

Looking Ahead

To estimate fuel costs in the following example, the gas price is rounded to the nearest whole number and the quantity of gas used is rounded to the nearest 5 gallons. You did not review rounding to the nearest 5, but this is similar to rounding to the nearest ten. If the ones place contains a 0, 1, or 2, the digit in the tens place will remain unchanged and the ones digit will be replaced with 0. If the ones place contains a 3, 4, 5, 6, or 7, the digit in the tens place will remain unchanged and the ones digit will be replaced with 5. If the ones place contains an 8 or 9, the digit in the tens place will increase by 1 and the ones digit will be replaced with 0.

Example Preview

Katie rents a car while spending her vacation traveling in Russia. When she returns the car, she has driven 1350 miles and used about 54 gallons of gas. If gas costs an average of \$3.969 per gallon, estimate how much she spent on fuel.

Solution

The problem asks for an estimate of the total amount of money Katie spent on fuel.

We know how many gallons of gas Katie used, and we know the average cost of gas per gallon. The total cost of gas can be found by multiplying these two amounts.

Since we are estimating, we can round the price of gas to the nearest dollar.

$$\$3.969 \approx 4$$

We could round to the nearest dime, or even to the nearest cent, but that would not make our calculations much easier, so there's not much benefit to rounding that way.

Similarly, we can round the number of gallons to the nearest ten, or even the nearest multiple of 5. Since the actual number of gallons is pretty close to 55 we'll use that number.

$$\$4 \cdot 55 = \$220$$

So Katie spent about \$220 on fuel while in Russia.

1.R.2 Exercises

Concept Check

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

1. Rounding means finding a number close to the given number, using a specified place of accuracy.
2. When rounded to the ten thousands place, 435,613 becomes 400,000.

3. To estimate the answer for a division problem, begin by rounding both the divisor and dividend.
4. If estimated, $4250 \div 51$ is $4000 \div 50 = 80$.

Practice

Estimate each answer; then find the actual answer.

5.
$$\begin{array}{r} 83 \\ 62 \\ + 78 \\ \hline \end{array}$$

6.
$$\begin{array}{r} 63,504 \\ - 42,700 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 420 \\ \times 104 \\ \hline \end{array}$$

8. $11 \overline{)99}$

Applications

Solve.

9. College cost for a private four-year college in the 2008–2009 academic year are as follows:

Tuition & Fees	\$25,243
Room & Board	\$8996
Books & Supplies	\$1077

Estimate the total cost to attend for a year using rounded numbers to the nearest thousand. Then calculate the actual cost.

10. Brendon is running a sand volleyball tournament soon and must purchase some new equipment. He needs three new nets, which cost \$159 each. He also needs five new sets of boundary lines, which cost \$86 each. Estimate the total cost of the new equipment. Then calculate the actual cost.

Writing & Thinking

11. In your own words, define estimation.
12. Compare and contrast rounding and estimating.