

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.

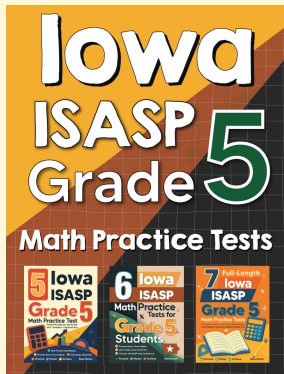
11. Look at what the numbers mean. For estimating with benchmark fractions, $\frac{7}{8} \approx 1$ and $\frac{5}{12} \approx \frac{1}{2}$. Always simplify at the end so the answer is clean and useful.

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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