

# Estimating with Benchmark Fractions

Grade 5 Math • Section 4.5

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

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

Score: \_\_\_\_\_ / 12

## Quick Review and Helpful Hints

**Benchmark fractions:**  $0$ ,  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ , and  $1$  are useful reference points for estimating.

**How to estimate:** Decide which benchmark each fraction is closest to, then add or subtract the benchmarks.

**Lightbulb:**  $\frac{3}{8} \approx \frac{1}{2}$ ,  $\frac{1}{5} \approx 0$ ,  $\frac{7}{8} \approx 1$ ,  $\frac{5}{12} \approx \frac{1}{2}$ .

**Q Example:** Estimate  $\frac{7}{8} + \frac{5}{12}$ .

**Hand:**  $\frac{7}{8}$  is close to  $1$ .  $\frac{5}{12}$  is close to  $\frac{1}{2}$ . Estimated sum:  $1 + \frac{1}{2} = 1\frac{1}{2}$ . (Exact answer:  $\frac{31}{24} = 1\frac{7}{24}$ , which is close to our estimate.)

**Lightbulb:** Answer: About  $1\frac{1}{2}$

## Practice Problems

Estimate each sum or difference using benchmark fractions ( $0$ ,  $\frac{1}{4}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ ,  $1$ ).

1.  $\frac{4}{9} + \frac{7}{8} \approx$  \_\_\_\_\_

6.  $\frac{7}{10} - \frac{2}{9} \approx$  \_\_\_\_\_

2.  $\frac{11}{12} - \frac{3}{8} \approx$  \_\_\_\_\_

7.  $\frac{5}{6} + \frac{3}{5} \approx$  \_\_\_\_\_

3.  $\frac{1}{5} + \frac{3}{7} \approx$  \_\_\_\_\_

8.  $\frac{8}{9} - \frac{7}{15} \approx$  \_\_\_\_\_

4.  $\frac{6}{7} - \frac{1}{9} \approx$  \_\_\_\_\_

9.  $2\frac{1}{8} + 3\frac{4}{5} \approx$  \_\_\_\_\_

5.  $\frac{2}{3} + \frac{5}{12} \approx$  \_\_\_\_\_

10.  $5\frac{11}{12} - 2\frac{1}{7} \approx$  \_\_\_\_\_

## Word Problems

11. Amy pours  $\frac{7}{8}$  cup of juice and  $\frac{5}{12}$  cup of sparkling water into a pitcher. Estimate the total amount. Is the pitcher likely more or less than  $1\frac{1}{2}$  cups? \_\_\_\_\_

12. A board is  $3\frac{11}{12}$  feet long. A carpenter cuts off about  $1\frac{2}{9}$  feet. Use benchmarks to estimate how much is left. \_\_\_\_\_



## Answer Keys

1.  $1\frac{1}{2}$

2.  $\frac{1}{2}$

3.  $\frac{1}{2}$

4.  $1$

5.  $1$

6.  $\frac{1}{2}$

7.  $1\frac{1}{2}$

8.  $\frac{1}{2}$

9.  $6$

10.  $4$

11.  $1\frac{1}{2}$ ; about equal to  $1\frac{1}{2}$

12.  $2\frac{1}{2}$  ft

### Step-by-Step Explanations

1. Start with the main idea. For estimating with benchmark fractions,  $\frac{4}{9} \approx \frac{1}{2}$  and  $\frac{7}{8} \approx 1$ , so the sum is about  $1\frac{1}{2}$ . Fractions are easier to combine when the pieces are the same size.

2. Keep the work tidy. For estimating with benchmark fractions,  $\frac{11}{12} \approx 1$  and  $\frac{3}{4} \approx \frac{1}{2}$ , so the difference is about  $\frac{1}{2}$ . Always simplify at the end so the answer is clean and useful.

3. Look at what the numbers mean. For estimating with benchmark fractions,  $\frac{1}{5} \approx 0$  and  $\frac{3}{7} \approx \frac{1}{2}$ , so the sum is about  $\frac{1}{2}$ . For mixed numbers, converting to improper fractions can make the arithmetic calmer.

4. Use the setup first. For estimating with benchmark fractions,  $\frac{6}{7} \approx 1$  and  $\frac{1}{9} \approx 0$ , so the difference is about 1. Fractions are easier to combine when the pieces are the same size.

5. Check the size of the answer. For estimating with benchmark fractions,  $\frac{2}{3} \approx \frac{1}{2}$  and  $\frac{5}{12} \approx \frac{1}{2}$ , so the sum is about 1. Always simplify at the end so the answer is clean and useful.

6. Match the operation to the words. For estimating with benchmark fractions,  $\frac{7}{10} \approx \frac{1}{2}$  and  $\frac{2}{9} \approx 0$ , so the difference is about  $\frac{1}{2}$ . For mixed numbers, converting to improper fractions can make the arithmetic calmer.

7. Write the important values first. For estimating with benchmark fractions,  $\frac{5}{6} \approx 1$  and  $\frac{3}{6} \approx \frac{1}{2}$ , so the sum is about  $1\frac{1}{2}$ . Fractions are easier to combine when the pieces are the same size.

8. Follow the pattern carefully. For estimating with benchmark fractions,  $\frac{8}{9} \approx 1$  and  $\frac{7}{15} \approx \frac{1}{2}$ , so the difference is about  $\frac{1}{2}$ . Always simplify at the end so the answer is clean and useful.

9. Start with the main idea. For estimating with benchmark fractions,  $2\frac{1}{8} \approx 2$  and  $3\frac{4}{5} \approx 4$ , so the sum is about 6. For mixed numbers, converting to improper fractions can make the arithmetic calmer.

10. Keep the work tidy. For estimating with benchmark fractions,  $5\frac{11}{12} \approx 6$  and  $2\frac{1}{7} \approx 2$ , so the difference is about 4. Fractions are easier to combine when the pieces are the same size.

11. Look at what the numbers mean. For estimating with benchmark fractions,  $\frac{7}{8} \approx 1$  and  $\frac{5}{12} \approx \frac{1}{2}$ . Always simplify at the end so the answer is clean and useful.

12. Use the setup first. For estimating with benchmark fractions,  $3\frac{11}{12} \approx 4$  and  $1\frac{2}{9} \approx 1\frac{1}{2}$ , so about  $2\frac{1}{2}$  feet remain. For mixed numbers, converting to improper fractions can make the arithmetic calmer.



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