Estimating Products and Quotients

Estimating Products and Quotients: Apply, Compare, and Design

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

QUICK REVIEW

Use rounded or compatible numbers that are easy to compute. $198 \times 31 \approx 200 \times 30 = 6000$; $1196 \div 29 \approx 1200 \div 30 = 40$. An estimate is not an exact answer. For a guaranteed capacity decision, check the original numbers.

Worked example

Find an estimate for 294×21 using 300×20. Say whether this estimate is above or below the exact value.

1. Replace the original numbers by the requested compatible pair: $294 \times 21 \approx 300 \times 20$.
2. Calculate the friendly expression: $300 \times 20 = 6000$.
3. The exact value is 6174; the absolute difference is 174.
Answer: About 6000. It is below the exact result; absolute error 174.

Practice Problems

Show your thinking.

1. A school uses 54 sheets per day for 19 days. Estimate its sheet use with 50×20.

2. For planning, compare the estimate $600 \div 30$ for $622 \div 31$ with a limit of 70. Is the estimate below the limit?

3. Compute the estimate 200×40 for 199×42, then use the exact result to state its error.

4. About how many 29-seat buses hold 898 students? Estimate with $900 \div 30$; an exact bus booking needs a separate calculation.

5. For planning, compare the estimate 300×20 for 307×18 with a limit of 6050. Is the estimate below the limit?

6. Find an estimate for $724 \div 24$ using $720 \div 24$. Say whether this estimate is above or below the exact value.

7. A student claims 72×28 is about 21000. Test the claim using 70×30.

8. A compatible-number estimate replaces $1213 \div 61$ by $\square \div 60 = 20$. Find the missing compatible dividend or factor.

Answer Key

1. About 1000.
2. Yes; the estimate is 50 below the limit.
3. About 8000. It is below the exact result; absolute error 358.
4. About 30.
5. Yes; the estimate is 50 below the limit.
6. About 30. It is below the exact result; absolute error $\frac{1}{6}$.
7. The claim is ten times the compatible estimate; use about 2100.
8. 1200.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Replace the original numbers by the requested compatible pair: $54 \times 19 \approx 50 \times 20$.

2. Calculate the friendly expression: $50 \times 20 = 1000$.

Problem 2

1. Replace the original numbers by the requested compatible pair: $622 \div 31 \approx 600 \div 30$.

2. Calculate the friendly expression: $600 \div 30 = 20$.

3. $70 - 20 = 50$.

Problem 3

1. Replace the original numbers by the requested compatible pair: $199 \times 42 \approx 200 \times 40$.

2. Calculate the friendly expression: $200 \times 40 = 8000$.

3. The exact value is 8358; the absolute difference is 358.

Problem 4

1. Replace the original numbers by the requested compatible pair: $898 \div 29 \approx 900 \div 30$.

2. Calculate the friendly expression: $900 \div 30 = 30$.

Problem 5

1. Replace the original numbers by the requested compatible pair: $307 \times 18 \approx 300 \times 20$.

2. Calculate the friendly expression: $300 \times 20 = 6000$.

3. $6050 - 6000 = 50$.

Problem 6

1. Replace the original numbers by the requested compatible pair: $724 \div 24 \approx 720 \div 24$.

2. Calculate the friendly expression: $720 \div 24 = 30$.

3. The exact value is $\frac{181}{6}$; the absolute difference is $\frac{1}{6}$.

Problem 7

1. Replace the original numbers by the requested compatible pair: $72 \times 28 \approx 70 \times 30$.

2. Calculate the friendly expression: $70 \times 30 = 2100$.

3. $21000 \div 2100 = 10$, so the claimed scale is not reasonable.

Problem 8

1. Undo the known compatible number: $20 \times 60 = 1200$.

2. Replace the original numbers by the requested compatible pair: $1213 \div 61 \approx 1200 \div 60$.

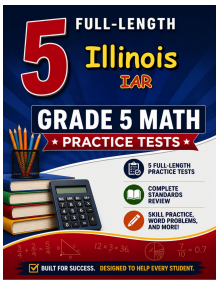
3. Calculate the friendly expression: $1200 \div 60 = 20$.

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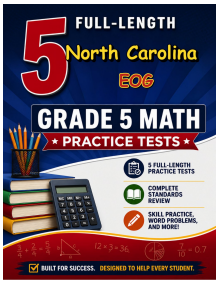
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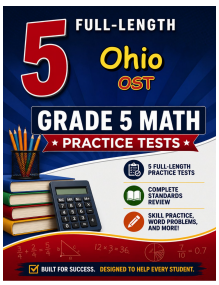
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