

Decimal Operations

Objective 1: Place Settings

Each digit after a decimal point will represent a different fraction, with the denominators of 10, 100, 1000, etc.

Ten-thousands	Thousands	Hundreds	Tens	Ones	.	Tenths	Hundredths	Thousandths	Ten-Thousandths
10,000	1,000	100	10	1		$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$	$\frac{1}{10,000}$

Example: For the number 48.1268, identify the digit in the hundredths place.

Example: Write out the decimal 0.517 as a sum of fractions representing each decimal place.

Objective 1 Questions:

1) For the number 571.482 identify the digit in the hundredths place.

2) Write out the decimal 0.1502 as a sum of fractions representing each decimal place.

Objective 2: Adding and Subtracting Decimals

To set up problems that add or subtract decimals, we need to be sure to line up the decimals, and add or subtract straight down. The reason we do this is to be sure we are adding or subtracting numbers that are in the correct “place” (tenths place, ones place, hundreds place, etc.). To understand, let us refer to fractions.

Example: Add: $0.3 + 0.4$

Solution: Since $0.3 = \frac{3}{10}$ and $0.4 = \frac{4}{10}$,

With fractions, we only add the numerators, and the denominators stay the same. This is why we line up decimals when adding or subtracting – so that we are adding terms that have the same place holder.

Example: Add: $1.652 + 20.91$

Solution:

*Keep in mind that carrying over and borrowing will work the same way with decimals as they do with whole numbers.

Example: Subtract: $2.83 - 1.206$

Solution:

Objective 2 Questions:

Add or subtract:

1) $0.263 + 5.86$

2) $0.36 - 0.076$

Objective 3: Multiplying and Dividing with Decimals

To set up decimal multiplication problems, lining up the decimals is not necessary. Instead, we will treat the numbers as regular integers, then account for all the decimal places at the end. To understand, let us refer to fractions.

Example: Multiply: 0.32×0.4

Solution: Since $0.32 = \frac{32}{100}$ and $0.4 = \frac{4}{10}$,

Notice that this time we ended up with a different denominator. This is because when we multiply fractions, we also multiply the denominators. When multiplying decimals, that means we will keep track of all the decimal places, and move our answer over that many places in the end.

To show the same idea we see with fractions on the right, we can line up the numbers like regular integer multiplication, but just note that there will be three shifts of the decimal in the final answer.

Example: Multiply: 819×7.756

Solution: (put the largest number of digits on top, regardless of which number is actually larger)

Example: Set up division for the problem: $72.8 \div 0.26$

Solution: To set up a long division problem with decimals, move the decimal of the divisor (the number on the outside) to the right until it is gone. However far you must move it, do the same to the dividend (the number inside). The decimal in your new dividend will line up with the answer.

Example: Divide: $2.814 \div 2.1$

Solution:

Objective 3 Questions:

Multiply or divide:

1) 9.8×94.3

2) 76.7×0.39

3) $2.146 \div 5.8$

4) $428 \div 2.5$