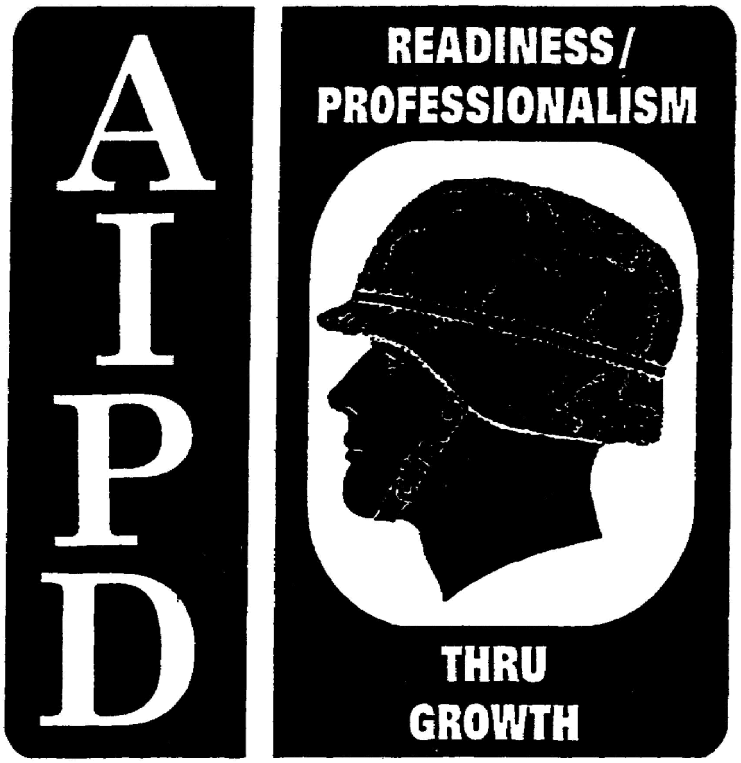
SUBCOURSE QM0114 **EDITION** 4

BASIC MATHEMATICS II (DECIMAL FRACTIONS)



THE ARMY INSTITUTE FOR PROFESSIONAL DEVELOPMENT

ARMY CORRESPONDENCE COURSE PROGRAM

BASIC MATHEMATICS II
(DECIMAL FRACTIONS)
Subcourse Number QM 0114

EDITION 4

United States Army Quartermaster Center and School
Fort Lee, Virginia 23801-6036

3 Credit Hours

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Unless otherwise stated, whenever the masculine gender is used, both men and women are included.

INTRODUCTION

This subcourse is designed to train a soldier on basic mathematics II (decimal fractions). It will cover each part of the task and your responsibilities.

Supplementary Training Material Provided: None.

Materials to be Provided by the Student: No. 2 pencil and paper.

Material to be Provided by the Unit or Supervisor: None.

This subcourse cannot be completed without the above material.

Three credit hours will be awarded for successful completion of this subcourse.

LESSON

TASK:	Basic Mathematics II (Decimal Fractions). As a result of successful completion of this subcourse, you will be able to perform the following performance measures: 1. Solve problems of addition, subtraction, multiplication, and division of numbers containing up to four decimal places. 2. Convert percent to decimal fractions and decimal fractions to percent.
CONDITIONS:	Given this subcourse you will be able to do basic mathematics II (decimal fractions).
STANDARD:	You must answer 70 percent of the written exam questions correctly to receive credit for this subcourse.
CREDIT HOURS:	See page ii, Introduction.

IMPORTANT NOTICE

THE PASSING SCORE FOR ALL ACCP MATERIAL IS NOW 70%.

PLEASE DISREGARD ALL REFERENCES TO THE 75% REQUIREMENT.

LESSON TEXT

HOW TO USE THIS BOOKLET

This is not an ordinary text. It is a programmed text which is designed to help you apply the principles of decimal fractions. We will ask you to take part in the program by answering questions, filling in blanks, and performing fundamental mathematical computation.

As you will see, the programmed text is designed so that you may study the text and then test yourself immediately. Write your answers in this booklet. Writing each answer will help you remember the specific information you have learned. You can correctly answer all the questions in the programmed text because the programmed text gives you all the correct answers. The answers to the questions will be on the following page.

Fill in all the answers on each page. If you find that you have written a wrong answer, mark through the wrong answer, go back over the teaching point you missed; then write in the correct answer.

If you merely fill in the blanks in the programmed text without studying and working out the problems, you will be unprepared to answer the examination exercises that are located at the back of the booklet.

Remember, you will be graded on the examination exercises.

SEQUENCE II

DECIMAL FRACTIONS

You will now begin a review of decimal fractions. You will use them more frequently than the other type of fractions you have been using because they are easier to handle.

You use decimal fractions every time you use money; for example, $0.50, $0.25, $0.10, $0.05, $0.01. You have added and subtracted money all of your life.

Decimal fractions are fractions written in a particular form. The denominator of the decimal fraction is always 10, 100, 1000 or some other multiple of 10. The fraction 1/10 is written as .1; 1/100 as .01; and 1/1000 as .001. The number of places to the right of the decimal point (.) shows the number of zeros in the denominator. Using this method, you write the fraction 875/1000 as .875. (3 zeros)(3 places to the right)

The decimal point (.) provides a simple way to write a number that contains both a whole number and a fraction. For example:

> The mixed number 10 3/4 can be written as 10 75/100 or 10.75 as a decimal. The _____ separates the two parts--the whole number on the left and the decimal fraction to the right.

10.75
whole)(decimal
number)(fraction

ANSWER: Decimal Point.

CONVERTING FRACTIONS TO DECIMALS

To work with decimals, you should know how to convert a fraction to a decimal.

REMEMBER: To convert a fraction to a decimal, you divide the denominator into the numerator.

1. Example: Convert 3/8 to a decimal. 3 is the numerator, 8 is the denominator.

   You divide _____ into _____.

   (1) 3/8 = 8/ 3.000 (.375)
   24
   60
   56
   40
   40

   (2) 3/8 = .375

2. Example: Convert 1/4 of a dollar to a decimal.

   You divide _____ into _____.

   (1) 1/4 = 4/ $1.00

   (2) 1/4 = $

ANSWERS: 1. 8 into 3

2. 4 into 1, 1/4 = $.25 or 25¢

READING AND WRITING DECIMALS

Now that you are able to convert a regular fraction into a decimal fraction, you should have no trouble in reading and writing decimals.

Just as there are names for the columns to the left of a decimal point, there are names for each column to the right of the decimal point.

LOOK AT THIS NUMBER: 6,703.472.

	Thousands	Hundreds	Tens	Units		Tenths	Hundredths	Thousandths	
Here is the same number with the name above each column:	6	7	0	3	,	4	7	2	When you read a number like this one, you say "and" when you come to the decimal point.

When you read the part of the number to the <u>right</u> of the decimal point, you use the name of the <u>last</u> column to the right. For example, the number above is read:

Six thousand, seven hundred three <u>and</u> four hundred and seventy two <u>thousandths</u>. (There are three numbers to the right of the decimal point, so you use the name of the third column - thousandths.)

The number 243.78 would be read:

Two hundred forty three <u>and</u> seventy-eight <u>hundredths</u>. (There are only two numbers to the right of the decimal point.)

HOW WOULD YOU READ THESE NUMBERS?

(1) 24,019.7 Twenty four thousand, nineteen <u>and</u> seven_____.

(2) 313.296 Three hundred thirteen and two hundred ninety-six.

ANSWERS: (1) tenths

(2) thousandths

This chart shows the names given to the columns to the right of the decimal point (note the spelling).

Tenths	Hundredths	Thousandths	Ten-Thousandths	Hundred-Thousandths	Millionths
↑	↑	↑	↑	↑	↑
.3	4	6	8	5	9

Another reference chart is on page iii of Volume I. Remember to say "and" each time you come to the decimal point.

Now practice:

1. The number 7.24 is read seven _____ twenty-four hundredths.

2. How would you read these numbers: (Write out in words.)

   a. 421.7 _____ and _____.

   b. 24.784 _____ and _____.

   c. 1.2418 _____ and _____.

ANSWERS: 1. "and"

2. a. Four hundred twenty-one and seven tenths.

b. Twenty-four and seven hundred eighty-four thousandths.

c. One and two thousand four hundred eighteen ten-thousandths.

ADDING AND SUBTRACTING DECIMALS

Decimals are added and subtracted in the same way as whole numbers, but you have to be careful to keep the decimal points lined up.

1. a. To add: .603 + 1.09, we must the decimal points.

b. .603
+ 1.09

the decimal points are _____.

2. a. To subtract: 9.6241 - .012, we would line up the _____ _____.

b. 9.6241
- .012

The _____ _____ are lined up.

ANSWERS: 1. a. line up

b. lined up

2. a. decimal points

b. decimal points

We may place zeros after the last number in a decimal without changing its value.

The value of a decimal is not changed when we place _____ after the last number in the decimal.

If we place a zero after the "4" in .64 and make it .640, have we changed the value of the decimal? (Yes or No)_____

Since placing zeros after the last number in a decimal does not change its _____ , we may use these zeros to make our addition or subtraction example clearer:

.65)		.640
.912)		.912
.9)	becomes	.900
+ .47)		+ .470
_____		_____
(do not add)		(do not add)

ANSWERS: Zeros

No

Value

Using zeros is most helpful when adding long columns of decimals.

1. Fill in the zeros and do the following addition:

.9	)		
1.01	)		
.624	)	becomes	
.091	)		
2.4	)		
+ 3.0124	)		+

2. Fill in the zeros and do the following subtraction:

```
  99.1
- 98.0472
```

ANSWERS: (1)

.9000
1.0100
.6240
.0910
2.4000
+ 3.0124
8.0374

(2)

99.1000
- 98.0472
1.0528

REVIEW OF ADDING AND SUBTRACTING DECIMALS

1. In adding or subtracting decimals, we must remember to _____ the decimal points.

2. We may place _____ after the last number in a decimal to make the example clearer to add or subtract.

3. Placing a zero after the last number in a decimal changes the value of the decimal. (True or False). _____

4. Do the following examples by _____ the decimal points and then placing zeros to make the example clearer:

   a. .9 + 1.0023 + 9.12 + .0401 =

   b. 101.12 - .64092 =

   c. 1.011 + .81 + .9 + 2.10111 =

ANSWERS:

1. line up
2. zeros
3. false
4. lining up

4.a.

$$\begin{array}{r} .9000 \\ 1.0023 \\ 9.1200 \\ +\ .0401 \\ \hline 11.0624 \end{array}$$

b.

$$\begin{array}{r} 101.12000 \\ -\ .64092 \\ \hline 100.47908 \end{array}$$

c.

$$\begin{array}{r} 1.01100 \\ .81000 \\ .90000 \\ +\ 2.10111 \\ \hline 4.82211 \end{array}$$

Now, if you were able to answer all of the questions on page 10 without any mistakes, you have done well with adding and subtracting decimals.

Which of the following statements describes you best?

I made some mistakes and would like some more practice.
(Turn to page 12)

I understand how to add and subtract decimal fractions.
(Turn to page 14)

EXTRA PRACTICE IN ADDING AND SUBTRACTING DECIMALS

ADDITION

(1)	$ 9.85	(2)	135.48	(3)	.34	(4)	16.385	(5)	3.5
	1.75		74.87		8.67		8.007		.037
	+ 3.65		7.73		14.03		.3		25.63
			+ 9.04		+ .38		+ 71.		+ 3.0385

(6) 54.372 + 16.8 + 111.301 + .007 =

(7) 99.009 + .003 + 103 + 5.32 =

(8) 932.04 + 93.204 + 9.3204 + .93204 =

SUBTRACTION

(1) 85.2 - 63.132 =

85.200 (0's were added)
- 63.132

(2) 4.837 - 2 =

4.837
- 2.000 (0's were added)

(3) $5.00 - .89 =

$5.00
- .89

(4) 67.9 - 32.5=

(5) 627.88 - 182.39 =

(6) 46.004 -17.685 =

(7) You receive $1.20 an hour for hauling pipe and $1.10 for fittings. What is the total amount received from an 8-hour day if half was spent in hauling pipe and half In hauling fittings?

(8) You bought 30 barrels of oil at a price of $14.60 per barrel, and sold it at a price of $9.75 per half barrel. How much profit did you receive?

(ANSWERS ON PAGE 13)

ANSWERS:

ADDITION

(1)	(2)	(3)	(4)	(5)
$ 9.85	135.48	.34	16.385	3.5000
1.75	74.87	8.67	8.007	.0370
+ 3.65	7.73	14.03	.300	25.6300
$15.25	+ 9.04	+ .38	+ 71.000	+ 3.0385
	227.12	23.42	95.692	32.2055

(6)	(7)	(8)
54.372.	99.009	932.04000
16.800	.003	93.20400
111.301	103.000	9.32040
+ .007	+ 5.320	+ .93204
182.480	207.332	1035.49644

SUBTRACTION

(1)	(2)	(3)	(4)
85.200	4.837	$5.00	67.9
- 63.132	- 2.000	- .89	- 32.5
22.068	2.837	$4.11	35.4

(5)	(6)	(7)
627.88	46.004	$4.80
- 182.39	- 17.685	+ 4.40
445.49	28.319	$9.20

(8) $19.50
- 14.60
$ 4.90 profit per bbl 4.90 x 30 = $147.00 total profit

MULTIPLYING DECIMALS

When you multiply decimal fractions or mixed decimals, you use the same procedure as for whole numbers. Then you locate the position of the decimal point.

If you were working on a job at a salary of $1.50 per hour, how much money would you make if you worked 48 hours?

$ 1.50	Salary
48	Number of hours worked
12 00	
60 0	
$72.00	Pay

You will receive $72.00 for 48 hours work. Let's see how you solve this problem.

First, write the mixed decimal.	$1.50	Fifth, count the number of digits to the right of the
Second, put the whole number under it.	48	decimal point in numbers being multiplied. (2)
	12 00	
Third, multiply.	60 0	
	$72 00	Sixth, mark off the same
Fourth, find the product.		number of digits from the
	two places	right in your answer.

To find how many decimal places there will be in the answer in a multiplication problem, count the number of digits to the _____ of the decimal point in the numbers being multiplied.

ANSWER: Right

DETERMINING THE NUMBER OF DECIMAL PLACES

Again, remember to count the number of digits to the right of the decimal point in both numbers being multiplied.

Example 1:

9.434 - - - number of digits to right of decimal = 3
x .54 - - - number of digits to right of decimal = 2

Total = 5

The answer will have 5 decimal places.

Example 2:

34.5678 - - - number of digits to right of decimal = 4
x .323 - - - number of digits to right of decimal = ___

Total =

The answer will have _____ decimal places.

Example 3:

567.99 - - - number of digits to right of decimal =
x .23 - - - number of digits to right of decimal = ___

Total =

The answer will have _____ decimal places.

ANSWERS: Example 1: 5

Example 2: 7

Example 3: 4

For each of the following examples, state the number of decimal places there will be in the answer.

Do not do the multiplication.

(1) 99.62)
x .04) _____ (number of decimal places in answer)

(2) 1964.1)
x .009) _____ (number of decimal places in answer)

(3) .0091)
x .375) _____ (number of decimal places in answer)

ANSWERS: 1. 4

2. 4

3. 7

LOCATING THE DECIMAL POINT IN THE ANSWER

After determining the number of decimal places there will be in the answer, we multiply and locate the decimal point.

We locate the decimal point in the answer by starting at the last digit on the right and counting to the left.

Example 1:

9.642)
x .31) number of decimal places in answer _____.
9642
28926
29.8902
↑↑↑↑
4321

We start at the right and count 4 places to the left.

Example 2:

1.963)
x .98) number of decimal places in answer _____.
15704
17667
192374
↑
1

Start at the _____ and count _____ places to the_____.
Locate the decimal point. The answer should read:_____.

ANSWERS: 1. 4
2. 5

Right, 5, Left, 1.92374

Do the following multiplication and locate the decimal point in the answer.

(1)
$$\begin{array}{r} 2\,3.4\,5 \\ \times\ .1\,2\,2 \\ \hline \end{array}$$

(2)
$$\begin{array}{r} .0\,9\,0\,9\,4 \\ \times\ \ \ \ 2.3\,6 \\ \hline \end{array}$$

(3)
$$\begin{array}{r} 1\,1\,7.5 \\ \times\ \ \ .5\,5 \\ \hline \end{array}$$

(4)
$$\begin{array}{r} 1.3\,5\,7 \\ \times\ .0\,1\,1 \\ \hline \end{array}$$

ANSWERS:

(1)

```
     2 3.4 5     2
   x   .1 2 2    3
     4 6 9 0     5 decimal
   4 6 9 0         places
 2 3 4 5
 2.8 6 0 9 0

   5 4 3 2 1
```

(2)

```
     .0 9 0 9 4     2
   x       2.3 6    5
     5 4 5 6 4      7 decimal
   2 7 2 8 2          places
 1 8 1 8 8
 .2 1 4 6 1 8 4

   7 6 5 4 3 2 1
```

(3)

```
     1 1 7.5
   x     .5 5
     5 8 7 5
   5 8 7 5
   6 4.6 2 5
```

(4)

```
     1.3 5 7
   x   .0 1 1
     1 3 5 7
   1 3 5 7
 .0 1 4 9 2 7
```

Zero must be added for six places.

You should understand how to solve multiplication problems containing decimals and be able to locate the decimal point in the answer correctly.

Pick the statement that describes you best.

I would like to try more decimal multiplication problems
(Turn to page 20)

I understand the multiplication of decimals.
(Turn to page 22)

EXTRA PRACTICE IN MULTIPLICATION OF DECIMALS

Solve the following:

(1) 1.6 2 9
× 6.5

(2) .1 0 6
× .0 1 8

(3) 1 1.7
× 1 2.3

(4) 5 0 0
× 2.8 4

(5) 3 6.4
× 3.5

(6) 3.1 4
× .1 4

(7) Find the total charged for 8 hours labor if the hourly rate is $2.25 per hour?

(8) If a certain type of finished steel plates is 0.36 inches thick, how many feet high is a pile of 250 of them?

ANSWERS:

(1)
```
   1.6 2 9     3
 x     6.5     1
   8 1 4 5     4 places
 9 7 7 4 _
1 0.5 8 8 5
```

(2)
```
     .1 0 6     3
   x .0 1 8     3
     8 4 8      6 places
   1 0 6 _
.0 0 1 9 0 8

6 5 4 3 2 1
```

(3)
```
     1 1.7
   x 1 2.3
     3 5 1
   2 3 4
 1 1 7 _
 1 4 3.9 1
```

(4)
```
     5 0 0
   x 2.8 4
   2 0 0 0
 4 0 0 0
1 0 0 0 _
1 4 2 0.0 0
```

(5)
```
     3 6.4
   x 3.5
   1 8 2 0
 1 0 9 2 _
 1 2 7.4 0
```

(6)
```
     3.1 4
   x .1 4
   1 2 5 6
   3 1 4 _
   .4 3 9 6
```

(7)
```
   $ 2.2 5
 x       8
 $ 1 8.0 0
```

(8)
```
     0.3 6
   x 2 5 0
   1 8 0 0
   7 2 _
     9 0.0 0  inches
```

```
      7.5     or  7 1/2 ft high
12 in √ 9 0.0 0 inches
       8 4
         6 0
         6 0
```

DIVIDING DECIMALS

Decimals are divided the same way you divided whole numbers earlier in the text, but with one additional step: The decimal point must be located in the proper place in the quotient.

Remember what the quotient is?

Here is a diagram showing the terms used in division.

Quotient

Divisor) Dividend

Quotient is the answer you get when you divide.

The decimal point must be accurately located for the quotient to he correct.

The only difference between the numbers 102.50 and 10.250, is the location of the decimal point. But if you were getting $10.25 pay instead of $102.50, you would consider the location of that decimal point very important.

Try these two problems for practice to see if you know how to divide using decimals:

(1) $.32\overline{)76.8}$

(2) Divide 127.4 by .035

ANSWERS:

```
                 240.
(1)    .32 ) 76.80
             64
             1280
             1280


                 3640.
(2)    .035 ) 127.400
             105
              224
              210
               1400
               1400
```

If you had no difficulty with these two problems and feel you understand division of decimals, then skip to page 32.

If you feel you need additional practice and a quick review, turn to page 25.

LOCATION OF THE DECIMAL POINT

1. A DECIMAL DIVIDED BY A WHOLE NUMBER.

```
   ___3.46__
14)48.44
   42
    64
    56
     84
     84
```

This division is very easy. You simply divide as in whole numbers and place the decimal point in the quotient above the decimal point in the dividend.

2. A DECIMAL DIVIDED BY A DECIMAL.

```
   ___34.6___
1.4)48.44
   42
    64
    56
     84
     84
```

This division sometimes causes trouble. The first thing to do is to make the divisor a whole number. Then move the decimal point in the dividend the same number of places to the right as you moved it in the divisor.

Now the division is the same as the easy problem #1.

NOW, YOU DO THIS ONE:

```
3.14)125.6
```

ANSWER:

```
      40.
3.14)125.60
     125 6
```

CHANGING THE DIVISOR TO A WHOLE NUMBER

Remember, if the divisor is a decimal, we change it to a whole number by moving the decimal point all the way to the right.

Change the following divisors to whole numbers by moving the decimal point all the way to the _____.

(1) .86)_____ becomes 86.)_____

(2) 9.2)_____ becomes)_____

(3) .132)_____ becomes)_____

ANSWERS: Right

(1) 86)

(2) 92.

(3) 132.

REVIEW OF LOCATING THE DECIMAL POINT

1. Write these terms in their proper places in the diagram:

dividend
quotient
divisor

(Check your answer on the next page. If you are incorrect, change it.)

Whenever we move the decimal point in a divisor, we must also move the decimal point in the dividend.

2. If we move the decimal point in the divisor, we must also move it in the_____.

We must move the decimal an equal number of places in the divisor and the dividend.

3. If we move the decimal in the divisor two places, then we must move the decimal in the dividend _____ places.

ANSWERS:

(1) Divisor) Quotient / Dividend

(2) Dividend

(3) Two

Move the decimal point in the divisor to make it a whole number. Then move the decimal in the dividend an equal number of places.

.84) 98.62

(1) We make .84 a whole number by moving the decimal point_____places to the _____.

.84) 98.62

(2) Then we move the decimal point in the _____ _____places to the _____.

.84) 98.62

Set up the decimal points in the following example by first making the divisor a whole number.

.012) 3.2645 becomes)

ANSWERS:

(1) 2, right

(2) Dividend, 2, right

(3) 12)3264.5

LOCATING THE DECIMAL POINT IN THE QUOTIENT

Once we have made the divisor a whole number and also moved the decimal in the dividend, we locate the decimal point in the quotient.

The decimal point in the quotient is always directly above the decimal point in the dividend.

26.)78.36

Place the decimal point in the quotient of these examples:

(1) 89)193.4

(2) 5)5.62

ANSWERS:

(1) $)\overline{193.4}$

(2) $)\overline{5.62}$

REVIEW OF DIVIDING DECIMALS

In order to divide decimals, we must:

(1) Make the divisor a _____ _____ by moving the decimal all the way to the _____.

(2) Move the decimal in the _____ the same number of places that we moved it in the divisor.

(3) Place the decimal point in the quotient directly _____ the decimal in the_____.

Set up the decimals in the following examples according to the above three steps. Then divide.

(1) $7.6\overline{)3.192}$

(2) $.023\overline{)368.0}$

(3) $.0012\overline{)14.40}$

(ANSWERS ON NEXT PAGE)

ANSWERS:

(1) Whole number
Right

(2) Dividend

(3) Above
Dividend

PROBLEM SOLUTIONS:

(1) $7.6\overline{)3.192}$ = $76\overline{)31.92}$

(2) $.023\overline{)368.0}$ = $023\overline{)368000.}$

(3) $.0012\overline{)14.40}$ = $0012\overline{)144000.}$

You should now be able to solve division problems containing decimals and be able to locate the decimal point in the quotient.

Select the statement that describes you best.

I would like to try some more decimal division problems for practice.
(Turn to page 32.)

I understand decimal division well enough.
(Turn to page 34.)

EXTRA PROBLEMS IN DIVIDING DECIMALS

(1) 4 3 9 2 ÷ 7.2

(2) 8)45.0

(3) .8 7 5 ÷ 0.5

(4) 33)2893

(5) 3 2.4 5 ÷ 1 0 0 0

(6) 28)196.084

(7) If 18.5 feet of 1 1/2-inch pipe weighs 50.32 lb, what is the weight per foot of this pipe?

(8) A 5/16-inch screw weighs 0.024 lb. Now many of these screws are in a box labeled "net weight 1.25 lb"?

(9) A double-acting single-cylinder steam pump makes 32 strokes per minute and delivers 46.976 gallons per minute. Row much does it pump at each stroke?

ANSWERS:

(1) 7.2) 4392.0 = 610
432
72
72

(2) 8) 45.000 = 5.625
40
50
48
20
16
40
40

(3) 0.5) .875 = 1.75
5
37
35
25
25

(4) 33) 2893.0 = 87.66
264
253
231
220
198
220
198
22

(5) 1000) 32.45000 = .03245
3000
2450
2000
4500
4000
5000
5000

(6) 28) 196.084 = 7.003
196
084
84

(7) 18.5) 50.32 = 2.72 lb

(8) .024) 1.2500 = 52.083 screws

(9) 32) 46.976 = 1.468 gallons

READING DECIMALS

By "reading" decimals, we mean using the terms "tenths," "hundredths," etc.

We do not read decimals as "point' something.

For example, .65 is ready "65 hundredths," not "point 65."

Here is a handy method for reading decimals.

(1) Place a "1" above the decimal point.

(2) Place a zero above each digit appearing to the right of the decimal point.

The "1" and "zeros" tell you what to read.

Example: Read .682.

(1) We place a _____ above the decimal point:

1
.682

(2) Then we place a _____ above each digit to the right of the decimal point:

1000
.682

The 1 and the three zeros make 1000.

So we read .682 as 682 "thousandths."

(3) How would you read .74?

100
.74

ANSWERS:

(1) 1

(2) Zero

(3) Seventy-four hundredths

ROUNDING OFF DECIMALS

When rounding off decimals, the rule is that if the decimal is 4 or less you round down to zero and if the decimal is 5 or more you round up to the next higher number.

Example 1: Round off 109.6536 to two decimal places.

(1) You look at the third decimal which is 3 and apply the rounding off rule.

(2) Since 3 is "4 or less," you round down to zero; this will not affect the preceding decimal.

(3) The answer, therefore, would be 109.65.

Example 2: Round off 109.2721 to one decimal place.

(1) You look at the second decimal which is 7 and apply the rounding off rule.

(2) Since 7 is "5 or more," you round up to the number 10 which will carry over to the preceding decimal and increase it by 1.

(3) The answer, therefore, would be 109.3.

NOTE: Rounding off a one-decimal number would carry back to the whole number: 96.5 would be 97, but 96.3 would be 96. Now, you round off some decimals.

(1) Round off decimals to two decimal places.

64.6581
1648.1243

(2) Round off decimals to one decimal place.

691.9265
76.2725

(3) Round off the following numbers.

54.3
68.9

ANSWERS:

(1) 64.66, 1648.12

(2) 691.9, 76.3

(3) 54, 69

CONVERTING DECIMALS TO PERCENT

Everyone uses percent (2) but how many really understand what they are talking about? You have seen percent used in many things. The interest paid by banks is in percent. Taxes are determined as a percent of certain other figures, and the clothing you are now wearing is probably 85% cotton and 152 wool.

Meaning of Percent

If a class has 100 men in it and 5 men get promoted to PFC, we say that 5X of the class got promoted.

Percent means "per hundred."

The symbol that is used for percent is Z. It is used just as the symbol $ is for dollars.

To convert a decimal to a percent, we move the decimal point two places to the right. Then add the X sign.

1. To convert .89 to a percent, we move the decimal point _____ places to the _____ and add the _____ sign.

.89 89. (first move decimal) - 89% (then add percent sign)

2. Example: Convert .455 to a percent

Move the decimal point _____ places to the right

(do it) .455
and add the % sign.

.455 = _____

ANSWERS:

(1) 2, right, %

(2) .455 - 45.52

Write the following decimals as percents by moving the decimal point _____ _____ to the _____ and adding a _____ sign.

(1) 11.2 =_____

(2) 3.462 =_____

(3) .00501 =_____

(4) 64 =_____

(5) 0.05 =_____

ANSWERS: 2 places, right, percent

(1) 1120%

(2) 346.2%

(3) .501%

(4) 6400%

(5) 5%

CONVERTING PERCENT TO DECIMALS

To convert a percent (%) to a decimal, we move the decimal point two places to the left and drop the % sign.

(1) To convert 12.5% to a decimal, we would move the decimal point _____ _____ places to the _____ and drop the _____ sign.

12.5% = .12 5% = .125

(2) Example: Convert 19.3% to a decimal.

Move the _____ _____ _____ places to the _ _____.

Then _____ the percent sign.

19.3% =

NOTE: If the percent does not have at least two digits to the left of the decimal point, put in zeros before proceeding.

Example: Change .5% to a decimal.

There are no digits to the left of the decimal point.

We need two digits there.

So we write .5% as 00.5% and then convert:

00.5% = .005

ANSWERS:

(1) 2, left, %

(2) decimal point, 2, left
drop
.193

Example: Convert 2.3% to a decimal.

There is only <u>one</u> digit to the left of the decimal point.

We need two digits there.

So we write 2.3% as 02.3%.

Then we convert:

02.3% =

Write the following percents as decimals.

(1) 21% =_____

(2) 2.1% =_____

(3) .21% =_____

(4) .05% =_____

(5) 172% =_____

(6) 5% =_____

(7) 37.65% =_____

ANSWERS: .023

(1) .21

(2) .021

(3) .0021

(4) .0005

(5) 1.72

(6) .05

(7) .3765

PERCENT OF A NUMBER

To find a percent of some number, we change the percent to a decimal and multiply.

To find 12.5% of 128, we would change 12.5% to a _____ and then _____.

Changing 12.5% to a decimal = .125.

(If you do not know how to change a percent to a decimal, see page 38.)

Now that we have converted 12.5% to the decimal .125, we are ready to_____.

```
   128
x  .125
   640
  256        12.5% of 128 = 16.00
 128
16.000
```

ANSWERS:

decimal
multiply
multiply

In petroleum operations, you must use percentages in figuring inventories of bulk product on hand. One of these is:

1/2 of 1% = ?

You know that to change 12 to a decimal, you must move the decimal point two places to the left and drop the % sign.

Step 1: 1% = .01

Now divide .01 in half: $\frac{.01}{2}$

Step 2:

$$2\overline{)\,.010} = .005$$

00
10
10

Another common percentage that you will use is:

1/4 of 1% = ?

Step 1: 1% = .01 1/4 of .01 = $\frac{.01}{4}$

Step 2: $4\overline{)\,.0100}$ 1/4 of 1% = .0025

Solve the following problem:

If a tank holds 2,500 gallons, what is 1/2 of 12 of the total gallons in the tank?

1/2 of 1% = .005

$$\begin{array}{r} 2500 \\ \times\ .005 \\ \hline \end{array}$$

gallons

ANSWERS: .005

.01

2500
x .005
12.500 gallons

REVIEW OF PERCENT AND CONVERTING TO DECIMALS

To find 5% of 200, we change _____ to a decimal.

5% = _____

Then we multiply _____ x .

200
x .
_____

(Answer on next page.)

Do the following problems.

(1) .25% of 25 = _____

(2) 135% of 200 = _____

(3) 1/4 of 1% of 900 gallons = _____

(4) 1/2 of 1% of 300 gallons = _____

ANSWERS: 5%

.05

.05 x 200

200
x .05
10.00

(1) .25% of 25 = .0025 x 25 = .0625

25
x .0025
125
50
.0625

(2) 135% of 200 = 1.35 x 200 = 270.00

1.35
x 200
270.00

(3) 1/4 of 1% of 900 gallons = .0025 x 900 = 2.25 gallons

.0025
x 900
2.2500

(4) 1/2 of 1% of 300 gallons = .005 x 300 = 1.5 gallons

.005
x 300
1.500