



# TAKE IT TO THE MAT

A NEWSLETTER ADDRESSING THE FINER POINTS OF MATHEMATICS INSTRUCTION



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When studying fractions and decimals, we are really looking at two different sides of the same coin. Both common fractions—numerals that are written numerator and denominator—and decimal fractions simply represent a part of a whole. Depending on the situation, one form or the other may be easier to work with. In computation, decimals are often easier. When considering discrete parts of a set, fractions are usually better. In this issue of *Take It to the MAT*, we'll look at how to change from one form to the other, in the event that we don't have the form we want.

Changing decimals to fractions is a snap. All one needs to do is read the decimal correctly and then write it as a fraction. For instance, read the following decimal: 0.6. If you said, "zero point six," try again. If you said, "six tenths," then we're on our way. Write the fraction six tenths.  $0.6 = \frac{6}{10}$ . Easy! The same is true of the decimals 0.54 and 0.103. Read them properly and the conversion to a fraction is simple.

Fifty-four hundredths and one hundred three thousandths.  $0.54 = \frac{54}{100}$  and  $0.103 = \frac{103}{1000}$ . (Simplifying the fractions is a topic for another issue.)

Changing fractions to decimals sometimes takes a little more thought, but many times it's just as easy as changing decimals to fractions. For instance, write the following fractions as decimals:  $\frac{1}{2}$ ,  $\frac{3}{4}$ ,  $\frac{7}{10}$ . The

fractions one half, three fourths, and seven tenths should be trivial. Think of all the things that connect to one-half. Fifty percent, fifty cents, half a dollar, five dimes, five tenths, etc. We write all of those 0.5. Three fourths, or three quarters, 75 cents, 75 percent, 75 pennies leads us to 0.75. Seven tenths is, well, seven tenths or 0.7. No big deal there.

Halves, fourths, fifths, tenths, twentieths, hundredths, and even fiftieths should be easily converted from an understanding of their connections to the real-world applications. There are 20 nickels in a dollar, so

$\frac{1}{20} = 0.05$ . If we count by twenties: 20, 40, 60, 80, 100, we can see that we make five jumps to get to 100, so  $\frac{1}{5} = 0.2$ . Notice the parallel between the decimal and fraction forms of  $\frac{1}{20}$  and  $\frac{1}{5}$ . A similar

parallel can be seen between  $\frac{1}{2} = 0.5$  and  $\frac{1}{50} = 0.02$ . Exploring the connection between fourths and twenty-fifths is also warranted.

You might have noticed that nowhere in the discussion (until now) has the long division algorithm been mentioned. While the long division algorithm can be used to convert fractions to decimals, and while it should be taught and mastered, it is a wholly inefficient strategy for dealing with simple fractions like halves, fourths, tenths, hundredths, and so on. To have a

student convert  $\frac{1}{4}$  to 0.25 as shown, takes math away from a real-life application. However,

it's totally appropriate to use it for eighths, twelfths, and forty-thirds. A lot of number sense and a little common sense will show when to use it and when not to.

$$\begin{array}{r} .25 \\ 4 \overline{)1.00} \\ \underline{8} \phantom{0} \\ 20 \\ \underline{20} \\ 0 \end{array}$$