

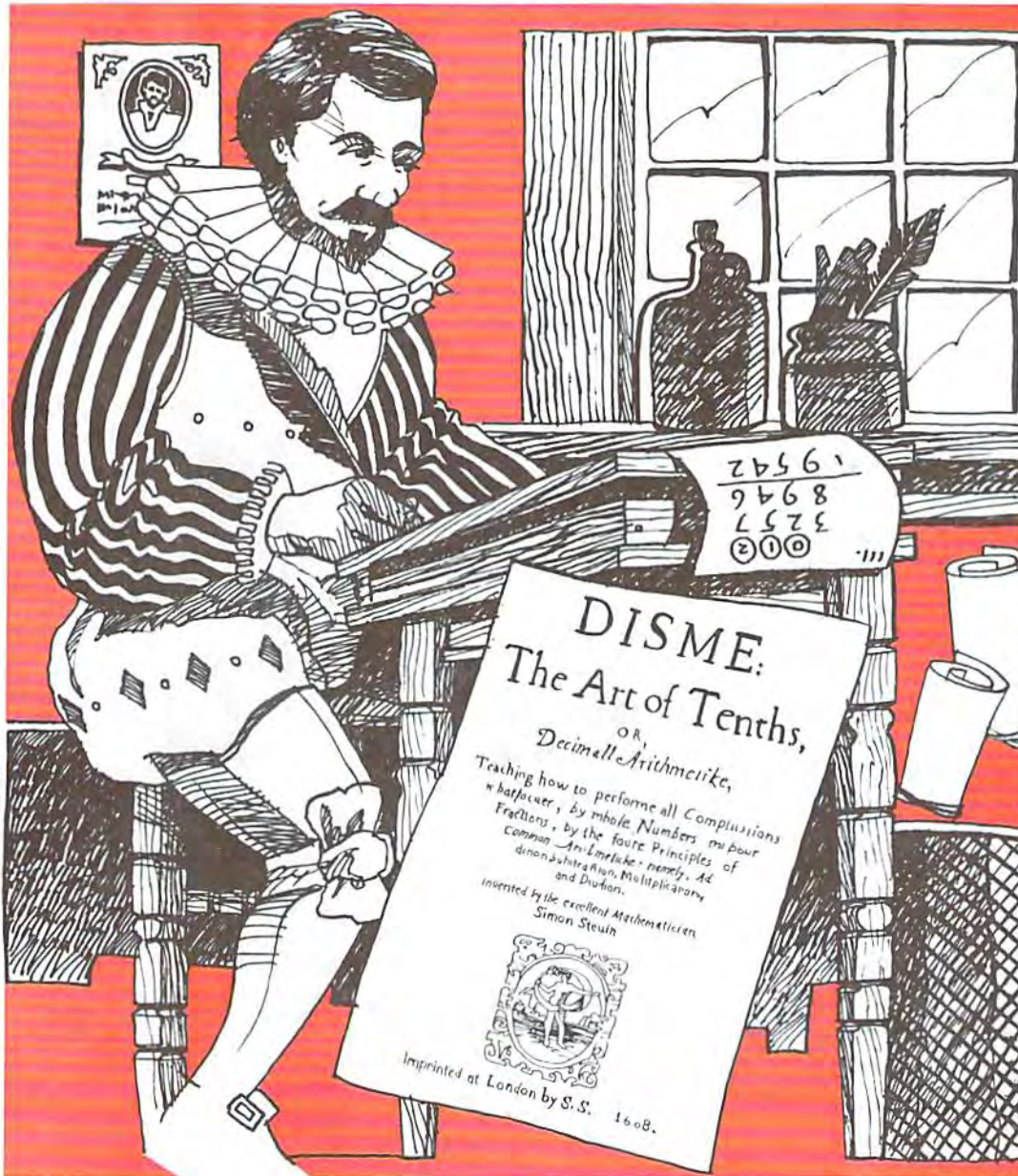
Key to

Decimals[®]

2

Student
Workbook

Adding, Subtracting, and Multiplying



By Steven Rasmussen and Spreck Rosekrans

Name _____

Class _____

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About the Cover:

Although the Hindu-Arabic place-value system was perfected between the fourth and seventh centuries A.D., the natural extension of this system to decimal fractions did not take place until almost a thousand years later. In the fifteenth and sixteenth centuries, several European mathematicians came close to inventing decimal fractions, but they failed to realize how valuable the idea was.

It is possible that the concept of decimal fractions came to Europe through contact with Asia. The Persian astronomer, Jamshid al-Kashi, used decimal fractions in his works published around 1430. Al-Kashi in turn may have been influenced by the Chinese and Hindus, who are known to have used decimal fractions to a limited extent.

In 1585 a Dutch scientist, engineer and businessman, Simon Stevin, published a short book about decimal fractions. Stevin's enthusiasm for decimal fractions stemmed from his belief that they could greatly simplify practical, day-to-day mathematics. In his essay Stevin discussed the rules for adding, subtracting, multiplying, and dividing decimals. He closed with examples showing how decimals could be used in surveying, measuring tapestries and casks, computing volumes, and in astronomy and commerce.

Although Stevin made a powerful plea for the use of decimal fractions, his notation was clumsy and his work did not immediately receive the attention that it deserved.

On the cover of this booklet Simon Stevin is writing his book, first published in his native language, Flemish, with the title *De Thiende*. His book, only seven pages long, was translated into



French and later translated into English and published under the title *Disme: The Art of Tenths, or Decimall Arithmetike*. *Disme* was the first systematic discussion of decimal fractions and the rules for using them in computation. Our word "dime," meaning tenth of a dollar, comes from the French word "disme," meaning tenth.

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Place Value Review

Put each number in the place value chart.

- 12.6
- $42\frac{1}{10}$
- seven and two tenths
- three hundred sixty-seven and eight tenths
- 81.06
- $340\frac{26}{100}$
- $21\frac{3}{100}$
- twenty-nine and seventy-two hundredths
- twelve and four hundredths
- $48\frac{125}{1000}$

	hundreds (100's)	tens (10's)	ones (1's)	tenths ($\frac{1}{10}$'s)	hundredths ($\frac{1}{100}$'s)	thousandths ($\frac{1}{1000}$'s)
a)		1	2	.	6	
b)				.		
c)				.		
d)				.		
e)				.		
f)				.		
g)				.		
h)				.		
i)				.		
j)				.		

Write each number in expanded notation.

- 12.6 = $10 + 2 + \frac{6}{10}$
- 42.1 =
- 7.2 =
- 367.8 =
- 81.06 = $80 + 1 + \frac{0}{10} + \frac{6}{100}$
- 340.26 =
- 21.03 =
- 29.72 =
- 12.04 =
- 48.125 =

Write the place name of each digit.

340.26

- The 3 is in the _____ place.
- The 4 is in the _____ place.
- The 0 is in the _____ place.
- The 2 is in the _____ place.
- The 6 is in the _____ place.

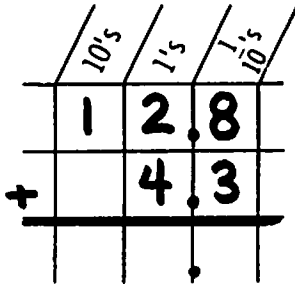
48.125

- The 8 is in the _____ place.
- The 5 is in the _____ place.
- The 1 is in the _____ place.

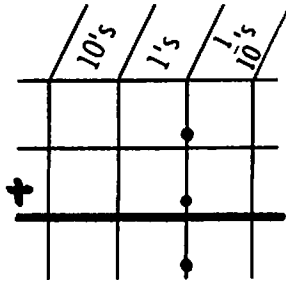
Addition Review

Use the place value charts to add.

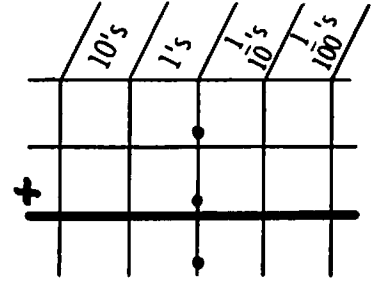
$12.8 + 4.3 =$



$6.4 + 7.8 =$



$13.60 + 2.51 =$



Add without place value charts.

$$\begin{array}{r} 3.1 \\ + 4.7 \\ \hline \end{array}$$

$$\begin{array}{r} 9.81 \\ + 4.46 \\ \hline \end{array}$$

$$\begin{array}{r} 1.76 \\ + 5.19 \\ \hline \end{array}$$

$$\begin{array}{r} .8 \\ 4.7 \\ + 9.4 \\ \hline \end{array}$$

$$\begin{array}{r} 0.526 \\ 1.237 \\ + 4.314 \\ \hline \end{array}$$

Add. Be sure to line up the decimal points.

$6.41 + 7.72 =$

$$\begin{array}{r} 6.41 \\ + 7.72 \\ \hline \end{array}$$

$4.8 + 6.9 =$

$3.14 + 2.72 =$

Ian has \$1.74 and Eric has \$3.43.
How much do they have together?

A year ago Julie's pet snake was 72.4 centimeters long. Since then it has grown 12.8 cm. How long is it now?

They have \$ _____.

The snake is _____ cm long.

Zero as a Placeholder in Addition

Sometimes you will have to add decimal numbers that do not have the same number of decimal digits.

$$\begin{array}{r} 3.4 \\ + 2.35 \\ \hline \end{array}$$

$$\begin{array}{r} 8.321 \\ 12.4 \\ + .03 \\ \hline \end{array}$$

$$\begin{array}{r} \$ 1.26 \\ + 8. \\ \hline \end{array}$$

$$\begin{array}{r} 34.6 \\ + 12.234 \\ \hline \end{array}$$

To add these numbers, put extra zeros on the right as placeholders until each number shows the same number of decimal digits. Then add.

Here are the examples from the top of the page with the extra zeros. Now you can add.

$$\begin{array}{r} 3.40 \\ + 2.35 \\ \hline \end{array}$$

$$\begin{array}{r} 8.321 \\ 12.400 \\ + .030 \\ \hline \end{array}$$

$$\begin{array}{r} \$ 1.26 \\ + 8.00 \\ \hline \end{array}$$

$$\begin{array}{r} 34.600 \\ + 12.234 \\ \hline \end{array}$$

Put in the extra zeros as placeholders and then add.

$$\begin{array}{r} 7.20 \\ + 1.33 \\ \hline 8.53 \end{array}$$

$$\begin{array}{r} 4.1 \\ + 2.57 \\ \hline \end{array}$$

$$\begin{array}{r} 14.75 \\ + 3.5 \\ \hline \end{array}$$

$$\begin{array}{r} 9.2 \\ + 3.14 \\ \hline \end{array}$$

$$\begin{array}{r} 5.4 \\ + 2.36 \\ \hline \end{array}$$

$$\begin{array}{r} \$ 34.88 \\ + 5. \\ \hline \$ \end{array}$$

$$\begin{array}{r} 8.263 \\ + 0.19 \\ \hline \end{array}$$

$$\begin{array}{r} 2.1 \\ + 1.365 \\ \hline \end{array}$$

$$\begin{array}{r} 28.2 \\ + 5.008 \\ \hline \end{array}$$

$$\begin{array}{r} 6. \\ + 2.55 \\ \hline \end{array}$$

$$\begin{array}{r} .3 \\ + .8239 \\ \hline \end{array}$$

$$\begin{array}{r} 9.0994 \\ + 1.12 \\ \hline \end{array}$$

Putting extra zeros at the right of a decimal number, after the decimal point, doesn't change the value of the number.

Each addition problem below has been rewritten three ways. Only one of the ways is correct. When you rewrite an addition problem:

1. Line up the decimal points.
2. Copy the numbers exactly.

Cross out the two incorrect ways of rewriting each problem. Put in zeros as placeholders and add. Then write the answer after the original problem.

$$5.7 + 2.633 = \mathbf{8.333}$$

~~$$\begin{array}{r} 5.7 \\ + 2.633 \\ \hline \end{array}$$~~

$$\begin{array}{r} 5.700 \\ + 2.633 \\ \hline 8.333 \end{array}$$

~~$$\begin{array}{r} 5.7 \\ + 2.633 \\ \hline \end{array}$$~~

$$17.4 + 6.201 =$$

$$\begin{array}{r} 17.4 \\ + 6.201 \\ \hline \end{array}$$

$$\begin{array}{r} 17.4 \\ + 6.201 \\ \hline \end{array}$$

$$\begin{array}{r} 17.4 \\ + 6.201 \\ \hline \end{array}$$

$$13.264 + 2.5 =$$

$$\begin{array}{r} 13.264 \\ + 2.5 \\ \hline \end{array}$$

$$\begin{array}{r} 13.264 \\ + 2.5 \\ \hline \end{array}$$

$$\begin{array}{r} 13.264 \\ + 2.5 \\ \hline \end{array}$$

$$123.62 + 3. =$$

$$\begin{array}{r} 123.62 \\ + 3. \\ \hline \end{array}$$

$$\begin{array}{r} 123.62 \\ + 3. \\ \hline \end{array}$$

$$\begin{array}{r} 123.62 \\ + 3. \\ \hline \end{array}$$

$$5.86 + 1.3 =$$

$$\begin{array}{r} 5.86 \\ + .13 \\ \hline \end{array}$$

$$\begin{array}{r} 5.86 \\ + 1.3 \\ \hline \end{array}$$

$$\begin{array}{r} 5.86 \\ + 1.3 \\ \hline \end{array}$$

$$8.993 + .5 =$$

$$\begin{array}{r} 8.993 \\ + .5 \\ \hline \end{array}$$

$$\begin{array}{r} 8.993 \\ + .5 \\ \hline \end{array}$$

$$\begin{array}{r} 8.993 \\ + .5 \\ \hline \end{array}$$

$$42.7 + 7.63 =$$

$$\begin{array}{r} 42.7 \\ + 7.63 \\ \hline \end{array}$$

$$\begin{array}{r} 42.7 \\ + 7.63 \\ \hline \end{array}$$

$$\begin{array}{r} 42.7 \\ + 7.63 \\ \hline \end{array}$$

$$6.1 + .492 =$$

$$\begin{array}{r} 6.1 \\ + .492 \\ \hline \end{array}$$

$$\begin{array}{r} 6.1 \\ + .492 \\ \hline \end{array}$$

$$\begin{array}{r} 6.1 \\ + .492 \\ \hline \end{array}$$

$$4.125 + 7.62 =$$

$$\begin{array}{r} 4.125 \\ + 7.62 \\ \hline \end{array}$$

$$\begin{array}{r} 4.125 \\ + 7.62 \\ \hline \end{array}$$

$$\begin{array}{r} 4.125 \\ + .762 \\ \hline \end{array}$$

$$3.96 + 4. =$$

$$\begin{array}{r} 3.96 \\ + 4. \\ \hline \end{array}$$

$$\begin{array}{r} 3.96 \\ + 4. \\ \hline \end{array}$$

$$\begin{array}{r} 3.96 \\ + 4. \\ \hline \end{array}$$

To do each problem below:

1. Rewrite the problem in vertical form by lining up the decimal points and copying the numbers carefully.
2. Put zeros on the right so that each number shows the same number of decimal digits.
3. Add. Then write the answer after the original problem.

$4.32 + 1.8 = 6.12$

$$\begin{array}{r} 4.32 \\ + 1.80 \\ \hline 6.12 \end{array}$$

$87.9 + 2.17 =$

$8.1 + 6.43 =$

$5.62 + 6.1 =$

$3.68 + 5.4 =$

$5.714 + 2.3 =$

$56.9 + 2.831 =$

$4. + 3.999 =$

$7.44 + 3. =$

$3.8 + 5.66 =$

$7.311 + 2. + 4.2 =$

$7. + 3.4 + .88 =$

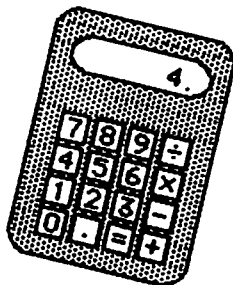
Adding Decimals and Whole Numbers

Whole numbers without decimal points can easily be written as decimal numbers. Just put a decimal point to the right of the whole number.

Whole numbers without decimal points.

4 = 4.
7 = 7.
25 = 25.
156 = 156.

Whole numbers with decimal points.



Electronic calculators usually display whole numbers with decimal points. If you push $\boxed{4}$ on a calculator, most calculators will display

$4.$

Write the whole numbers below as decimal numbers.

5 = **5.**

7 =

2 =

1 =

14 =

23 =

55 =

80 =

90 =

283 =

When you do an addition or subtraction problem that has a whole number written without a decimal point, you should put a decimal to the right of the whole number. That decimal point will help you rewrite the problem correctly in vertical form.

Each problem below has at least one whole number. Put a decimal point to the right of the whole number to express it as a decimal number. You don't have to add or subtract.

$4.2 + 3. =$	$12.6 + 7 =$	$\$9.22 + \$4 =$	$8 - 3.74 =$
$6.2 - 1 =$	$\$13 - \$8.44 =$	$5 + 3.006 =$	$9 - 2.1 =$
$25 + 20.5 =$	$527.5 + 136 =$	$7 + 8.66 + 2.4 + 1 =$	
$93 - 87.2 =$	$30.5 + 305 =$	$8.4 + 9 + 7.2 + 8 =$	
$42 - 4.2 =$	$\$100 - \$1.00 =$	$26.73 + 17 + 2.4 =$	
$6.8 + 608 =$	$.5 + 7 =$	$3 + 4 + 1.02 + 6 =$	

You must be very careful when a problem combines whole numbers and decimal numbers. Follow the steps below to add whole numbers and decimal numbers.

Problem	Step 1	Step 2	Step 3	Step 4
$8.71 + 5 =$	$8.71 + 5. =$	$\begin{array}{r} 8.71 \\ + 5. \\ \hline \end{array}$	$\begin{array}{r} 8.71 \\ + 5.00 \\ \hline \end{array}$	$\begin{array}{r} 8.71 \\ + 5.00 \\ \hline 13.71 \end{array}$
	Put a decimal point to the right of the whole number to express it as a decimal number.	Rewrite the problem vertically. Line up decimal points.	Put in zeros as placeholders.	Add.

Add. Make sure you put a decimal point to the right of each whole number.

$3.52 + 6. = 9.52$ $\begin{array}{r} 3.52 \\ + 6.00 \\ \hline 9.52 \end{array}$	$8.17 + 5. =$ $\begin{array}{r} 8.17 \\ 5. \end{array}$	$2.83 + 8 =$
$16.3 + 12 =$	$\$4.15 + \$3 =$	$6 + 5.8 =$
$\$6 + \$2.99 =$	$\$1 + \$0.01 =$	$125 + 96.8 =$
$2.164 + 3 + 4.2 =$	$\$7 + \$1.89 + \$5 =$	$13 + 8 + 17.6 =$

Add.

$7.83 + 4 =$

$3.45 + 2.7 =$

$8 + 19.2 =$

$16.11 + 3.4 =$

$15 + 142.99 =$

$9.3 + 8.442 =$

$7 + 1.508 =$

$\$100 + \$59.50 =$

$37.4 + .86 =$

$3.42 + 0.1 + 16 =$

$7 + .38 + 18.4 =$

$3.564 + 82 + 374.9 =$

Jack had \$7.43 in his pocket. His sister gave him \$4 more. Then he found \$.55 in a phone booth. How much money did he have altogether?

Jack had \$ _____ .

Subtracting Decimal Numbers

When subtracting decimal numbers, line up the decimal points just as you did with addition. Regroup just as you would with whole numbers.

Subtract.

$4.3 - 3.2 = 1.1$

$$\begin{array}{r} 4.3 \\ -3.2 \\ \hline 1.1 \end{array}$$

$7.4 - 2.1 =$

$16.25 - 8.11 =$

$7.32 - 1.61 = 5.71$

$$\begin{array}{r} 7.32 \\ -1.61 \\ \hline 5.71 \end{array}$$

$5.14 - 3.09 =$

$4.4 - 2.7 =$

$14.3 - 7.5 =$

$9.5 - 0.7 =$

$9.5 - .7 =$

$120.1 - 3.7 =$

$5.00 - 1.63 =$

Jessica had \$14.83 in her purse. She bought a present for her math teacher and spent \$6.42. How much did she have left?

$11.00 - 8.52 =$

$10.0 - .6 =$

She had \$ _____ left.

As in addition, when you subtract decimal numbers which do not have the same number of digits in their decimal parts, you must put extra zeros on the right as placeholders.

$$7.83 - 5.1 = 2.73$$

$$\begin{array}{r} 7.83 \\ - 5.10 \\ \hline 2.73 \end{array}$$

Put in zero as placeholder.

$$9.72 - 3.6 =$$

$$13.43 - 5.8 =$$

$$6.4 - 5.37 = 1.03$$

$$\begin{array}{r} 6.40 \\ - 5.37 \\ \hline 1.03 \end{array}$$

Put in zero as placeholder.

$$8.2 - 5.14 =$$

$$7.5 - 2.84 =$$

$$1.42 - 1.367 =$$

$$0.48 - 0.3 =$$

$$.361 - .08 =$$

$$5.3 - 1.04 =$$

$$5.3 - 1.004 =$$

$$13. - 2.6 =$$

$$12.5 - 8. =$$

$$\$3. - \$1.42 =$$

$$15. - .0001 =$$

Subtracting Decimal and Whole Numbers

If a subtraction problem has both a whole number and a decimal number, make sure you put a decimal point to the right of the whole number. Then you'll know how to line up the numbers when you rewrite the problem in vertical form.

$\$8.42 - \$4. = \mathbf{\$4.42}$ $\begin{array}{r} \$8.42 \\ - 4.00 \\ \hline \$4.42 \end{array}$	$\$7.36 - \$2 =$	$15.8 - 6 =$
$7. - 1.62 = \mathbf{5.38}$ $\begin{array}{r} 7.00 \\ - 1.62 \\ \hline 5.38 \end{array}$	$5 - 1.47 =$ <div style="border: 1px solid black; border-radius: 15px; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Don't make this mistake:</p> $\begin{array}{r} 1.47 \\ - 5 \\ \hline \end{array}$ <p>The first number belongs on top.</p> </div>	$2 - 1.6 =$
$12 - 2.54 =$	$\$18.10 - \$4 =$	$24.3 - 17 =$
$9.6 - 9 =$	<p>Pat had \$125 in her savings account. She withdrew \$43.25. How much was left?</p>	<p>Philip bought \$12.56 worth of groceries at the store. He paid with a \$20 bill. How much change should he get?</p>
$5 - .37 =$	<p>She had \$ _____ left.</p>	<p>He should get \$ _____ .</p>

Add or subtract.

$8.64 - 3.28 =$

$6.9 - 5.55 =$

$3 + 7.4 =$

$42 - 38.6 =$

$\$32 + \$25.98 =$

$8.1 + .004 =$

$17 - 15.2 =$

$17.2 - 15 =$

$9.653 - 9.6 =$

$4 + 3.8 + .46 =$

$70.1 - 9 =$

$\$100 - \$0.01 =$

Bubba is overweight. He weighs 114 kilograms. He should weigh no more than 83.4 kilograms. How much weight does Bubba need to lose?

Isabella bought two records for \$13.76. She paid with a \$20 bill. How much change should she get back?

Bubba should lose _____ kg.

Isabella should get \$ _____.

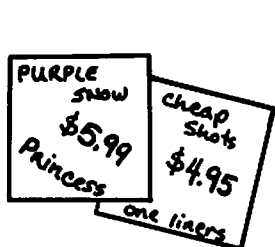
In each problem below, first add to find the total amount of the purchase. Write the total on the cash register display. Then subtract to find the change from the bills shown. Write that amount on the register display also.

You buy:

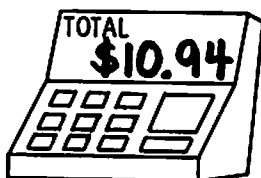
You pay:

You pay with:

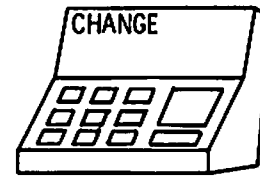
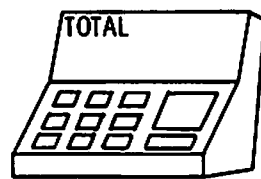
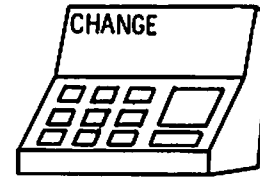
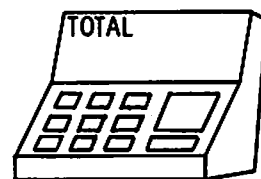
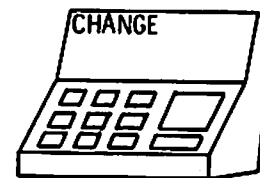
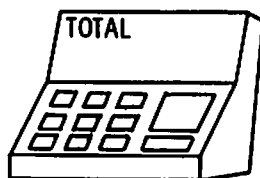
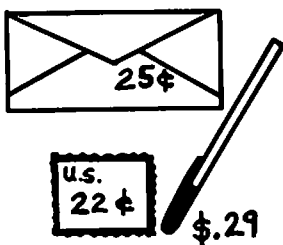
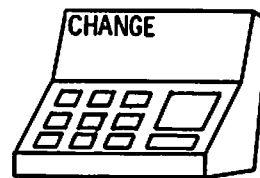
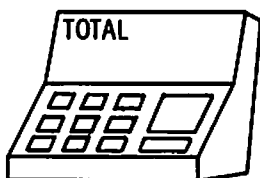
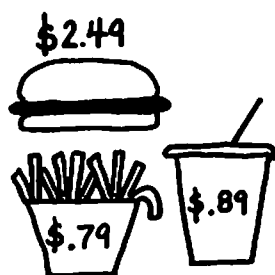
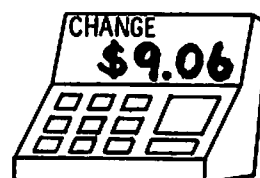
Your change:



$$\begin{array}{r} \overset{1}{5}.\overset{1}{9}9 \\ + 4.95 \\ \hline 10.94 \end{array}$$



$$\begin{array}{r} 20.00 \\ - 10.94 \\ \hline 9.06 \end{array}$$



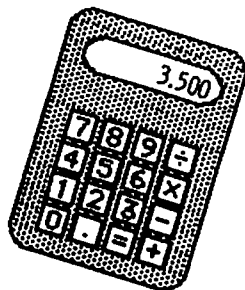
Simplifying Decimal Numbers

Putting extra zeros at the end of a decimal number, after the decimal point, doesn't change the value of the number. Removing extra zeros doesn't change the value of the number either as long as the zeros are after the decimal point and at the end of the number.

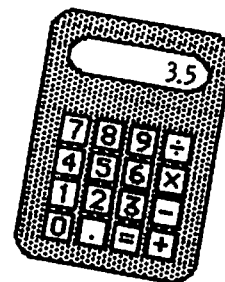
The simplest form of a decimal number has no extra zeros at the end after the decimal point.

Electronic calculators will always shorten a decimal number to its simplest form by removing any extra zeros.

Put a decimal number with extra zeros on the display of a calculator.



Then press \square . The calculator will remove the extra zeros and display the number in simplest form.



Remove extra zeros and write each decimal number below in simplest form. You might try this on a calculator if you have one.

$$8.24\cancel{0} = \mathbf{8.24}$$

$$5.20 =$$

$$26.40 =$$

$$3.400 =$$

$$16.500 =$$

$$183.550 =$$

$$17.6900 =$$

$$253.30 =$$

$$3.770000 =$$

Be careful below when you simplify. You can only remove zeros if they come after the decimal point and at the end. A few of the numbers below can't be simplified.

$$50.\cancel{00} = \mathbf{50.}$$

$$30.00 =$$

$$920.0 =$$

$$70.00 =$$

$$27.000 =$$

$$31.01 = \mathbf{31.01}$$

$$100.00 =$$

$$10.00 =$$

$$1.00 =$$

$$5.00300 =$$

$$9.06 =$$

$$820.040 =$$

$$16.01000 =$$

$$700. =$$

$$0.00500 =$$

$$2000 =$$

$$2.000 =$$

$$200.0 =$$

Add or subtract. Remove extra zeros to express your answer in simplest form.

$7.436 + 1.864 = 9.3$

$$\begin{array}{r} \overset{\cdot}{7}.\overset{\cdot}{4}\overset{\cdot}{3}6 \\ + 1.\overset{\cdot}{8}\overset{\cdot}{6}4 \\ \hline 9.3\cancel{00} \end{array}$$

$5.381 + 2.519 =$

$7.65 + 5.05 =$

$34.62 + 21.38 =$

$23.52 - 1.02 =$

$3.288 - 0.288 =$

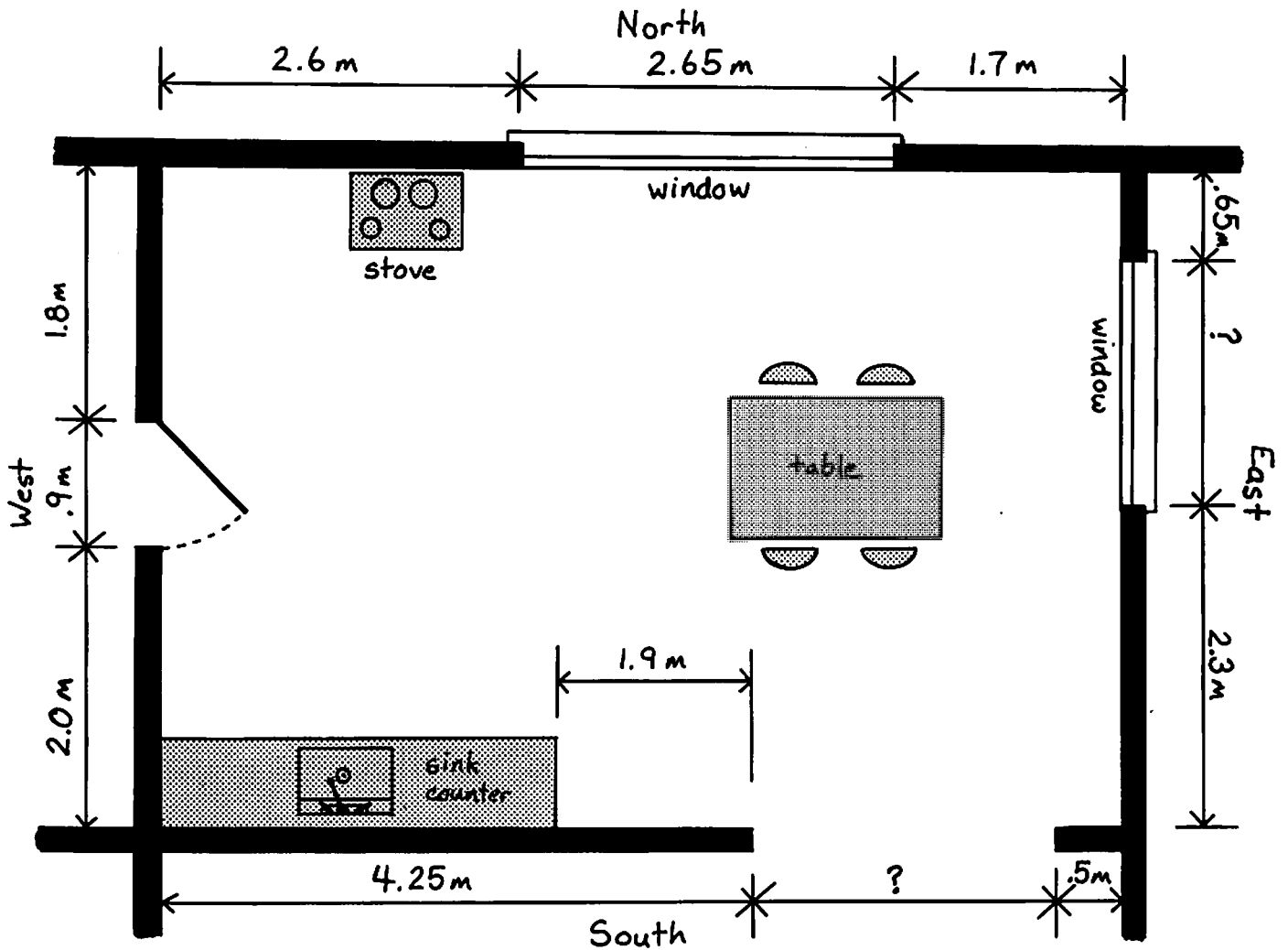
$7.371 - 4.671 =$

$2.53 + 8.6 + 1.87 =$

$5 + 2.9 + 3.1 =$

$3.742 + 16 + 0.258 =$

Picture Problems



How long is the room?
(Add the lengths on the north wall.)

_____ m

How wide is the room?
(Add the lengths on the west wall.)

_____ m

How long is the counter with the sink?
(Subtract.)

_____ m

How wide is the opening into the room on the south wall?

(You need to use the answer above.)

_____ m

How wide is the large window on the east wall?

_____ m

What is the perimeter of the room?

(The perimeter is the distance all the way around the room.)

_____ m

Counting Decimal Digits

Before you can multiply decimal numbers, you must easily be able to count the number of digits in a decimal number. The decimal digits in a number are the digits to the right of the decimal point.

4.63 4.63 has two decimal digits.

4.63 = $4\frac{63}{100}$ The decimal digits name hundredths.

54.608	has <u>3</u> decimal digits.	They name <u>thousandths</u>
7.15	has <u> </u> decimal digits.	They name <u>hundredths</u>
396.2	has <u> </u> decimal digit.	It names <u>tenths</u>
8.643	has <u> </u> decimal digits.	They name <u> </u>
3.9	has <u> </u> decimal digit.	It names <u> </u>
2.47	has <u> </u> decimal digits.	They name <u> </u>
.7	has <u> </u> decimal digit.	It names <u> </u>
.63	has <u> </u> decimal digits.	They name <u> </u>

Count the decimal digits.

.3	<input type="radio"/>	decimal digit	2.0	<input type="radio"/>	decimal digit
.34	<input type="radio"/>	decimal digits	2.00	<input type="radio"/>	decimal digits
.348	<input type="radio"/>	decimal digits	2.000	<input type="radio"/>	decimal digits
.348273	<input type="radio"/>	decimal digits	8.	<input checked="" type="radio"/>	decimal digits
555.05	<input type="radio"/>	decimal digits	7.	<input type="radio"/>	decimal digits
0.0001	<input type="radio"/>	decimal digits	26.	<input type="radio"/>	decimal digits
.1008	<input type="radio"/>	decimal digits	9	<input type="radio"/>	decimal digits
1.008	<input type="radio"/>	decimal digits	.9	<input type="radio"/>	decimal digit
10.08	<input type="radio"/>	decimal digits	.09	<input type="radio"/>	decimal digits

Count decimal digits. Do not multiply.

$$\begin{array}{r} 3.06 \\ \times .4 \\ \hline \end{array}$$

decimal digits
 decimal digit

$$\begin{array}{r} 14.2 \\ \times .6 \\ \hline \end{array}$$

decimal digit
 decimal digit

$$\begin{array}{r} 8.546 \\ \times 3.1 \\ \hline \end{array}$$

decimal digits
 decimal digit

$$\begin{array}{r} .0003 \\ \times .65 \\ \hline \end{array}$$

decimal digits
 decimal digits

$$\begin{array}{r} 23.11 \\ \times 5 \\ \hline \end{array}$$

decimal digits
 decimal digits

$$\begin{array}{r} 823.9 \\ \times 2 \\ \hline \end{array}$$

decimal digit
 decimal digits

Put a decimal point in each number so that it shows the correct number of decimal digits.

1.453 3 decimal digits

1453 2 decimal digits

820347 4 decimal digits

820347 2 decimal digits

820347 3 decimal digits

820347 1 decimal digit

820347 0 decimal digits

820347 6 decimal digits

820347 5 decimal digits

1453 1 decimal digit

1453 4 decimal digits

30992 0 decimal digits

30992 1 decimal digit

30992 2 decimal digits

30992 3 decimal digits

30992 4 decimal digits

30992 5 decimal digits

30992 6 decimal digits

Multiplying Decimals by Whole Numbers

Multiplying a decimal number by a whole number can be thought of as repeated addition.

$$\begin{array}{r} 3.1 \\ +3.1 \\ \hline 6.2 \end{array} \Rightarrow \begin{array}{r} 3.1 \\ \times 2 \\ \hline 6.2 \end{array}$$

$$\begin{array}{r} 2.13 \\ 2.13 \\ 2.13 \\ 2.13 \\ +2.13 \\ \hline 10.65 \end{array} \Rightarrow \begin{array}{r} 2.13 \\ \times 5 \\ \hline 10.65 \end{array}$$

$$\begin{array}{r} .143 \\ .143 \\ +.143 \\ \hline .429 \end{array} \Rightarrow \begin{array}{r} .143 \\ \times 3 \\ \hline .429 \end{array}$$

Add to find the answer to the multiplication problem.

$$\begin{array}{r} 1.2 \\ 1.2 \\ +1.2 \\ \hline \end{array} \Rightarrow \begin{array}{r} 1.2 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 2.94 \\ +2.94 \\ \hline \end{array} \Rightarrow \begin{array}{r} 2.94 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 3.26 \\ 3.26 \\ 3.26 \\ +3.26 \\ \hline \end{array} \Rightarrow \begin{array}{r} 3.26 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} .231 \\ .231 \\ .231 \\ .231 \\ .231 \\ +.231 \\ \hline \end{array} \Rightarrow \begin{array}{r} .231 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 2.5 \\ 2.5 \\ 2.5 \\ 2.5 \\ +2.5 \\ \hline \end{array} \Rightarrow \begin{array}{r} 2.5 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 4.187 \\ +4.187 \\ \hline \end{array} \Rightarrow \begin{array}{r} 4.187 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 1.5 \\ 1.5 \\ 1.5 \\ 1.5 \\ 1.5 \\ +1.5 \\ \hline \end{array} \Rightarrow \begin{array}{r} 1.5 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 2.23 \\ 2.23 \\ 2.23 \\ +2.23 \\ \hline \end{array} \Rightarrow \begin{array}{r} 2.23 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 12.5 \\ 12.5 \\ 12.5 \\ 12.5 \\ 12.5 \\ +12.5 \\ \hline \end{array} \Rightarrow \begin{array}{r} 12.5 \\ \times 7 \\ \hline \end{array}$$

Here's a quicker way to multiply a decimal number by a whole number.
To multiply a decimal number by a whole number:

1. Multiply the numbers as if they were whole numbers.
2. Count the decimal digits in the decimal factor.
3. Place a decimal point in the answer so that it shows as many decimal digits as the decimal factor.

$\begin{array}{r} 1.4 \\ \times 3 \\ \hline 4.2 \end{array}$ <p><input checked="" type="radio"/> 1 decimal digit</p> <p><input checked="" type="radio"/> 1 decimal digit</p>	$\begin{array}{r} 2.9 \\ \times 2 \\ \hline \end{array}$ <p><input checked="" type="radio"/> 1 decimal digit</p> <p><input checked="" type="radio"/> 1 decimal digit</p>	$\begin{array}{r} .32 \\ \times 4 \\ \hline \end{array}$ <p><input checked="" type="radio"/> 2 decimal digits</p> <p><input checked="" type="radio"/> 2 decimal digits</p>
$\begin{array}{r} .21 \\ \times 6 \\ \hline \end{array}$ <p><input type="radio"/> decimal digits</p> <p><input type="radio"/> decimal digits</p>	$\begin{array}{r} 14.3 \\ \times 2 \\ \hline \end{array}$ <p><input type="radio"/> decimal digit</p> <p><input type="radio"/> decimal digit</p>	$\begin{array}{r} 1.43 \\ \times 2 \\ \hline \end{array}$ <p><input type="radio"/> decimal digits</p> <p><input type="radio"/> decimal digits</p>
$\begin{array}{r} .475 \\ \times 7 \\ \hline \end{array}$ <p><input type="radio"/> decimal digits</p> <p><input type="radio"/> decimal digits</p>	$\begin{array}{r} .03 \\ \times 8 \\ \hline \end{array}$ <p><input type="radio"/> decimal digits</p> <p><input type="radio"/> decimal digits</p>	$\begin{array}{r} 3.008 \\ \times 3 \\ \hline \end{array}$ <p><input type="radio"/> decimal digits</p> <p><input type="radio"/> decimal digits</p>

Multiply. Count decimal digits in your head but don't forget to put a decimal point in each answer.

$\begin{array}{r} 2.1 \\ \times 9 \\ \hline 18.9 \end{array}$ <p>1 decimal digit</p> <p>1 decimal digit</p>	$\begin{array}{r} .15 \\ \times 4 \\ \hline \end{array}$ <p>2 decimal digits</p> <p>2 decimal digits</p>	$\begin{array}{r} 3.21 \\ \times 6 \\ \hline \end{array}$	$\begin{array}{r} 4.4 \\ \times 8 \\ \hline \end{array}$	$\begin{array}{r} .264 \\ \times 7 \\ \hline \end{array}$ <p>3 decimal digits</p> <p>3 decimal digits</p>
---	--	---	--	---

$\begin{array}{r} .32 \\ \times 5 \\ \hline \end{array}$	$\begin{array}{r} 3.2 \\ \times 5 \\ \hline \end{array}$	$\begin{array}{r} .032 \\ \times 5 \\ \hline \end{array}$	$\begin{array}{r} 81.6 \\ \times 7 \\ \hline \end{array}$	$\begin{array}{r} 8.16 \\ \times 7 \\ \hline \end{array}$
--	--	---	---	---

Multiply. Don't forget to put a decimal point in each answer.

$$\begin{array}{r} 4.4 \\ \times 11 \\ \hline 44 \\ 440 \\ \hline 48.4 \end{array}$$

1 decimal digit.

Don't put decimal points in these partial products.

1 decimal digit.

$$\begin{array}{r} .31 \\ \times 15 \\ \hline 155 \\ 310 \\ \hline 4.65 \end{array}$$

2 decimal digits

2 decimal digits

$$\begin{array}{r} .24 \\ \times 32 \\ \hline \end{array}$$

$$\begin{array}{r} 3.1 \\ \times 22 \\ \hline \end{array}$$

$$\begin{array}{r} .41 \\ \times 15 \\ \hline \end{array}$$

$$\begin{array}{r} 30.7 \\ \times 12 \\ \hline \end{array}$$

$$\begin{array}{r} .05 \\ \times 91 \\ \hline \end{array}$$

$$\begin{array}{r} 1.02 \\ \times 75 \\ \hline \end{array}$$

$$\begin{array}{r} .25 \\ \times 40 \\ \hline \end{array}$$

$$\begin{array}{r} 2.5 \\ \times 40 \\ \hline \end{array}$$

$$\begin{array}{r} .256 \\ \times 16 \\ \hline \end{array}$$

$$\begin{array}{r} .125 \\ \times 80 \\ \hline \end{array}$$

$$\begin{array}{r} 53.6 \\ \times 22 \\ \hline \end{array}$$

$$\begin{array}{r} 4.50 \\ \times 24 \\ \hline \end{array}$$

$$\begin{array}{r} .33 \\ \times 10 \\ \hline \end{array}$$

$$\begin{array}{r} 3.3 \\ \times 10 \\ \hline \end{array}$$

You might want to rewrite these in vertical form before you multiply. You do not need to line up the decimal points - that's only for addition and subtraction.

$6.2 \times 4 = 24.8$

$$\begin{array}{r} 6.2 \\ \times 4 \\ \hline 24.8 \end{array}$$

You don't need to line up decimal points when you multiply.

$7.38 \times 3 =$

$16.2 \times 10 =$

$2.14 \times 2 =$

$.49 \times 5 =$

$16.2 \times 100 =$

$2.41 \times 12 =$

$3.216 \times 4 =$

$16.2 \times 1000 =$

$7.8 \times 22 =$

$96.3 \times 54 =$

Felicia is a carpenter. She makes \$16.45 per hour and she works 8 hours per day. How much money does she make per day?

Felicia makes \$ _____ per day.

Joe is a plumber. He makes \$13.50 per hour and he works 36 hours per week. How much money does he make per week?

Joe makes \$ _____ per week.

Multiplying by 10, 100 or 1000

Multiply. Remove extra zeros to express each answer in simplest form.

$2.3 \times 10 = \mathbf{23.}$ $\begin{array}{r} 2.3 \\ \times 10 \\ \hline 00 \\ 230 \\ \hline 23.\cancel{0} \end{array}$	$6.9 \times 10 =$	$12.4 \times 10 =$	$.74 \times 10 =$
$5.31 \times 10 =$	$.306 \times 10 =$	$2.54 \times 10 =$	$32. \times 10 =$

Perhaps you see an easy way to multiply by ten. If you see it, you can do problems below in your head. If you don't see it, do them on scratch paper.

$4.9 \times 10 =$	$17.3 \times 10 =$	$22.1 \times 10 =$	$51. \times 10 =$
$1.58 \times 10 =$	$.15 \times 10 =$	$.742 \times 10 =$	$23 \times 10 =$
3.14×100	$31.59 \times 100 =$	$22.1 \times 100 =$	

Do the problems below in your head or on scratch paper.

$1.72 \times 100 =$	$.386 \times 100 =$	$1.475 \times 100 =$
$2.43 \times 100 =$	$3.50 \times 100 =$	$3.5 \times 100 =$

Here's a shortcut for multiplying decimal numbers by 10, 100 or 1000.

Multiplying by 10

Move the decimal point one place right.

$$2.3 \times 10 = 23.$$

$$14.06 \times 10 = 140.6$$

$$74. \times 10 = 740.$$

Multiplying by 100

Move the decimal point two places right.

$$3.14 \times 100 = 314.$$

$$.031 \times 100 = 3.1$$

$$6.5 \times 100 = 650.$$

Multiplying by 1000

Move the decimal point three places right.

$$6.475 \times 1000 = 6475.$$

$$7.6031 \times 1000 = 7603.1$$

$$19.2 \times 1000 = 19200.$$

Use the shortcut to multiply by 10, 100 or 1000.

$$3.75 \times 10 =$$

$$8.326 \times 100 =$$

$$.6321 \times 1000 =$$

$$5.6 \times 10 =$$

$$14.2 \times 100 =$$

$$100.56 \times 1000 =$$

$$7.4 \times 10 =$$

$$2.57 \times 100 =$$

$$2.387 \times 1000 =$$

$$12.01 \times 10 =$$

$$.0682 \times 100 =$$

$$0.3468 \times 1000 =$$

$$.479 \times 10 =$$

$$.479 \times 100 =$$

$$.479 \times 1000 =$$

$$4.79 \times 10 =$$

$$4.79 \times 100 =$$

$$4.79 \times 1000 =$$

$$47.9 \times 10 =$$

$$47.9 \times 100 =$$

$$47.9 \times 1000 =$$

$$479. \times 10 =$$

$$479. \times 100 =$$

$$479. \times 1000 =$$

Try these. (Hint: The number of zeros tells you how many places to move the decimal point.) Use scratch paper if you need it.

$$3.14159 \times 100,000 =$$

$$15.68327 \times 100,000 =$$

$$.479 \times 10,000 =$$

$$5.2 \times 1,000,000 =$$

Picturing Multiplication

Do you remember how to multiply common fractions? Just multiply the numerators together and then multiply the denominators together.

Multiply.

$$\frac{3}{10} \times \frac{7}{10} = \frac{21}{100}$$

$$\frac{2}{10} \times \frac{8}{10} =$$

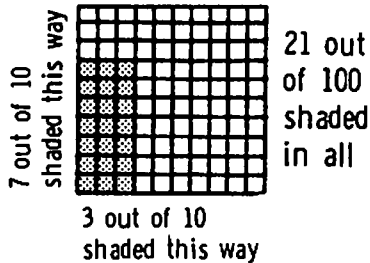
$$\frac{3}{10} \times \frac{32}{10} =$$

$$\frac{6}{10} \times \frac{9}{10} =$$

$$\frac{1}{10} \times \frac{9}{10} =$$

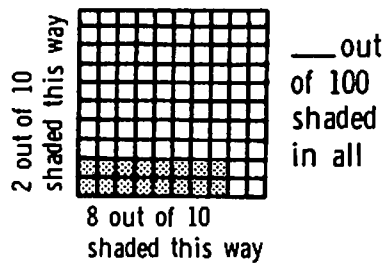
$$\frac{8}{100} \times \frac{8}{100} =$$

Six multiplication problems are pictured below. Use common fractions and decimal fractions to write each problem. Then multiply.



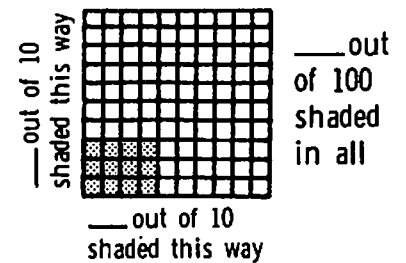
$$\frac{7}{10} \times \frac{3}{10} = \frac{21}{100}$$

$$.7 \times .3 = .21$$



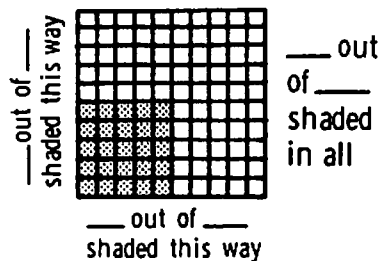
$$\frac{2}{10} \times \frac{8}{10} =$$

$$.2 \times .8 =$$



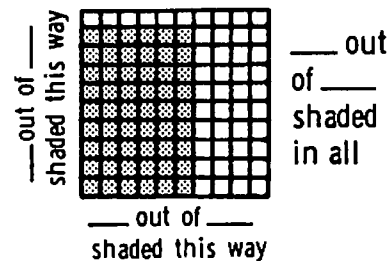
$$\frac{1}{10} \times \frac{10}{10} = \frac{10}{100}$$

$$x =$$



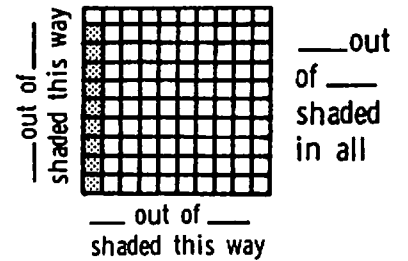
$$\frac{\quad}{\quad} \times \frac{\quad}{\quad} =$$

$$x =$$



$$\frac{\quad}{\quad} \times \frac{\quad}{\quad} =$$

$$x =$$



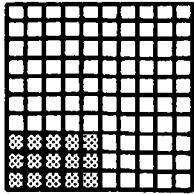
$$\frac{\quad}{\quad} \times \frac{\quad}{\quad} =$$

$$x =$$

Multiply. Then shade each square to picture the multiplication.

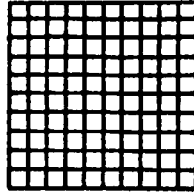
$$\frac{3}{10} \times \frac{5}{10} = \frac{15}{100}$$

$$.3 \times .5 = .15$$



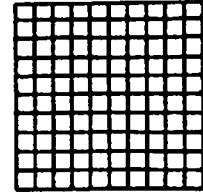
$$\frac{4}{10} \times \frac{6}{10} =$$

$$.4 \times .6 =$$



$$\frac{2}{10} \times \frac{3}{10} =$$

$$.2 \times .3 =$$



Multiply the decimal numbers below without using common fractions or pictures.

$$.7 \times .5 = .35$$

$$.4 \times .8 =$$

$$\begin{array}{r} .7 \\ \times .6 \\ \hline \end{array}$$

$$\begin{array}{r} .4 \\ \times .8 \\ \hline \end{array}$$

$$\begin{array}{r} .8 \\ \times .2 \\ \hline \end{array}$$

$$.9 \times .4 =$$

$$.6 \times .5 =$$

Be careful on these!

$$\frac{7}{10} \times \frac{1}{10} = \frac{7}{100}$$

$$.7 \times .1 = .07$$

$$\frac{1}{10} \times \frac{1}{10} = \frac{1}{100}$$

$$.1 \times .1 =$$

$$\begin{array}{r} .4 \\ \times .2 \\ \hline \end{array}$$

$$\begin{array}{r} .3 \\ \times .3 \\ \hline \end{array}$$

$$\begin{array}{r} .5 \\ \times .1 \\ \hline \end{array}$$

Common fractions can help you multiply decimal fractions with more than one decimal digit.

Multiply the common fractions. Then rewrite the answer as a decimal fraction to express the product of the decimals.

$$\frac{51}{100} \times \frac{3}{10} = \frac{153}{1000}$$

$$.51 \times .3 = .153$$

$$\frac{4}{10} \times \frac{42}{100} =$$

$$.4 \times .42 =$$

$$\frac{2}{10} \times \frac{534}{1000} =$$

$$.2 \times .534 =$$

$$\frac{7}{10} \times \frac{5}{10} =$$

$$.7 \times .5 =$$

$$\frac{21}{100} \times \frac{6}{10} =$$

$$.21 \times .6 =$$

$$\frac{42}{100} \times \frac{33}{100} =$$

$$.42 \times .33 =$$

Multiplying Decimals

Below are the last three problems from the last page written in vertical form.

$$\begin{array}{r} .7 \quad 1 \text{ decimal digit} \\ \times .5 \quad 1 \text{ decimal digit} \\ \hline .35 \quad 2 \text{ decimal digits} \end{array}$$

$$\begin{array}{r} .21 \quad 2 \text{ decimal digits} \\ \times .6 \quad 1 \text{ decimal digit} \\ \hline .126 \quad 3 \text{ decimal digits} \end{array}$$

$$\begin{array}{r} .42 \quad 2 \text{ decimal digits} \\ \times .33 \quad 2 \text{ decimal digits} \\ \hline 126 \\ \hline 1260 \\ \hline .1386 \quad 4 \text{ decimal digits} \end{array}$$

These problems illustrate a very important rule for multiplying decimal numbers.

Whenever you multiply decimal numbers, the total number of decimal digits in the factors (numbers you're multiplying) equals the number of decimal digits in the product (answer).

Put the decimal point where it belongs in each product below. First count the decimal digits in the factors, then add to find the total. Finally put the decimal point in the product to show the total number of decimal digits.

$$\begin{array}{r} \overset{2}{1}.\overset{2}{2}3 \\ \times .9 \\ \hline 1.\overset{2}{1}07 \end{array}$$

2 decimal digits
 1 decimal digit
 3 total decimal digits

$$\begin{array}{r} 4.2 \\ \times .7 \\ \hline 294 \end{array}$$

decimal digit
 decimal digit
 total decimal digits

$$\begin{array}{r} 4.\overset{1}{0}8 \\ \times .2 \\ \hline 816 \end{array}$$

decimal digits
 decimal digit
 total decimal digits

$$\begin{array}{r} \overset{2}{4}71 \\ \times .3 \\ \hline 1413 \end{array}$$

decimal digits
 decimal digit
 total decimal digits

$$\begin{array}{r} \overset{1}{2}\overset{3}{3}9 \\ \times .4 \\ \hline 956 \end{array}$$

decimal digits
 decimal digit
 total decimal digits

$$\begin{array}{r} \overset{3}{.}75 \\ \times 7 \\ \hline 525 \end{array}$$

decimal digits
 decimal digits
 total decimal digits

$$\begin{array}{r} 2.346 \\ \times .15 \\ \hline 11730 \\ 23460 \\ \hline 35190 \end{array}$$

decimal digits
 decimal digits
 total decimal digits

$$\begin{array}{r} 8.46 \\ \times 2.2 \\ \hline 1692 \\ 16920 \\ \hline 18612 \end{array}$$

decimal digits
 decimal digits
 total decimal digits

In each problem below, you must first multiply the numbers. Then count the decimal digits in the factors, find the total and put the decimal point in your answer.

$$\begin{array}{r} 3.62 \\ \times .5 \\ \hline 1.810 \end{array}$$

2 decimal digits
 1 decimal digit
 3 total

$$\begin{array}{r} 2.4 \\ \times .3 \\ \hline \end{array}$$

decimal digit
 decimal digit
 total

$$\begin{array}{r} .35 \\ \times .7 \\ \hline \end{array}$$

decimal digits
 decimal digit
 total

$$\begin{array}{r} 42.8 \\ \times .6 \\ \hline \end{array}$$

decimal digit
 decimal digit
 total

$$\begin{array}{r} .61 \\ \times .2 \\ \hline \end{array}$$

decimal digits
 decimal digit
 total

$$\begin{array}{r} .078 \\ \times 5 \\ \hline \end{array}$$

decimal digits
 decimal digits
 total

$$\begin{array}{r} 5.02 \\ \times 2.1 \\ \hline 502 \\ 10040 \\ \hline 10.542 \end{array}$$

2 decimal digits
 1 decimal digit
 3 total

$$\begin{array}{r} .234 \\ \times 1.5 \\ \hline \end{array}$$

decimal digits
 decimal digit
 total

$$\begin{array}{r} 35 \\ \times .09 \\ \hline \end{array}$$

decimal digits
 decimal digits
 total

$$\begin{array}{r} 7.4 \\ \times .8 \\ \hline \end{array}$$

total

$$\begin{array}{r} .37 \\ \times .5 \\ \hline \end{array}$$

total

$$\begin{array}{r} 1.46 \\ \times 3 \\ \hline \end{array}$$

total

$$\begin{array}{r} 8.06 \\ \times .6 \\ \hline \end{array}$$

total

Multiply. Make sure to put the decimal point in each answer.

$$\begin{array}{r} 5.07 \\ \times .6 \\ \hline \end{array}$$

total

$$\begin{array}{r} 328 \\ \times .2 \\ \hline \end{array}$$

total

$$\begin{array}{r} .537 \\ \times .6 \\ \hline \end{array}$$

total

$$\begin{array}{r} 473. \\ \times .9 \\ \hline \end{array}$$

total

$$\begin{array}{r} 9.56 \\ \times .11 \\ \hline \end{array}$$

total

$$\begin{array}{r} 3.4 \\ \times .61 \\ \hline \end{array}$$

total

$$\begin{array}{r} .644 \\ \times .22 \\ \hline \end{array}$$

total

total

total

total

Multiply. Count the decimal digits in both factors but only write the total.

$$\begin{array}{r} 1.07 \\ \times .6 \\ \hline \end{array}$$

total

$$\begin{array}{r} 1.07 \\ \times 6. \\ \hline \end{array}$$

total

$$\begin{array}{r} 10.7 \\ \times .6 \\ \hline \end{array}$$

total

$$\begin{array}{r} .4302 \\ \times .8 \\ \hline \end{array}$$

total

$$\begin{array}{r} 18.3 \\ \times 32 \\ \hline \end{array}$$

total

$$\begin{array}{r} .404 \\ \times 1.3 \\ \hline \end{array}$$

total

$$\begin{array}{r} 4.362 \\ \times .53 \\ \hline \end{array}$$

total

total

total

total

Multiply. Count decimal digits in your head but don't forget to put a decimal point in each product.

$$\begin{array}{r} 2.6 \\ \times .3 \\ \hline \end{array}$$

.78

$$\begin{array}{r} 8.1 \\ \times .5 \\ \hline \end{array}$$

$$\begin{array}{r} .96 \\ \times .2 \\ \hline \end{array}$$

$$\begin{array}{r} .75 \\ \times 8 \\ \hline \end{array}$$

Multiply

$$\begin{array}{r} \$3.65 \\ \times \quad 8 \\ \hline \end{array}$$

$$\begin{array}{r} 23.4 \\ \times \quad .7 \\ \hline \end{array}$$

$$\begin{array}{r} 8.06 \\ \times \quad .1 \\ \hline \end{array}$$

$$\begin{array}{r} 806 \\ \times \quad .2 \\ \hline \end{array}$$

$$\begin{array}{r} 3.3 \\ \times \quad 5 \\ \hline \end{array}$$

$$\begin{array}{r} 40. \\ \times \quad .9 \\ \hline \end{array}$$

$$\begin{array}{r} 2.46 \\ \times \quad .3 \\ \hline \end{array}$$

$$\begin{array}{r} .473 \\ \times \quad .7 \\ \hline \end{array}$$

$$\begin{array}{r} .888 \\ \times \quad .3 \\ \hline \end{array}$$

$$\begin{array}{r} 8.88 \\ \times \quad .3 \\ \hline \end{array}$$

$$\begin{array}{r} 88.8 \\ \times \quad .3 \\ \hline \end{array}$$

$$\begin{array}{r} 888 \\ \times \quad .3 \\ \hline \end{array}$$

$$\begin{array}{r} .437 \\ \times \quad 19 \\ \hline \end{array}$$

$$\begin{array}{r} .437 \\ \times \quad 1.9 \\ \hline \end{array}$$

$$\begin{array}{r} \$3.06 \\ \times \quad 25 \\ \hline \end{array}$$

$$\begin{array}{r} 4.53 \\ \times \quad .06 \\ \hline \end{array}$$

$$\begin{array}{r} 85 \\ \times \quad .24 \\ \hline \end{array}$$

$$\begin{array}{r} 6.6 \\ \times \quad .52 \\ \hline \end{array}$$

$$\begin{array}{r} 1.93 \\ \times \quad 7.4 \\ \hline \end{array}$$

$$\begin{array}{r} 4.41 \\ \times \quad .35 \\ \hline \end{array}$$

Multiply. Remove extra zeros to express each answer in simplest form if possible. Watch out on the problems involving money. Remember that change is always shown with two decimal digits.

$45.6 \times .25 = 11.4$

$$\begin{array}{r}
 \overset{.}{4}\overset{.}{5}\overset{.}{6} \\
 \times \overset{.}{2}\overset{.}{5} \\
 \hline
 2280 \\
 9120 \\
 \hline
 11.400
 \end{array}$$

$.8 \times 3.25 =$

$2.05 \times 5.4 =$

$18.6 \times 5 =$

$1.3 \times 7.02 =$

$.8 \times 1.25 =$

$\$3.78 \times 20 =$

$\$7.50 \times 1.5 =$

$\$750 \times 1.5 =$

Sandra took her family out for dinner. Their meal cost \$46.80 without tax or tip. The waiter multiplied the cost by .05 (five percent) to find the tax. What was the tax on the meal?

The tax was \$_____.

Sandra left the waiter a tip. She multiplied the cost of the meal by .15 (fifteen percent) to find out how much to leave. How much was the tip?

The tip was \$_____.

Add the meal, tax and tip to find how much it cost Sandra to take her family out.

It cost Sandra \$_____.

Solve. Then answer each question in a sentence.

A bricklayer earns \$17.50 per hour. How much will the bricklayer earn in an 8 hour work day?

The bricklayer earns \$ _____ each day.

John wants to sew a jacket for himself. He needs 1.8 meters of fabric. The fabric costs \$4.25 per meter. What is the total cost of the fabric?

The fabric costs \$ _____.

Isabella bought 1.1 kilograms of top quality hamburger meat at \$5.00 per kilogram. How much did it cost?

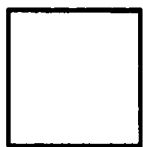
The hamburger meat cost \$ _____.

A certain kind of rope costs \$.21 per meter. How much will 75 meters cost? (Answer in a sentence.)

Unleaded gasoline costs \$.36 per liter at Zelda's gas station. Aaron bought 40.5 liters. How much did he pay?

There are 2 liters of milk in a large size carton. Dana drank 3.25 large cartons last week. How many liters did Dana drink last week?

Four multiplication problems are pictured below. Each large square represents one whole unit.



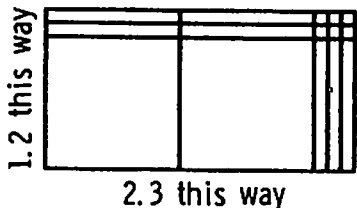
one whole unit



one tenth

□ one hundredth

Count the whole units, tenths and hundredths in each picture. Then write the total as a decimal number. Finally, multiply to check your answer.

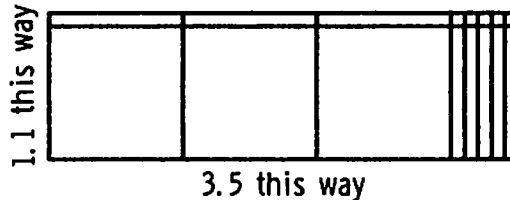


check

How many?

whole units 2
 tenths 7
 hundredths 6
 total 2.76

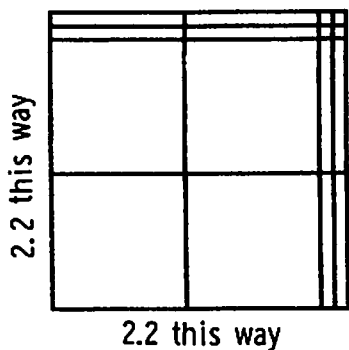
$$\begin{array}{r} 2.3 \\ \times 1.2 \\ \hline 46 \\ 230 \\ \hline 2.76 \end{array}$$



check

How many?

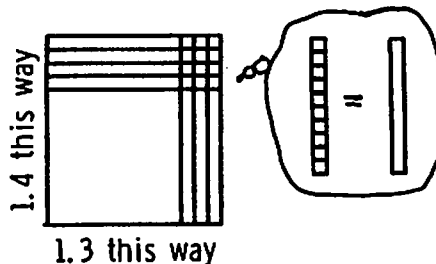
whole units _____
 tenths _____
 hundredths _____
 total _____



check

How many?

whole units _____
 tenths _____
 hundredths _____
 total _____



check

How many?

whole units _____
 tenths _____
 hundredths _____
 total _____

Be careful!

Zero as a Placeholder in Multiplication

Pat started the problem below but got stuck. Can you see why Pat had trouble?

$$\begin{array}{r} .34 \\ \times .2 \\ \hline 68 \end{array}$$

2 decimal digits
 1 decimal digit
 3 total decimal digits

Pat needed to show three decimal digits in the answer but the answer had only two digits.

Sandy said, "Think about how the problem would look if you used common fractions instead of decimal fractions. That will help you find the answer."

$$\frac{34}{100} \times \frac{2}{10} = \frac{68}{1000} \quad \Rightarrow \quad .34 \times .2 = .068 \quad \Rightarrow \quad \begin{array}{r} .34 \\ \times .2 \\ \hline .068 \end{array}$$

Here's another way you can finish multiplication problems when you find you need more decimal digits in the answer.

Problem

$$\begin{array}{r} .34 \\ \times .2 \\ \hline \end{array}$$

Step 1

$$\begin{array}{r} .34 \\ \times .2 \\ \hline 68 \end{array}$$

Multiply.

Step 2

$$\begin{array}{r} .34 \\ \times .2 \\ \hline 068 \end{array}$$

Put one or more zeros on the left side of the answer as placeholders.

Step 3

$$\begin{array}{r} .34 \\ \times .2 \\ \hline .068 \end{array}$$

Put the decimal point in the answer to show the total number of decimal digits.

Multiply.

$$\begin{array}{r} .23 \\ \times .3 \\ \hline .069 \end{array}$$

2 decimal digits
 1 decimal digit
 3 total

$$\begin{array}{r} .08 \\ \times .7 \\ \hline \end{array}$$

decimal digits
 decimal digit
 total

$$\begin{array}{r} .106 \\ \times .6 \\ \hline \end{array}$$

decimal digits
 decimal digit
 total

$$\begin{array}{r} .125 \\ \times .6 \\ \hline \end{array}$$

$$\begin{array}{r} .204 \\ \times .4 \\ \hline \end{array}$$

$$\begin{array}{r} .19 \\ \times .5 \\ \hline \end{array}$$

$$\begin{array}{r} .103 \\ \times .8 \\ \hline \end{array}$$

$$\begin{array}{r} .4721 \\ \times .2 \\ \hline \end{array}$$

$$\begin{array}{r} .27 \\ \times .2 \\ \hline \end{array}$$

$$\begin{array}{r} .27 \\ \times .3 \\ \hline \end{array}$$

$$\begin{array}{r} .27 \\ \times .4 \\ \hline \end{array}$$

$$\begin{array}{r} .027 \\ \times .3 \\ \hline \end{array}$$

$$\begin{array}{r} .0027 \\ \times .3 \\ \hline \end{array}$$

$$\begin{array}{r} .328 \\ \times .3 \\ \hline \end{array}$$

$$\begin{array}{r} .036 \\ \times .8 \\ \hline \end{array}$$

$$\begin{array}{r} .003 \\ \times .6 \\ \hline \end{array}$$

$$\begin{array}{r} .0001 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} .017 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} .082 \\ \times .04 \\ \hline \end{array}$$

$$\begin{array}{r} .403 \\ \times .21 \\ \hline \end{array}$$

$$\begin{array}{r} .0036 \\ \times 7.2 \\ \hline \end{array}$$

$$\begin{array}{r} .0005 \\ \times .001 \\ \hline \end{array}$$

Multiply. Remove extra zeros to express each answer in simplest form.

$$.065 \times .4 = .026$$

$$.084 \times .5 =$$

$$.4 \times .25 =$$

$$\begin{array}{r} .065 \\ \times .4 \\ \hline .026 \end{array}$$

$$.16 \times .8235 =$$

$$1.5 \times .03434 =$$

$$.25 \times .25 =$$

Adding, Subtracting and Multiplying

Rule A: + and -

Line up decimal points and then put a decimal point in the answer directly below the decimal points in the problem.

Rule B: x

The number of decimal digits in the product (answer) equals the total number of decimal digits in the factors.

Each addition, subtraction and multiplication problem on this page has been done for you -- almost. Your job is to put the decimal point in the answer. First look and see which rule you should use. Then put the decimal point where it belongs.

Rule **A**

$$\begin{array}{r} \overset{1}{3.82} \\ + \overset{1}{1.93} \\ \hline 5.75 \end{array}$$

Rule **B**

$$\begin{array}{r} \overset{1}{6.48} \\ \times \overset{2}{.3} \\ \hline 1.944 \end{array}$$

Rule _____

$$\begin{array}{r} \overset{25}{.126} \\ \times \overset{1}{.9} \\ \hline 1134 \end{array}$$

Rule _____

$$\begin{array}{r} 4.83 \\ - .50 \\ \hline 433 \end{array}$$

Rule _____

$$\begin{array}{r} \overset{1}{.837} \\ + \overset{1}{.726} \\ \hline 1563 \end{array}$$

Rule _____

$$\begin{array}{r} \overset{4}{28.2} \\ \times \overset{1}{6} \\ \hline 1692 \end{array}$$

Rule _____

$$\begin{array}{r} 15.9 \\ + 2.0 \\ \hline 179 \end{array}$$

Rule _____

$$\begin{array}{r} \overset{3}{\$4.00} \\ - \overset{1}{1.36} \\ \hline \$264 \end{array}$$

Rule _____

$$\begin{array}{r} \overset{2}{7.5} \\ \times \overset{1}{.5} \\ \hline 375 \end{array}$$

Rule _____

$$\begin{array}{r} \overset{1}{.36} \\ + 1.01 \\ + .43 \\ \hline 180 \end{array}$$

Rule _____

$$\begin{array}{r} \overset{1}{.456} \\ \times \overset{1}{.2} \\ \hline 912 \end{array}$$

Rule _____

$$\begin{array}{r} \overset{6}{.374} \\ - \overset{1}{.009} \\ \hline 365 \end{array}$$

Rule _____

$$\begin{array}{r} \overset{2}{3.04} \\ \times \overset{1}{7} \\ \hline 2128 \end{array}$$

Rule _____

$$\begin{array}{r} \overset{2}{1.16} \\ \times \overset{1}{.4} \\ \hline 464 \end{array}$$

Rule _____

$$\begin{array}{r} \overset{1}{.006} \\ + .009 \\ \hline 015 \end{array}$$

Rule _____

$$\begin{array}{r} 0.2 \\ + 0.2 \\ \hline 04 \end{array}$$

Rule _____

$$\begin{array}{r} \$3.57 \\ - .36 \\ \hline \$321 \end{array}$$

Rule _____

$$\begin{array}{r} .807 \\ \times .1 \\ \hline 807 \end{array}$$

Rule _____

$$\begin{array}{r} .2 \\ .8 \\ + .9 \\ \hline 19 \end{array}$$

Rule _____

$$\begin{array}{r} .3 \\ - .2 \\ \hline 1 \end{array}$$

Rule _____

$$\begin{array}{r} 5.64 \\ \times 8 \\ \hline 4512 \end{array}$$

Rule _____

$$\begin{array}{r} \overset{7}{8.0} \\ - 2.5 \\ \hline 55 \end{array}$$

Rule _____

$$\begin{array}{r} .12 \\ \times .4 \\ \hline 48 \end{array}$$

Rule _____

$$\begin{array}{r} .3 \\ \times .2 \\ \hline 6 \end{array}$$

Chris took the test below. Correct Chris's test. Put **C** by each problem that Chris did correctly and **X** by each problem that is wrong. Write Chris a note explaining each mistake. The first three problems have already been corrected.

Test on Decimals		Name <u>Chris</u>	
		Period <u>4</u>	Date <u>1/12</u>
① $\begin{array}{r} 5.73 \\ + 8.46 \\ \hline 14.19 \end{array}$	② $\begin{array}{r} 7.01 \\ + .99 \\ \hline 8.00 \end{array}$	③ $\begin{array}{r} 8.00 \\ - 1.38 \\ \hline .0472 \end{array}$	④ $\begin{array}{r} 8.5 \\ - 3.1 \\ \hline .54 \end{array}$
		X Decimal point in. wrong place.	
⑤ $\begin{array}{r} \$3.84 \\ + 1.79 \\ \hline \$5.53 \end{array}$	⑥ $\begin{array}{r} 2.43 + 7 + .68 = 3.18 \\ \begin{array}{r} 2.43 \\ 7 \\ + .68 \\ \hline 3.18 \end{array} \end{array}$		
⑦ $\begin{array}{r} 5.6 \\ \times .4 \\ \hline 22.4 \end{array}$	⑧ $\begin{array}{r} 63 \\ \times .7 \\ \hline 44.1 \end{array}$	⑨ $\begin{array}{r} 3.07 \\ \times 9 \\ \hline 27.63 \end{array}$	⑩ $\begin{array}{r} .046 \\ \times 7 \\ \hline .322 \end{array}$
⑪ $\begin{array}{r} 4.6 \\ \times 2.3 \\ \hline 138 \\ 9200 \\ \hline 93.30 \end{array}$	⑫ $\begin{array}{r} 7.2 \\ \times 2.2 \\ \hline 14.4 \\ 144.0 \\ \hline 158.4 \end{array}$	⑬ $\begin{array}{r} 99 \\ \times 51 \\ \hline 99 \\ 4950 \\ \hline 5049 \end{array}$	⑭ $\begin{array}{r} .27 \\ \times .04 \\ \hline 108 \\ 000 \\ \hline .0108 \end{array}$

There are 8 mistakes on Chris's paper.
 How would you rate Chris's work? _____

Add, subtract or multiply.

$$\begin{array}{r} 7.25 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 45.8 \\ + 9.6 \\ \hline \end{array}$$

$$\begin{array}{r} 15.2 \\ \times .3 \\ \hline \end{array}$$

$$\begin{array}{r} 3.621 \\ - .807 \\ \hline \end{array}$$

$$\begin{array}{r} 6.8 \\ 80.3 \\ + 4.2 \\ \hline \end{array}$$

$$\begin{array}{r} \$5.00 \\ - 2.31 \\ \hline \end{array}$$

$$\begin{array}{r} 2287 \\ \times .6 \\ \hline \end{array}$$

$$\begin{array}{r} .149 \\ \times .5 \\ \hline \end{array}$$

$$\begin{array}{r} .128 \\ - .119 \\ \hline \end{array}$$

$$\begin{array}{r} .091 \\ \times .7 \\ \hline \end{array}$$

$$\begin{array}{r} \$36.08 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} \$10.00 \\ - .98 \\ \hline \end{array}$$

$7.36 + 5 =$	$7.36 - 5 =$	$7.36 \times 5 =$
$3.15 + .2 =$	$3.15 - .2 =$	$3.15 \times 2 =$
$14 + 2.306 =$	$14 - 2.306 =$	$14 \times 2.306 =$

Read each problem carefully. Decide whether to add, subtract or multiply. Then solve each problem and answer in a sentence.

Terry was driving to a friend's house. Her trip should have been 18.4 kilometers. She got lost and drove 15.3 extra kilometers. How far did she drive altogether?

Terry drove _____ kilometers.

Sonia makes and sells jewelry. She got an order for 12 gold rings. Each ring weighs 2.3 grams. How much gold does she need?

A person's normal body temperature is 37°C . Sarah was sick and had a temperature of 38.3°C . How many degrees above normal was Sarah's temperature?

Junk Food Johnny loves potato chips. He eats 2 bags an hour.

a) How many bags of chips does he eat during a 6.5 hour school day?

b) What does he do with the empty bags?

David likes to run. Last weekend he ran 7.3 kilometers on Saturday and 5.6 kilometers on Sunday.

a) How far did he run altogether last weekend?

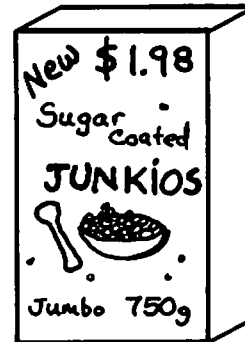
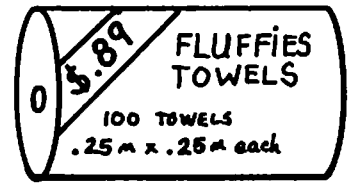
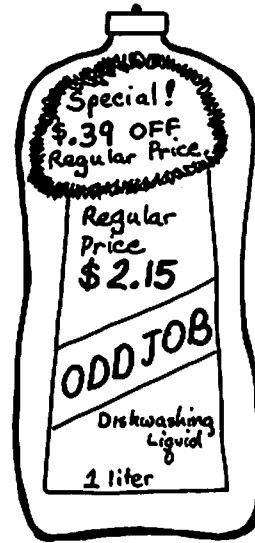
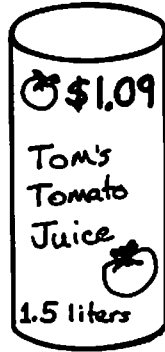
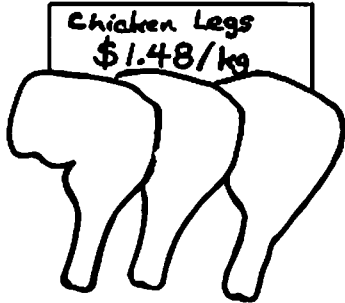
b) How much farther did he run on Saturday than on Sunday?

Sandy bought 6 pens at \$.39 each.

a) How much should Sandy pay?

b) How much change should Sandy get from a \$5 bill?

FELICIA'S MARKET
Fabulous Savings



How much would you pay for one liter of Odd Job?

\$ _____

How much would you pay for 2.5 kg of chicken legs?

\$ _____

Steve bought 1 can of tomato juice and 2.5 kg of chicken legs. How much should he pay?

\$ _____

How many liters of Tom's Tomato Juice are in a case (6 cans)?

_____ liters

How much should a case (12 rolls) of Fluffies cost?

\$ _____

If you buy a case of Fluffies, Felicia takes \$2 off the price. How much will you pay for a case?

\$ _____

How much do two jumbo boxes of Junkios cost?

\$ _____

How much do three regular boxes of Junkios cost?

\$ _____

Two jumbo boxes weigh the same as three regular boxes. How much do you save by buying two jumbo boxes?

\$ _____

Combining Addition, Subtraction and Multiplication

The problems below combine addition, subtraction and multiplication. The parentheses tell you what to do first.

1. Do what's in the parentheses first.
2. Write the answer above.
3. Complete the problem.

$$3 \times (8.6 + 7.5) = 48.3$$

$$\begin{array}{r} 8.6 \\ + 7.5 \\ \hline 16.1 \end{array}$$

$$\begin{array}{r} 16.1 \\ \times 3 \\ \hline 48.3 \end{array}$$

$$5 \times (.37 + .82) =$$

$$.9 \times (10.55 + 3.5) =$$

$$(\$7.15 + \$4.45) \times 8 =$$

$$3 \times (2.143 - 2) =$$

$$(3 \times 2.143) - (3 \times 2) =$$

$$(3.2 + 3) \times .8 =$$

$$(3.2 \times .8) + (3 \times .8) =$$

Read each problem carefully. Decide whether you need to add, subtract or multiply. Solve each problem and write the answer in a sentence.

Each morning, Isaac walks .3 kilometers to Leonardo's house. From there, they walk 1.4 kilometers to school. How far does Isaac walk each morning?

How far does Isaac walk in a 5 day week? (He takes the bus when he goes home.)

Jose earns \$6.30 per hour. How much does he earn per week if he works 40 hours per week?

Jose got a raise of \$.50 per hour. How much does he make per hour now?

How much does he make per week now?

How much more does Jose earn in a week since he got the raise?

At Felicia's market, apples cost \$1.78 per kg and ice cream costs \$2.29 per liter. Jim and Rhonda bought 10 kg of apples and 3 liters of ice cream.

How much did the apples cost?

How much did the ice cream cost?

How much did the apples and ice cream cost together?

They paid with a \$50 bill. How much change did they get back?

Did Jim and Rhonda buy enough ice cream?

Add or subtract.

$$\begin{array}{r} 1.2 \\ + 2.4 \\ \hline \end{array}$$

$$\begin{array}{r} 37.86 \\ + 1.25 \\ \hline \end{array}$$

$$\begin{array}{r} .794 \\ 6.432 \\ + .007 \\ \hline \end{array}$$

$$\begin{array}{r} 4.53 \\ - 2.31 \\ \hline \end{array}$$

$$\begin{array}{r} 16.42 \\ - 5.64 \\ \hline \end{array}$$

$2.506 + 1.7 =$

$6.24 + 3.8 =$

$124. + 2.12 + 7.1 =$

$\$12.43 - \$6 =$

$16.9 - 7 =$

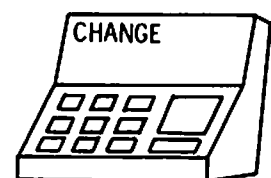
$9 - 2.34 =$

Add or subtract. Remove extra zeros to express your answer in simplest form.

$3.75 + 2.15 + 2 =$

$16.342 - 5.642 =$

Carmen bought a new coat for \$69.95. She paid with a \$100 bill. How much change should Carmen get? Write your answer on the cash register display.



Multiply.

$$\begin{array}{r} 1.7 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} .45 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 51.3 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} .136 \\ \times 41 \\ \hline \end{array}$$

$$\begin{array}{r} 27.9 \\ \times 10 \\ \hline \end{array}$$

$$43.79 \times 10 =$$

$$43.79 \times 1000 =$$

$$43.79 \times 100 =$$

$$.036 \times 100 =$$

$$\begin{array}{r} .4 \\ \times .3 \\ \hline \end{array}$$

$$\begin{array}{r} 6.43 \\ \times .8 \\ \hline \end{array}$$

$$\begin{array}{r} 78 \\ \times .9 \\ \hline \end{array}$$

$$\begin{array}{r} 7.2 \\ \times .04 \\ \hline \end{array}$$

$$\begin{array}{r} 3.527 \\ \times 1.2 \\ \hline \end{array}$$

$$\begin{array}{r} .107 \\ \times .4 \\ \hline \end{array}$$

$$\begin{array}{r} .36 \\ \times .2 \\ \hline \end{array}$$

$$\begin{array}{r} .0003 \\ \times .03 \\ \hline \end{array}$$

$$8 \times 2.63 =$$

$$.407 \times .3 =$$

$$52.6 \times .5 =$$

Add, subtract or multiply.

$$12 + 3.406 =$$

$$12 - 3.406 =$$

$$12 \times 3.406 =$$

$$(2 + 8.5) \times .3 =$$

Jackie sells apples for \$1.78 per kilogram. How much should Duncan pay for 1.5 kilograms?

Duncan should pay \$_____.

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