice is left?

Answer: _____

29. A ribbon is 2 1/2 metres long. It is cut into pieces of 1/2 metre each. How many pieces are made?

Answer: _____

30. A student studies Maths for 1 1/4 hours and Science for 1 1/2 hours. How many hours did the student study in total?

Answer: _____

## 8. Answer Key

| Question | Answer |
|---|---|
| 1 | Proper fraction |
| 2 | Improper fraction |
| 3 | Mixed number |
| 4 | Yes, they are like fractions |
| 5 | Example: 4/6 or 6/9 |
| 6 | 5/8 |
| 7 | 5/13 |
| 8 | 11/12 |
| 9 | 1/2 |
| 10 | 13/10 = 1 3/10 |
| 11 | 3/10 |
| 12 | 1/6 |
| 13 | 2/5 |
| 14 | 3/2 = 1 1/2 |
| 15 | 1/4 |
| 16 | 2/3 |
| 17 | 3/4 |
| 18 | 1 |
| 19 | 5/2 = 2 1/2 |
| 20 | 2/3 |
| 21 | 17/5 |
| 22 | 4 3/4 |
| 23 | 3 3/4 |
| 24 | 2 2/3 |
| 25 | 3 |
| 26 | 2 |
| 27 | 5/8 of the cake |
| 28 | 5/12 litre |
| 29 | 5 pieces |
| 30 | 2 3/4 hours |

**Final revision checklist**

Before a test, make sure you can: identify fraction types, find LCM, add and subtract unlike fractions, multiply and simplify, use KCF for division, and convert mixed numbers correctly.