

Estimating with Whole Numbers

When an exact answer to a math problem is not needed, or when you want to check the reasonableness of an answer, you can use **estimation**. There are several methods of estimation. One common method is **rounding**.

To round a whole number, look at the digit to the right of the place being rounded.

- If the digit is 4 or less, the underlined digit remains the same.
- If the digit is 5 or greater, add 1 to the underlined digit.

EXAMPLES

Estimate by Rounding

Estimate by rounding.

1 $30,798 + 4,115 + 1,891$

$$\begin{array}{r} 30,798 \rightarrow 31,000 \\ 4,115 \rightarrow 4,000 \\ + 1,891 \rightarrow + 2,000 \\ \hline 37,000 \end{array}$$

In this case, each number is rounded to the same place value.

So, the sum is about 37,000.

2 478×12

$$\begin{array}{r} 478 \rightarrow 500 \\ \times 12 \rightarrow \times 10 \\ \hline 5,000 \end{array}$$

In this case, each number is rounded to its greatest place value.

So, the product is about 5,000.

Clustering can be used to estimate sums if all of the numbers are close to a certain number.

EXAMPLES

Estimate by Clustering

Estimate by clustering.

3 $97 + 102 + 99 + 104 + 101 + 98$

All of the numbers are clustered around 100. There are 6 numbers. So, the sum is about 6×100 or 600.

4 $748 + 751 + 753 + 747$

All of the numbers are clustered around 750. There are 4 numbers. So, the sum is about 4×750 or 3,000.

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

EXAMPLES

Estimate by Using Compatible Numbers

Estimate by using compatible numbers.

5 $102 \div 24$

$$24 \overline{)102} \rightarrow 25 \overline{)100}^4$$

So, the quotient is about 4.

6 $71 + 19 + 28 + 83$

$$\begin{aligned} 71 + 19 + 28 + 83 &\rightarrow 70 + 20 + 30 + 80 \\ &= (70 + 30) + (20 + 80) \\ &= 100 + 100 \text{ or } 200 \end{aligned}$$

The sum is about 200.

Another strategy that works well for some addition and subtraction problems is **front-end estimation**. In this strategy, you add or subtract the left-most column of digits.

EXAMPLES Use Front-End Estimation

Estimate by using front-end estimation.

7 $739 + 259$

$$\begin{array}{r} 739 \\ + 259 \\ \hline 9 \end{array}$$

← Add the left-most column.

$$\begin{array}{r} 739 \\ + 259 \\ \hline 900 \end{array}$$

← Annex two zeros.

So, the sum is about 900.

8 $3,542 - 1,280$

$$\begin{array}{r} 3,542 \\ - 1,280 \\ \hline 2 \end{array}$$

← Subtract the left-most column.

$$\begin{array}{r} 3,542 \\ - 1,280 \\ \hline 2,000 \end{array}$$

← Annex three zeros.

So, the difference is about 2,000.