

Rational Numbers 9: Decimal Form of Rational Numbers

Objectives

- ⇒ To use base ten blocks to model operations on decimal numbers
- ⇒ To review the algorithms for addition, subtraction, multiplication and division of decimal numbers
- ⇒ To understand why the algorithms for operations on decimal numbers work

Activity 1: Using base ten blocks to model operations on decimals

Base ten blocks consist of: single units, longs (10 units), flats (100 units) and cubes (1000 units). There are often several different ways to model a given decimal number, depending on which type of block is selected to represent 1. For example, we could model the decimal number 1.34 in either of the following ways:

- ⇒ If we choose the large cube to represent 1 then:

a flat represents $\frac{1}{10}$ of 1 or 0.1
a long represents $\frac{1}{100}$ of 1 or 0.01 and
a single unit represents $\frac{1}{1000}$ of 1 or 0.001.

Using this scheme, the number 1.34 is represented by 1 large cube, 3 flats and 4 longs.

- ⇒ If instead we choose a flat to represent 1 then:

a long represents $\frac{1}{10}$ of 1 or 0.1 and
a single cube represents $\frac{1}{100}$ of 1 or 0.01 .

Using this scheme, 1.34 would be modeled by 1 flat, 3 longs and 4 single cubes.

Model each of the following calculations with base ten blocks. Draw a sketch of your model and *be sure to specify the unit you chose to represent one* . Several groups will be chosen to present their models to the class.

1. $2.346 + 1.27$

2. $837/1000 + 2424/1000$

3. $3.3 - 2.875$

4. $1437/1000 - 582/1000$

Activity 2: Modeling products and quotients of decimal numbers

Model each of the following calculations with base ten blocks. Draw a sketch of your model and *be sure to specify the unit you chose to represent one* . Several groups will be chosen to present their models to the class.

1. 2×2.35

2. $4.84 \div 4$

3. $9.6 \div 3$ (hint: choose a long to represent 1)

4. $0.2 \times \frac{1}{3}$ (hint: choose 3 longs to represent 1)

5. $0.6 \div 0.2$

6. $0.2 \div 0.6$

7. 1.25×0.4

Activity 3: Placing the decimal point when operating on decimals

Recall that when we do operations on decimals, we use the familiar algorithms that are used for integers. The only difference arises when dealing with the decimal points. The following questions require you to summarize the decimal point rules and explain where they come from. Several groups will be selected to present their responses to the class at the next meeting.

1. What are the rules regarding decimal points when adding or subtracting decimal numbers ? Make up several examples to illustrate them. Explain why these rules are valid.

2. What is the rule for placing the decimal point when multiplying decimal numbers ? Make up several examples to illustrate it. Explain why this rule is valid. (Hint: you might want to rewrite the numbers in improper fraction form in your explanation. It can also be explained if you write the numbers in scientific notation.)

3. How do you deal with the decimal points when dividing a number by a decimal number ? Give several examples to illustrate it. Explain why this rule is valid. (Hint: what are we really doing when we move a decimal point to the right ?)