

## Fractions on a Number Line

A fraction tells you a location on the number line, not just a piece of a pie. To find  $\frac{3}{4}$ , split the line from 0 to 1 into 4 equal pieces and count 3 jumps from 0.

### Plotting $\frac{a}{b}$ on the number line from 0 to 1

1. Divide the line into  $b$  equal pieces (the denominator  $b$  tells you this).
2. Starting at 0, count  $a$  pieces (the numerator).
3. The point where you land is  $\frac{a}{b}$ .

### Key Concepts

1. A fraction is a *number* that lives on the number line, just like whole numbers do.
2. The denominator tells you how many equal pieces the line from 0 to 1 is cut into. The numerator tells you how many of those pieces you jump.
3.  $\frac{0}{b}$  is always 0 and  $\frac{b}{b}$  is always 1. The line from 0 to 1 is the full whole.
4. Fractions with the same denominator are easy to compare on the line: more pieces = farther right.

### Worked Examples

① Place  $\frac{5}{8}$  on a number line from 0 to 1.

 Split the line from 0 to 1 into 8 equal pieces (because the denominator is 8). Start at 0 and count 5 pieces to the right. The point you land on is  $\frac{5}{8}$ . It's a little past the middle, since  $\frac{4}{8} = \frac{1}{2}$  is right in the middle.


 **Answer:**  $\frac{5}{8}$  marked at the 5th tick

② What fraction is at the 2nd tick mark if the line is divided into 6 equal parts?

 The denominator is 6 (the line is in sixths). The 2nd tick means we jumped 2 pieces from 0, so the numerator is 2. The fraction at that point is  $\frac{2}{6}$ .

 **Answer:**  $\frac{2}{6}$

③ Is  $\frac{1}{3}$  to the left or right of  $\frac{2}{3}$  on the number line?

 Both fractions have denominator 3, so the line is cut into thirds.  $\frac{1}{3}$  is 1 piece from 0;  $\frac{2}{3}$  is 2 pieces from 0. On the number line, bigger numbers sit to the right — so  $\frac{1}{3}$  is to the *left* of  $\frac{2}{3}$ .

 **Answer:** *Left*

### Practice Problems

Find or place each fraction.

- |                                |       |  |       |
|--------------------------------|-------|--|-------|
| 1. 3rd tick, line split into 4 | _____ | 7. Place $\frac{1}{2}$ (halves line)   | _____ |
| 2. 1st tick, line split into 3 | _____ | 8. Place $\frac{3}{8}$ (eighths line)  | _____ |
| 3. 5th tick, line split into 6 | _____ | 9. Place $\frac{2}{3}$ (thirds line)   | _____ |
| 4. 7th tick, line split into 8 | _____ | 10. Place $\frac{5}{6}$ (sixths line)  | _____ |
| 5. 2nd tick, line split into 4 | _____ | 11. 6th tick, line split into 8        | _____ |
| 6. 4th tick, line split into 6 | _____ | 12. Place $\frac{4}{4}$ (fourths line) | _____ |

### Study Tips

- 👉 Always draw the line first, then mark 0 and 1, then split it into equal pieces. Don't try to "eyeball" fraction positions.
- 👉 The number of *tick marks between 0 and 1* equals the denominator. The position from 0 equals the numerator.
- 👉  $\frac{b}{b}$  always lands exactly on 1. If you ended up past 1, your jumps are too big.

### Word Problems

1. Liam walked  $\frac{3}{4}$  of a mile to school. Draw a number line from 0 to 1 and mark the point where Liam stopped. How many quarter-mile jumps did he take?

Answer: \_\_\_\_\_

2. Ana drank  $\frac{5}{8}$  of a bottle of water. Is that closer to  $\frac{1}{2}$  or to 1? Explain using a number line.

Answer: \_\_\_\_\_

### Answer Key — with Friendly Explanations

#### Practice Problems

1. Denominator 4, numerator 3.

 **Answer:**  $\frac{3}{4}$

2. Denominator 3, numerator 1.

 **Answer:**  $\frac{1}{3}$

3. Denominator 6, numerator 5.

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

4. Denominator 8, numerator 7.

 **Answer:**  $\frac{7}{8}$


5. Denominator 4, numerator 2.

 **Answer:**  $\frac{2}{4}$


6. Denominator 6, numerator 4.

 **Answer:**  $\frac{4}{6}$


7. Halves line: split into 2 pieces, count 1 from 0.

 **Answer:**  $\frac{1}{2}$  at the midpoint

8. Eighths line: 8 pieces, count 3.

 **Answer:**  $\frac{3}{8}$  at the 3rd tick

9. Thirds line: 3 pieces, count 2.

 **Answer:**  $\frac{2}{3}$  at the 2nd tick

10. Sixths line: 6 pieces, count 5.

 **Answer:**  $\frac{5}{6}$  at the 5th tick

11. Denominator 8, numerator 6.

 **Answer:**  $\frac{6}{8}$

12. Fourths line: 4 pieces, count 4. That's the whole.

 **Answer:**  $\frac{4}{4}$  at 1

#### Word Problems

1. Three quarter-mile jumps reach  $\frac{3}{4}$ . So 3 jumps.

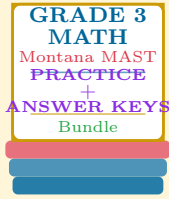
 **Answer:** 3 jumps

2.  $\frac{5}{8}$  is  $\frac{1}{8}$  past  $\frac{1}{2}$  and  $\frac{3}{8}$  before 1. The smaller gap is to  $\frac{1}{2}$ .

 **Answer:** Closer to  $\frac{1}{2}$

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