

Estimation Strategies

Sometimes you do not need to know the exact answer to a problem, or you may want to check the reasonableness of an answer. In those instances, you can use **estimation**. There are several different methods of estimation. A common method is to use **rounding**.

EXAMPLES Estimate by Rounding

Estimate by rounding.

1 189.2×315.6

Round each number to the nearest hundred. Then multiply.

$$\begin{array}{r} 189.2 \rightarrow 200 \\ \times 315.6 \rightarrow \times 300 \\ \hline 60,000 \end{array}$$

The product is about 60,000.

2 $453\frac{1}{5} + 68\frac{2}{3}$

Round each number to the nearest ten. Then add.

$$\begin{array}{r} 453\frac{1}{5} \rightarrow 450 \\ + 68\frac{2}{3} \rightarrow + 70 \\ \hline 520 \end{array}$$

The sum is about 520.

You can use clustering to estimate sums. **Clustering** works best with numbers that all round to approximately the same number.

EXAMPLES Estimate by Clustering

Estimate by clustering.

3 $13\frac{1}{4} + 16\frac{2}{5} + 14\frac{5}{6} + 15\frac{3}{8}$

All of the numbers are close to 15. There are four numbers.

The sum is about 4×15 or 60.

4 $99.6 + 97.83 + 102.18 + 100.101 + 99.90$

All of the numbers are close to 100.

There are five numbers.

The sum is about 5×100 or 500.

Compatible numbers are numbers that are easy to compute with mentally.

EXAMPLES Estimate by Using Compatible Numbers

Estimate by using compatible numbers.

5 $76.36 \div 24.73$

76.36 is close to 75, and 24.73 is close to 25.

$$24.73 \overline{)76.36} \rightarrow 25 \overline{)75}$$

The quotient is about 3.

6 $7\frac{3}{8} + 12 + 20\frac{2}{3}$

The fractions $\frac{3}{8}$ and $\frac{2}{3}$ are close to $\frac{1}{2}$.

$$\begin{aligned} 7\frac{1}{2} + 12 + 20\frac{1}{2} &= 7 + 12 + 20 + \left(\frac{1}{2} + \frac{1}{2}\right) \\ &= 39 + 1 \text{ or } 40 \end{aligned}$$

The sum is about 40.

A strategy that works well for some addition and subtraction problems is **front-end estimation**. This strategy involves adding or subtracting the left-most column of digits. Annex zeros for the remaining digits.

EXAMPLES

Use Front-End Estimation

Use front-end estimation to find an estimate.

7 $5,283 + 3,634$

$$\begin{array}{r} 5,283 \rightarrow 5,000 \\ + 3,634 \rightarrow + 3,000 \\ \hline 8 \qquad \qquad 8,000 \end{array}$$

The sum is about 8,800.

8 $118.1 - 57.5$

$$\begin{array}{r} 118.1 \rightarrow 110.0 \\ - 57.5 \rightarrow - 50.0 \\ \hline 6 \qquad \qquad 60.0 \end{array}$$

The difference is about 61.