Estimating Sums and Differences of Fractions

Estimating Sums and Differences of Fractions: Find, Fix, and Work Backward

Name _____ **Date** _____ **Score** _____ / 8

QUICK REVIEW

Choose the nearest of $0, \frac{1}{2}, 1$ for each proper fraction, then calculate with those benchmarks. For $\frac{7}{8} + \frac{1}{10}$, use $1 + 0 = 1$. The exact sum is $\frac{39}{40}$, close to 1. An estimate does not settle a close exact comparison.

Worked example

Estimate $\frac{5}{6} + \frac{1}{8}$ with nearest benchmarks, then find the exact value and state whether the estimate is high or low.

1. $\frac{5}{6}$ is nearest 1 and $\frac{1}{8}$ is nearest 0.
2. Benchmark calculation: $1 + 0 = 1$.
3. A common denominator is 24: $\frac{5}{6} = \frac{20}{24}$ and $\frac{1}{8} = \frac{3}{24}$.
4. $\frac{5}{6} + \frac{1}{8} = \frac{20+3}{24} = \frac{23}{24}$.
5. The estimate is high by $1 - (\frac{23}{24}) = \frac{1}{24}$.
Answer: About 1. Exact value $\frac{23}{24}$. The estimate is high by $\frac{1}{24}$.

Practice Problems

Show your thinking.

1. A student says $\frac{11}{12} - \frac{2}{5}$ is about $\frac{3}{2}$. Test that estimate with nearest benchmarks $0, \frac{1}{2}, 1$.

2. Give the nearest benchmark for $\frac{3}{7}$, then use both benchmarks to estimate $\frac{3}{7} + \frac{1}{8}$.

3. Estimate $\frac{9}{10} - \frac{1}{12}$ with nearest benchmarks, then find the exact value and state whether the estimate is high or low.

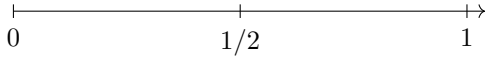
4. A student says $\frac{5}{12} + \frac{7}{12}$ is about 2. Test that estimate with nearest benchmarks $0, \frac{1}{2}, 1$.

5. Estimate $\frac{4}{5} - \frac{3}{8}$ with nearest benchmarks. Is an exact calculation still needed to decide whether it is greater than $\frac{1}{2}$? Explain with the exact value.

6. Estimate $\frac{1}{10} + \frac{1}{6}$ with nearest benchmarks, then find the exact value and state whether the estimate is high or low.

7. Give the nearest benchmark for $\frac{7}{8}$, then use both benchmarks to estimate $\frac{7}{8} + \frac{1}{9}$.

8. On the line, label the closest benchmark to $\frac{5}{9}$ with A and the closest to $\frac{4}{9}$ with B. Use them to estimate $\frac{5}{9} + \frac{4}{9}$.



Answer Key

1. The proposed estimate does not follow the benchmark rule. About $\frac{1}{2}$. Exact value $\frac{31}{60}$.
2. First benchmark $\frac{1}{2}$; estimate $\frac{1}{2}$.
3. About 1. Exact value $\frac{49}{60}$. The estimate is high by $\frac{11}{60}$.
4. The proposed estimate does not follow the benchmark rule. About 1. Exact value 1.
5. About $\frac{1}{2}$. Exact value $\frac{17}{40}$. Yes, check exactly; the exact value is not greater.
6. About 0. Exact value $\frac{4}{15}$. The estimate is low by $\frac{4}{15}$.
7. First benchmark 1; estimate 1.
8. About 1.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. $\frac{11}{12}$ is nearest 1 and $\frac{2}{5}$ is nearest $\frac{1}{2}$.
2. Benchmark calculation: $1 - \frac{1}{2} = \frac{1}{2}$.
3. A common denominator is 60: $\frac{11}{12} = \frac{55}{60}$ and $\frac{2}{5} = \frac{24}{60}$.
4. $\frac{11}{12} - \frac{2}{5} = \frac{55-24}{60} = \frac{31}{60}$.
5. The estimate is low by $\frac{31}{60} - (\frac{1}{2}) = \frac{1}{60}$.

Problem 2

1. $\frac{3}{7}$ is nearest $\frac{1}{2}$ and $\frac{1}{8}$ is nearest 0.
2. Benchmark calculation: $\frac{1}{2} + 0 = \frac{1}{2}$.

Problem 3

1. $\frac{9}{10}$ is nearest 1 and $\frac{1}{12}$ is nearest 0.
2. Benchmark calculation: $1 - 0 = 1$.
3. A common denominator is 60: $\frac{9}{10} = \frac{54}{60}$ and $\frac{1}{12} = \frac{5}{60}$.
4. $\frac{9}{10} - \frac{1}{12} = \frac{54-5}{60} = \frac{49}{60}$.
5. The estimate is high by $1 - (\frac{49}{60}) = \frac{11}{60}$.

Problem 4

1. $\frac{5}{12}$ is nearest $\frac{1}{2}$ and $\frac{7}{12}$ is nearest $\frac{1}{2}$.
2. Benchmark calculation: $\frac{1}{2} + \frac{1}{2} = 1$.
3. A common denominator is 12: $\frac{5}{12} = \frac{5}{12}$ and $\frac{7}{12} = \frac{7}{12}$.
4. $\frac{5}{12} + \frac{7}{12} = \frac{5+7}{12} = \frac{12}{12}$.
5. The benchmark estimate equals the exact value 1 in this case.

Problem 5

1. $\frac{4}{5}$ is nearest 1 and $\frac{3}{8}$ is nearest $\frac{1}{2}$.
2. Benchmark calculation: $1 - \frac{1}{2} = \frac{1}{2}$.
3. A common denominator is 40: $\frac{4}{5} = \frac{32}{40}$ and $\frac{3}{8} = \frac{15}{40}$.
4. $\frac{4}{5} - \frac{3}{8} = \frac{32-15}{40} = \frac{17}{40}$.
5. The estimate is high by $\frac{1}{2} - (\frac{17}{40}) = \frac{3}{40}$.

Problem 6

1. $\frac{1}{10}$ is nearest 0 and $\frac{1}{6}$ is nearest 0.
2. Benchmark calculation: $0 + 0 = 0$.
3. A common denominator is 30: $\frac{1}{10} = \frac{3}{30}$ and $\frac{1}{6} = \frac{5}{30}$.
4. $\frac{1}{10} + \frac{1}{6} = \frac{3+5}{30} = \frac{8}{30}$.
5. The estimate is low by $\frac{4}{15} - (0) = \frac{4}{15}$.

Problem 7

1. $\frac{7}{8}$ is nearest 1 and $\frac{1}{9}$ is nearest 0.
2. Benchmark calculation: $1 + 0 = 1$.

Problem 8

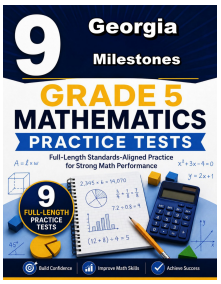
1. $\frac{5}{9}$ is nearest $\frac{1}{2}$ and $\frac{4}{9}$ is nearest $\frac{1}{2}$.
2. Benchmark calculation: $\frac{1}{2} + \frac{1}{2} = 1$.

TESTINAR

Keep Building Grade 5 Math Skills

Choose the practice book matched to your state assessment and turn worksheet practice into a complete test-prep plan.

All Grade 5 books



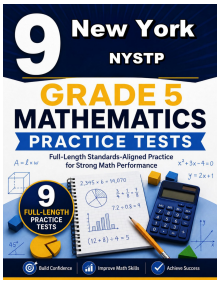
GEORGIA MILESTONES

9 Full-Length Math Practice Tests

Build Grade 5 accuracy, confidence, and test stamina with 9 printable practice tests.

Printable eBook • Instant PDF access

View eBook



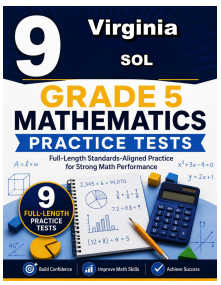
NEW YORK NYSTP

9 Full-Length Math Practice Tests

Build Grade 5 accuracy, confidence, and test stamina with 9 printable practice tests.

Printable eBook • Instant PDF access

View eBook



VIRGINIA SOL

9 Full-Length Math Practice Tests

Build Grade 5 accuracy, confidence, and test stamina with 9 printable practice tests.

Printable eBook • Instant PDF access

View eBook

Need a different state?
Testinar has Grade 5 math practice books for state assessments across the country.

TESTINAR.COM/GRADES/5