

# Dividing Fractions and Mixed Numbers

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

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

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

Dividing fractions sounds tricky, but here is the secret: every fraction division is just a multiplication in disguise! The rule *Keep · Change · Flip* turns the problem into one you already know how to solve—keep the first fraction, change  $\div$  to  $\times$ , and flip the second fraction. After that, cross-cancel, multiply straight across, and simplify, exactly like the last topic. If mixed numbers appear, convert them to improper fractions first and use the sign rules to finish the job.

## Key Concepts & Quick Review

**Keep · Change · Flip (KCF):**  $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \times \frac{d}{c}$  (multiply by the reciprocal)

**Reciprocal of  $\frac{c}{d}$ :**  $\frac{d}{c}$     **Convert first:**  $3\frac{1}{2} \div \frac{7}{4} = \frac{7}{2} \times \frac{4}{7} = 2$     **Sign rule:** same signs  $\rightarrow +$ ; different signs  $\rightarrow -$ .

## Examples

① Find  $\frac{5}{8} \div \frac{3}{4}$ .

**Think It Through:** Division by a fraction is easier if you use Keep, Change, Flip. Keep  $\frac{5}{8}$ , change division to multiplication, and flip the second fraction to  $\frac{4}{3}$ . Now the problem is  $\frac{5}{8} \times \frac{4}{3}$ . Before multiplying, cross-cancel the 8 and 4 by 4. That leaves  $\frac{5}{2} \times \frac{1}{3} = \frac{5}{6}$ . The important thing to remember is that only the second fraction gets flipped.

**Answer:**  $\frac{5}{6}$

② A chef has  $3\frac{1}{2}$  cups of flour. Each batch of muffins requires  $\frac{3}{4}$  cup. How many complete batches can the chef make?

**Think It Through:** We are finding how many  $\frac{3}{4}$ -cup groups fit into  $3\frac{1}{2}$  cups, so divide:  $3\frac{1}{2} \div \frac{3}{4}$ . First convert the mixed number:  $3\frac{1}{2} = \frac{7}{2}$ . Then use Keep, Change, Flip:  $\frac{7}{2} \times \frac{4}{3} = \frac{28}{6} = \frac{14}{3} = 4\frac{2}{3}$ . That is the math answer, but the question asks for complete batches, so the chef can make only 4 full batches. The extra  $\frac{2}{3}$  of a batch is not enough for another full one.

**Answer:** 4 complete batches

## Practice Problems

Divide using Keep · Change · Flip. Simplify each answer.

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

3.  $\frac{5}{6} \div \frac{5}{3} =$  \_\_\_\_\_

2.  $\frac{2}{3} \div \frac{4}{9} =$  \_\_\_\_\_

4.  $\frac{7}{8} \div \frac{7}{4} =$  \_\_\_\_\_



5.  $\frac{1}{2} \div \frac{3}{4} =$  \_\_\_\_\_

6.  $\left(-\frac{3}{4}\right) \div \frac{1}{2} =$  \_\_\_\_\_

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

8.  $\left(-\frac{2}{3}\right) \div \left(-\frac{4}{9}\right) =$  \_\_\_\_\_

9.  $6 \div \frac{3}{4} =$  \_\_\_\_\_

10.  $\frac{3}{5} \div 9 =$  \_\_\_\_\_

11.  $2\frac{1}{3} \div \frac{7}{9} =$  \_\_\_\_\_

12.  $1\frac{3}{4} \div \frac{7}{8} =$  \_\_\_\_\_

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

14.  $2\frac{1}{2} \div 1\frac{1}{4} =$  \_\_\_\_\_

15.  $(-2\frac{1}{4}) \div \frac{3}{4} =$  \_\_\_\_\_

**Study Tips**

- 👉 **Only** the second fraction (the divisor) gets flipped — never flip the first fraction.
- 👉 An integer divided by a fraction is usually *larger*:  $6 \div \frac{3}{4} = 8$ . This makes sense — there are 8 three-quarter pieces in 6.
- 👉 Verify your answer by multiplying: quotient  $\times$  divisor = dividend.

**Word Problems**

16. A ribbon that is  $6\frac{3}{4}$  feet long must be cut into pieces that are each  $\frac{3}{8}$  foot long. Write a division expression using improper fractions to find the number of pieces, and evaluate it. If the ribbon costs \$4.80 total, what is the cost per piece? \_\_\_\_\_

17. Two hikers are splitting a trail equally. The full trail is  $5\frac{5}{6}$  mi. Hiker A walks  $-1\frac{2}{3}$  mi relative to the midpoint (meaning she hiked backward part of the way). If Hiker B covers  $\frac{3}{4}$  of his assigned half of the trail, how many miles does Hiker B walk? Show all fraction conversions and simplifications. \_\_\_\_\_



## Answer Keys

- |   |  |
|---|--|
| <p>1) <math>\frac{3}{2}</math></p> <p>2) <math>\frac{3}{2}</math></p> <p>3) <math>\frac{3}{2}</math></p> <p>4) <math>\frac{3}{2}</math></p> <p>5) <math>\frac{3}{2}</math></p> <p>6) <math>\frac{3}{2}</math></p> <p>7) <math>\frac{3}{2}</math></p> <p>8) <math>\frac{3}{2}</math></p> <p>9) 8</p> | <p>10) <math>\frac{1}{15}</math></p> <p>11) 3</p> <p>12) 2</p> <p>13) 2</p> <p>14) 2</p> <p>15) -3</p> <p>16) 18 pieces; about \$0.27 per piece</p> <p>17) Each half: <math>\frac{35}{12}</math> mi; B walks <math>2\frac{3}{16}</math> mi</p> |
|---|--|

### Step-by-Step Explanations

**Strategy:** For Dividing Fractions and Mixed Numbers, rewrite division as multiplication by the reciprocal, then simplify just like a multiplication problem. If the fraction-division result feels odd, compare it with a quick estimate.

**Practice 1:**  $\frac{3}{4} \div \frac{1}{2} =$  **Answer:**  $\frac{3}{2}$

In the first example, keep the first fraction, change division to multiplication, and use the reciprocal of the second fraction.

**Practice 15:**  $(-2\frac{1}{4}) \div \frac{3}{4} =$  **Answer:** -3

Toward the end, keep the first fraction, change division to multiplication, and use the reciprocal of the second fraction.

**Word-problem notes:**

**16. Answer:**  $\frac{27}{4} \div \frac{3}{8} = 18$  pieces; cost per piece =  $\$0.267 \approx \$0.27$ .

Start by converting the ribbon length:  $6\frac{3}{4} = \frac{27}{4}$ . Now divide by the piece length:  $\frac{27}{4} \div \frac{3}{8}$ . Use Keep, Change, Flip to get  $\frac{27}{4} \times \frac{8}{3}$ . Cross-cancel to make it easier:  $27 \div 3 = 9$  and  $8 \div 4 = 2$ , so the answer is  $9 \times 2 = 18$  pieces. For cost per piece, divide the total cost by the number of pieces:  $\$4.80 \div 18 \approx \$0.266\dots$ , which rounds to about \$0.27 per piece. In money problems, rounding to the nearest cent matters.

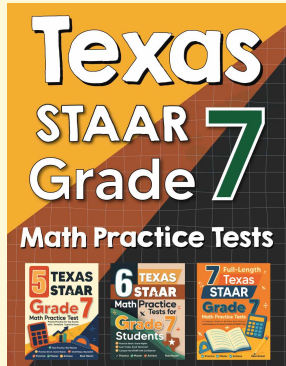
**17. Answer:** Each half =  $\frac{35}{12}$  mi; B walks  $\frac{3}{4} \times \frac{35}{12} = \frac{35}{16} = 2\frac{3}{16}$  mi.

First split the whole trail equally:  $5\frac{5}{6} = \frac{35}{6}$ , and  $\frac{35}{6} \div 2 = \frac{35}{12}$ . So Hiker B's assigned half is  $\frac{35}{12}$  miles. He walks  $\frac{3}{4}$  of that half, so multiply:  $\frac{3}{4} \times \frac{35}{12} = \frac{105}{48} = \frac{35}{16} = 2\frac{3}{16}$  mi. Hiker A's backward movement is extra story information here; it does not change the amount Hiker B walks. This is a good reminder to focus on the exact quantity being asked for.



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