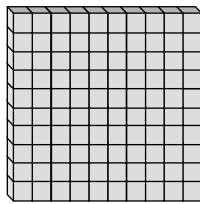


## Math 365 Lecture Notes Section 6.2 – Operations on Decimals

### ★ Computations with Algorithms

- 1) **adding/subtracting decimals** – Keep the numbers in their decimal form, line up the decimal points and add/subtract as if the numbers were whole numbers.
- 2) **multiplying decimals** – If there are  $n$  digits to the right of the decimal point in one number and  $m$  digits to the right of the decimal point in a second number, multiply the two numbers, ignoring the decimals, and then place the decimal point so that there are  $n + m$  digits to the right of the decimal point in the product.
- 3) **dividing decimals** – Multiply both divisor and dividend by a power of ten that will make the divisor a whole number and then handle the division as you do with whole numbers.


### ★ Computations without Algorithms



= one unit



= one-tenth  
of a unit

 = one-hundredth  
of a unit

- 1) Compute  $3.45 + 2.67$  using base ten blocks and fractions.

- 2) Compute  $4.23 - 3.09$  using base ten blocks and fractions.

3) Compute  $3 \times 2.3$  using base ten blocks and fractions.

4) Compute  $3.4 \times 1.2$  using base ten blocks and fractions.

5) Compute  $5.058 \div 0.12$  using fractions.

### ★ Scientific Notation

#### Definition:

1) Scientific Notation –

Example: Which of the following are written in scientific notation?

$$10.34 \times 10^{-13}$$

$$1.4 \times 10^{24}$$

$$-4.44 \times 10^{25}$$

*On your own:* Convert from standard form to scientific notation and from scientific notation to standard form.

Standard Numerals	Scientific Notation
351.0278	
	$3.53189 \times 10^4$
0.0214	
	$8.001 \times 10^{-3}$
-489	
	$9.8765 \times 10^{-4}$

### ★ Mental Computations

- Breaking and Bridging:  $1.5 + 3.7$
  
  
  
  
  
  
  
  
  
  
- Use Compatible Numbers:  $7.91 + 3.85 + 4.09 + 0.15$
  
  
  
  
  
  
  
  
  
  
- Make Compatible Numbers:  $1.5 + 3.7$
  
  
  
  
  
  
  
  
  
  
- Balance with Decimals in Subtraction:  $4.63 - 1.97$
  
  
  
  
  
  
  
  
  
  
- Balance with Decimals in Division:  $8 \div 0.2$

## ★ Rounding Decimals

**Rule:** When rounding to the  $10^{-n}$  decimal place, look at the  $10^{-(n+1)}$  decimal place. If this digit is 5 or greater you round the digit in the  $10^{-n}$  decimal place up, otherwise you keep the digit the same.

Round each of the following numbers to the indicated accuracy:

1. 752.28357 to the nearest hundred.
2. 752.28357 to the nearest thousandth.
3. 752.28357 to the nearest tenth.
4. 752.28357 to the nearest hundredth.
5. 752.28357 to the nearest ten-thousandth.

## ★ Estimating Decimal Computations Using Rounding

*Note:* Round-off errors are typically compounded when computations using rounding are involved. When computations are done with approximate numbers, the final result should not be reported using more decimal places than the number used with the fewest decimal places. In other words, an answer can be “no more accurate” than “the least accurate” number used to find it. (Billstein pg. 335)

1. Jim travels 26.2 miles on Monday, 43.9 miles on Tuesday, 53.7 miles on Wednesday and 13.4235 miles on Thursday. Estimate the number of miles Jim drove to the nearest mile.
2. Mike and Katy celebrated their anniversary at a fancy restaurant, where the bill for dinner came to \$86.23. Estimate the tip if he wants to leave a 15% tip, and then find the total bill.



3. Maddy wants to estimate the number of miles she gets per gallon of gas. If she drove 387.2 miles on 15.25 gallons of gas, find the estimate of her miles per gallon on that trip.