Topic Tutorials

POWERED BY Alpha II

Decimals

Student Copy: Decimals – Topic Tutorials

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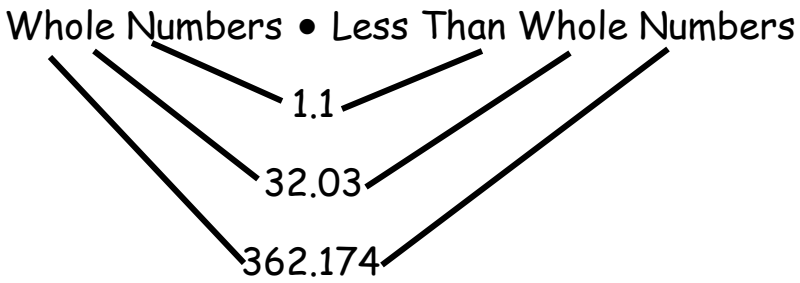
What is a Decimal?

A decimal is a number that is written with a dot followed by places to the right. Each of the digits to the *right* stands for *less* than a whole number. The dot is the decimal point.

Each of these decimals stands for less than a whole number.

.1 .01 .38 .552 .1639

A decimal may also contain digits to the left of the decimal point. The digits to the *left* of the decimal point stand for a *whole number*. Numbers like these are called ***mixed*** decimals.



To rename a whole number as an equivalent decimal, write a decimal point to the right of the last digit. For example: 23 = 23.

Draw a line under all the digits that stand for less than a whole number.

Examples:

1) 45.067 45.067

2) 164.35 164.35

3) 544.002 544.002

Try These:

Draw a line under all the digits that stand for less than a whole number.

1) 40.17

2) 829.1

3) 391.24

4) 98.3157

5) 403.405

Subtraction of Decimals

You subtract decimals the same way you subtract whole numbers. Follow the steps below.

Step 1: Write the decimal carefully. Line up the decimal points one under the other.

Step 2: Write ending zeros so all decimals have the same number of places.

Step 3: Subtract the decimals just the way you subtract whole numbers.

Step 4: Put a decimal point in the difference. This decimal point should line up under the other decimal points.

Procedure

1) Subtract: .512 - .421

```
   .512   ← minuend
 - .421   ← Subtrahend
 ------
     1
```

Arrange in columns. Line up the decimal points. Subtract starting from the right.

```
    4 11
   .5 12   2 is greater than 1
 - .421
 ------
   .091   ← difference
```

Regroup when necessary.

5 tenths 1 hundredth = 4 tenths 11 hundredths

Place the decimal point in the difference directly below the decimal points in the given numbers. Check by adding the difference and the subtrahend to get the minuend.

Answer: .091

Check: .091
+ .421
.512

Correct. The answer matches the minuend.

2) From 10.6 subtract 5.524

5 9 10
10.6~~00~~
- 5.524
5.076

Write ending zeros so both numbers have the same number of decimal places.
6 tenths = 5 tenths 9 hundredths 10 thousandths

Answer: 5.076

Check: 5.076
+ 5.524
10.600 = 10.6

Correct. The answer matches the minuend.

3) Subtract: $20 - $6.38

1 9 9 10
$~~20.00~~
- 6.38
$13.62

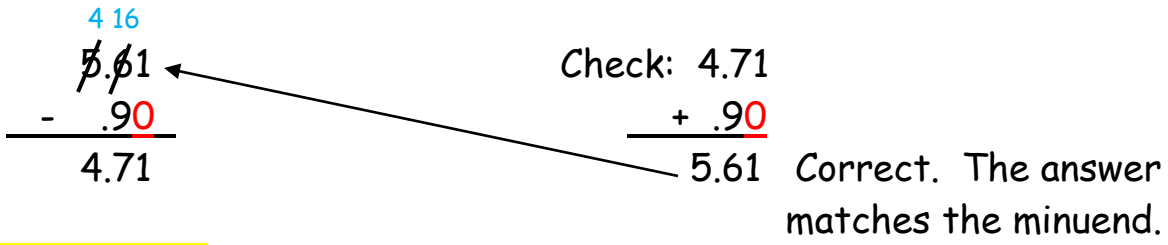
When subtracting whole numbers and decimals, place a decimal point and ending zeros after the whole number.

Answer: $13.62

Check: $13.62
+ 6.38
$20.00

Correct. The answer matches the minuend.

4) Find the difference: 5.61 - .9



Answer: 4.71

Try These:

a) Subtract 29.34 – 16.52

b) Subtract 87 – 35.83

Changing & Writing Decimals as Fractions

Follow the steps below for the method of changing decimals to fractions.

Step 1: Use the digits of the decimal as the numerator.

Step 2: Look at the last place value in the decimal. The value of this place is the denominator.

Step 3: Simplify the fraction to lowest terms.

Procedure

1) Write .15 as a fraction.

$.15 = \frac{15}{100} = \frac{3}{20}$

hundredths

Use the digits of the given decimal as the numerator. As the denominator, choose from powers of ten (10, 100, 1,000, and so on) the number that corresponds to the place value of the last digit of the decimal.

Simplify. In this case, divide the numerator and the denominator both by 5.

Answer: $\frac{3}{20}$

2) Write .625 as a fraction.

$.625 = \frac{625}{1000} = \frac{5}{8}$

Thousandths

The digits of the decimal are the numerator. For the denominator, use 1000 because it corresponds to the place value of the last digit of the decimal.

Simplify. Divide the numerator and denominator by 5. Then simplify again by dividing them both by 25.

Answer: $\frac{5}{8}$

3) Write .0005 as a fraction.

$.0005 = \frac{5}{10000} = \frac{1}{2000}$

Ten-thousandths

Answer: $\frac{1}{2000}$

4) Write 5.875 as a mixed number.

$5.875 = 5 + .875 = 5 + \frac{875}{1000}$

$= 5 + \frac{7}{8} = 5\frac{7}{8}$

Write the mixed decimal a sum. Then write the decimal as a fraction and simplify. Add the whole number and the fraction.

Answer: $5\frac{7}{8}$

5) Write $.12\frac{1}{2}$ as a fraction.

$.12\frac{1}{2} = \frac{12\frac{1}{2}}{100} = 12\frac{1}{2} \div 100$

$= \frac{25}{2} \div 100$

$= \frac{25}{2} \times \frac{1}{100} = \frac{1}{8}$

Answer: $\frac{1}{8}$

Try These:

1) .3

2) .25

3) .04

4) .60

5) $.66\frac{2}{3}$

Solving Problems with Decimals

You have already learned the steps to solve problems with whole numbers. You can use those same steps to solve problems with decimals. Read the problem below. Follow the steps to solve it.

Step 1: Read the problem.

Step 2: Learn what you must find out (question asked).

Step 3: Notice the clue words. What operation is needed to solve this problem?

Step 4: Notice the numbers. Which ones will you be using?

Step 5: Think or write your plan. Solve it.

Step 6: Check the answer. Ask yourself if it makes sense.

Problem: A mutual fund quarterly dividend of $59.40 was reinvested in the fund at the price of $8.64 per share. How many shares of the fund (to three decimal places) should the investor receive?

Procedure

1) **Given facts**: Dividend of $59.40 reinvested at the price of $8.64 per share.

   Question Asked: How many shares should the investor receive?

2) **Operation Needed:** The words *how many shares* when the *price per share* and *total price* are given indicate division.

   Think or write out your plan: The amount of the dividend divided by the price per share is equal to the number of shares.

   Equation: $59.40 ÷ $8.64 = Shares

3) **Estimate the answer:**

$8.64 ⟶ $9

$59.40 ⟶ $63 (divisible by 9)

$63 ÷ $9 = 7 Share (estimate)

Solution:

$$
\begin{array}{r}
6.875 \\
8.64\overline{)59.40000} \\
-\ 5184 \\
\hline
7560 \\
-\ 6912 \\
\hline
6480 \\
-\ 6048 \\
\hline
4320 \\
-\ 4320 \\
\hline
\end{array}
$$

4) **Check the accuracy:**

$$
\begin{array}{r}
6.875 \\
\times\ \ 8.64 \\
\hline
27500 \\
412500 \\
+5500000 \\
\hline
59.40000
\end{array}
\quad = \$59.40
$$

5) **Compare the answer to the estimate:**
The answer of 6.875 shares compares reasonably with the estimate of 7 shares.

Answer: 6.875 shares

Problem: Darrell's pay for two weeks is $624.32. He spent $229.55 the first week. He spent $234.92 the second week. How much money did he have left?

Procedure:

1) **Given Facts:** Earned $624.32. Spent $229.55 during week 1 and $234.92 during week 2.

   Question Asked: How much money did he have left?

2) **Operation Needed:** The words *how much money left* and *spent* indicated subtraction.

   Think or Write out your plan: Darrell's pay minus the amount spent in week 1 minus the amount spent in week 2.

   Equation: $624.32 - $229.55 - $234.92 = Amount Left

3) **Estimate** the answer.
   $624.32 ⟶ $600.00
   $229.55 ⟶ $200.00
   $234.92 ⟶ $200.00
   $600 - $200 - $200 = $200, estimate

   Solution:
   $624.32 - $229.55 = $394.77
   $394.77 - $234.92 = $159.85

4) **Check the accuracy:**

$$\begin{array}{r} \$159.85 \\ \$234.92 \\ +\$229.55 \\ \hline \$624.32 \end{array}$$

Compare answer to the estimate:
The answer of $159.85 left compares reasonably to the estimate of $200.00.

Answer: $159.85

Try These:

1) How many times as large is an 18 oz. jar of jelly compared to a 4.5 oz. jar of jelly?

2) An automobile traveled 247.5 miles on 12.5 gallons of gasoline. Find how many miles per gallon the automobile averaged.

3) Jim walks to work and back every day. He walks a total of 2.9 miles every day. He works 5 days a week. How many miles does he walk each week? He works 49 weeks a year. How many miles does he walk a year?