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.

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

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

$\frac{7}{8}$ 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.)

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. $\frac{4}{9} + \frac{7}{8} \approx$ _____
2. $\frac{11}{12} - \frac{3}{8} \approx$ _____
3. $\frac{1}{5} + \frac{3}{7} \approx$ _____
4. $\frac{6}{7} - \frac{1}{9} \approx$ _____
5. $\frac{2}{3} + \frac{5}{12} \approx$ _____
6. $\frac{7}{10} - \frac{2}{9} \approx$ _____
7. $\frac{5}{6} + \frac{3}{5} \approx$ _____
8. $\frac{8}{9} - \frac{7}{15} \approx$ _____
9. $2\frac{1}{8} + 3\frac{4}{5} \approx$ _____
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. $\boxed{1\frac{1}{2}}$
2. $\boxed{\frac{1}{2}}$
3. $\boxed{\frac{1}{2}}$
4. $\boxed{1}$
5. $\boxed{1}$
6. $\boxed{\frac{1}{2}}$
7. $\boxed{1\frac{1}{2}}$
8. $\boxed{\frac{1}{2}}$
9. $\boxed{6}$
10. $\boxed{4}$
11. $\boxed{1\frac{1}{2};\ \text{about equal to } 1\frac{1}{2}}$
12. $\boxed{2\frac{1}{2}\ \text{ft}}$

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 $\frac{3}{8} \approx \frac{1}{2}$, 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 $\frac{3}{5} \approx \frac{1}{2}$, 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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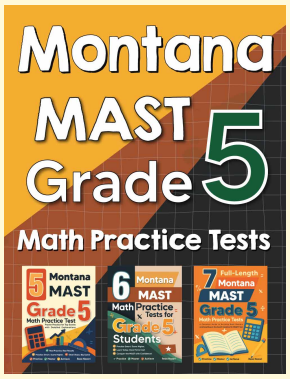

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