

# Key Concepts

Lessons

4-3 and 4-4

## Dividing Decimals by Whole Numbers; Dividing by Decimals

**Objective** Teach students to apply the division algorithm to dividing decimals.

**Note to the Teacher** *As is the case with addition, subtraction, and multiplication, dividing decimals requires only the use of the standard algorithm together with a method for placing the decimal point. Emphasize this to the class, so students see they are not having to learn a new algorithm, just a small change to one they already know.*

### Dividing a Decimal by a Whole Number

To divide a decimal by a whole number, perform the division as if the dividend (the number being divided) is a whole number, and place the decimal point in the quotient (the result) directly above the decimal point in the dividend.

#### Example 1 Divide 7.12 by 4.

**Solution** Carry out the long division as if there is no decimal point in the dividend.

$$\begin{array}{r} 178 \\ 4 \overline{)7.12} \\ \underline{-4} \phantom{00} \\ 31 \phantom{0} \\ \underline{-28} \phantom{0} \\ 32 \phantom{0} \\ \underline{-32} \phantom{0} \\ 0 \end{array}$$

Now insert the decimal point in the quotient directly above the decimal point in the dividend.

$$\begin{array}{r} 1.78 \\ 4 \overline{)7.12} \end{array}$$

So, the quotient is 1.78.

## Dividing a Decimal by a Decimal

The following algorithm can be used to divide one decimal by another decimal.

### Division Algorithm for Decimals

To divide one decimal by another, use the following two steps.

1. Move the decimal points of both divisor and dividend to the right the same number of places, until the divisor is a whole number. This may require adding zeros to the end of the dividend.
2. Carry out the division as with whole numbers.
3. Place the decimal point in the quotient directly above the decimal point in the dividend.

### Example 2 Divide 14.292 by 0.12.

**Solution** Begin by writing the problem in long-division form.

$$0.12 \overline{)14.292}$$

Next, move the decimal points of both divisor and dividend to the right the same number of steps until the divisor becomes a whole number. In this problem, it is necessary to move each decimal point two places to the right.

$$\underbrace{12} \overline{)1429.2}$$

Now we can carry out the division in the usual way.

$$\begin{array}{r} 119.1 \\ 12 \overline{)1429.2} \\ \underline{12} \phantom{.2} \\ 22 \phantom{.2} \\ \underline{12} \phantom{.2} \\ 109 \phantom{.2} \\ \underline{108} \phantom{.2} \\ 12 \phantom{.2} \\ \underline{12} \phantom{.2} \\ 0 \end{array}$$

The quotient is 119.1.

**Example 3** Divide 346.5 by 0.25.

**Solution** Write the problem in long-division form.

$$0.25 \overline{)346.5}$$

Next, move the decimal point the same number of places to the right in both divisor and dividend so that the divisor becomes a whole number. For the divisor to be a whole number, we must move its decimal point two places to the right. Therefore we must add a zero to the end of the dividend 346.5 so its decimal point can also be moved two places to the right.

$$\begin{array}{r} 25 \overline{)34650} \\ \hline \end{array}$$

Now, we can carry out the division.

$$\begin{array}{r} 1386 \\ 25 \overline{)34650} \\ \underline{25} \phantom{00} \\ 96 \phantom{00} \\ \underline{75} \phantom{00} \\ 215 \phantom{00} \\ \underline{200} \phantom{00} \\ 150 \phantom{00} \\ \underline{150} \phantom{00} \\ 0 \end{array}$$

The quotient is 1,386.

