

T102 SECTION 6-2 OPERATIONS WITH DECIMALS

ADDITION AND SUBTRACTION OF DECIMALS

A. ADDITION

Before jumping directly to the standard algorithm for adding and subtracting decimals, let us discover why the algorithm works with some concrete and other examples:

Our Example: $2.4 + 1.75$

BASE 10 BLOCKS Represent each number. Combine. Regroup

$2.4 + 1.75$

DECIMAL SQUARES Shade each number. "Read" entire shaded portion.

$2.4 + 1.75$

CONVERTING TO FRACTIONS Write expanded form using fractions. Combine. Regroup.

$2.4 + 1.75$

USING THE ALGORITHM Align numbers according to place value (or the point). Add.

$2.4 + 1.75$

ALGORITHM FOR ADDITION AND SUBTRACTION OF DECIMALS:

1. Align the number according to place value (or the decimal point).
2. Add or Subtract.
3. Place the decimal point directly below the other points.

B. SUBTRACTION

Our Example: $3.2 - 1.15$

BASE 10 BLOCKS

Represent only the first number. Take away the second number, regrouping if necessary.

$$3.2 - 1.15$$

DECIMAL SQUARES

Shade only the first number. "Cross out" the second number.

$$3.2 - 1.15$$

CONVERTING TO FRACTIONS

Write expanded form using fractions. Regroup.

$$3.2 - 1.15$$

USING THE ALGORITHM

Align numbers according to place value (or the point). Annex zeros if necessary. Subtract.

$$3.2 - 1.15$$

EXAMPLES:

$$45.389 + 21.75$$

$$126.4 - 87.047$$

II. MULTIPLICATION AND DIVISION OF DECIMALS

A. MULTIPLICATION

We can develop the algorithm for multiplication of decimals using what we know about fractions from Section 6.1

$$4.23 \times 2.7 = \frac{423}{100} \cdot \frac{27}{10} = \frac{\quad}{\quad} = \frac{\quad}{\quad} =$$

ALGORITHM FOR MULTIPLICATION OF DECIMALS:

1. Disregarding the decimal point, multiply the numbers
2. Count how many digits lay to the right of BOTH decimals points.
3. Place the decimal point in the product so that it has this many digits to the right of the point

EXAMPLES:

$$(6.2)(1.43)$$

$$.02 \times 0.13$$

$$8.43 \times 1000$$

B. DIVISION

1. Converting to Fractions

$$9.42 \div 3$$

2. Divisor is a Whole Number

When the divisor is a whole number, the division can be handled as with whole numbers and the decimal point is placed directly over the decimal point in the dividend.

$$36.295 \div 5$$

3. Divisor is NOT a Whole Number

When the divisor is not a whole number, we can obtain a whole-number divisor by multiplying both the divisor and dividend by a power of 10 (ie. moving the decimal point).

$$.45 \div .5$$

$$13.169 \div .13$$

$$9 \div 7.5$$

III. SCIENTIFIC NOTATION

Scientific Notation is another way to write a very large or very small number. A number written in scientific notation satisfies the following criteria:

- It is the product between:
1. A number greater than or equal to 1 and less than 10.
 2. An integer power of 10.

Change each of the following to **SCIENTIFIC NOTATION**:

97.9

.000873

1,000,000

565,000

Change each of the following to the **STANDARD FORM OF A NUMBER**

$4.61 \cdot 10^{-4}$

$7.035 \cdot 10^6$

9.87×10^2

1.32×10^{-8}

IV. ROUNDING DECIMALS

Round to the nearest ...	Ten	Unit	Tenth	Hundreth	Thousandth
7.24562					
398.5398					
9.9873					

V. MENTAL COMPUTATION

A. BREAKING AND BRIDGING

$$\begin{array}{r} 1.5 \\ 3.7 \\ + 4.48 \\ \hline \end{array}$$

B. USING COMPATIBLE NUMBERS

$$\begin{array}{r} 7.91 \\ 3.85 \\ 4.09 \\ + 0.15 \\ \hline \end{array}$$

C. MAKING COMPATIBLE NUMBERS

$$\begin{array}{r} 9.27 \\ + 3.79 \\ \hline \end{array}$$

D. BALANCING IN SUBTRACTION

$$\begin{array}{r} 4.63 \\ - 1.97 \\ \hline \end{array}$$

E. BALANCING IN DIVISION

$$.25 \overline{)8}$$

VI. ESTIMATING DECIMAL COMPUTATION

Estimate the cost of your clothing purchase:

$$\$47.50 + \$32.75 + \$91.25$$

If you buy 7 books that each cost \$8.35, estimate your bill.