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 _____

2. 1st tick, line split into 3 _____

3. 5th tick, line split into 6 _____

4. 7th tick, line split into 8 _____

5. 2nd tick, line split into 4 _____

6. 4th tick, line split into 6 _____

7. Place $\frac{1}{2}$ (halves line) _____

8. Place $\frac{3}{8}$ (eighths line) _____

9. Place $\frac{2}{3}$ (thirds line) _____

10. Place $\frac{5}{6}$ (sixths line) _____

11. 6th tick, line split into 8 _____

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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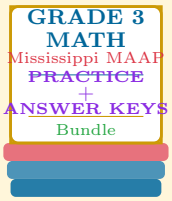

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