

Patterns in Counting with Decimals

Math Concepts

- patterns
- ordering decimals
- decimals
- place value
- comparing decimals
- addition



Materials

- TI-15 Explorer™
- **Patterns in Counting with Decimals** recording sheets
- pencils

Overview

Students will use the calculator to connect concrete and symbolic representations of decimal quantities and to recognize patterns in the number symbols.

Introduction

1. Show a 10×10 grid on the overhead (see recording sheet). Ask students: How many squares are there across? How many down? How many in all?
2. Now ask students: If the entire grid is worth one dollar, how much is each square worth? Help students connect their understanding of one cent to $1/100$ of a dollar.
3. Have students work in pairs. Give each student a recording sheet. Have the first partner fill in the first blank after the single square with a fraction ($1/100$) and the second blank with a decimal symbol (.01) for one one-hundredth.
4. Have students clear the constant stored in [Op] by pressing [MODE]   [ENTER] [CLEAR].
5. Have the first partner use the calculator to count by hundredths in decimal form by entering [Op] [+] [.] 01 [Op] [Op] [Op] [Op] . . . and then label the squares on the 10×10 grid with decimals. Have the second partner count by hundredths in fraction form by entering [Op] [+] 1 [Op] 100 [Op] 0 [Op] [Op] [Op] . . . and then label the squares in another grid with fractions.
6. Challenge the students to find as many patterns as they can in each of the labeled grids and record the patterns on their recording sheets.
7. Also challenge the students to record any connections they see between the two labeled grids.



How do your results differ when you [Fix] your calculator to [0.01]?

Patterns in Counting with Decimals (*continued*)

Collecting and Organizing Data

While students explore with the 10×10 grid and their calculators, ask questions such as:

- What patterns do you see in the decimal representations?
- What patterns do you see in the fraction representations?
- What connections do you see between the fraction and decimal representations?



What do the numbers that show on the calculator after you press $\boxed{0.01}$ tell you?



What did you enter to prepare the calculator to count by hundredths? Why?



If you press the $\boxed{F \leftrightarrow D}$ key, a fraction symbol will change to a decimal symbol and vice versa. Try this and see how it connects to your two grids.

Analyzing Data and Drawing Conclusions

After students have looked for patterns and connections, have them work as a group to analyze their observations. Ask questions such as:

- What patterns did you notice in the decimal symbols? In the fraction symbols?
- How are the spaces on the grid and the symbols on the calculator connected?
- How are the two kinds of symbols connected?
- With what number does each grid end? Does that make sense? Why or why not?



How did you set up the calculator to count by hundredths in decimal form? In fraction form? Explain your choices.



How could you use the calculator to count ten squares at a time?

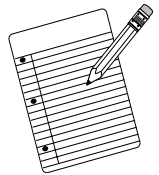


What does using the $\boxed{F \leftrightarrow D}$ represent?

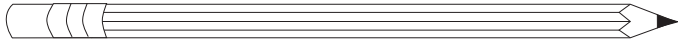
Continuing the Investigation

Have students:

- Investigate the question: How would you set up the calculator to count by tenths? How could counting by tenths be represented on the 10×10 grid if the whole grid represents 1?
- Investigate the question: One percent (1%) is another name for $1/100$ or $.01$. Label another 10×10 grid with percent symbols. What connections do you see between the three grids?



Name: _____



Patterns in Counting with Decimals

Recording Sheet

Collecting and Organizing Data

10 × 10 Grid

☐ = _____
Fraction

or _____
Decimal

Analyzing Data and Drawing Conclusions

- The patterns we saw in the decimal symbols:
- The patterns we saw in the fraction symbols:
- The connections we saw between the two kinds of symbols: