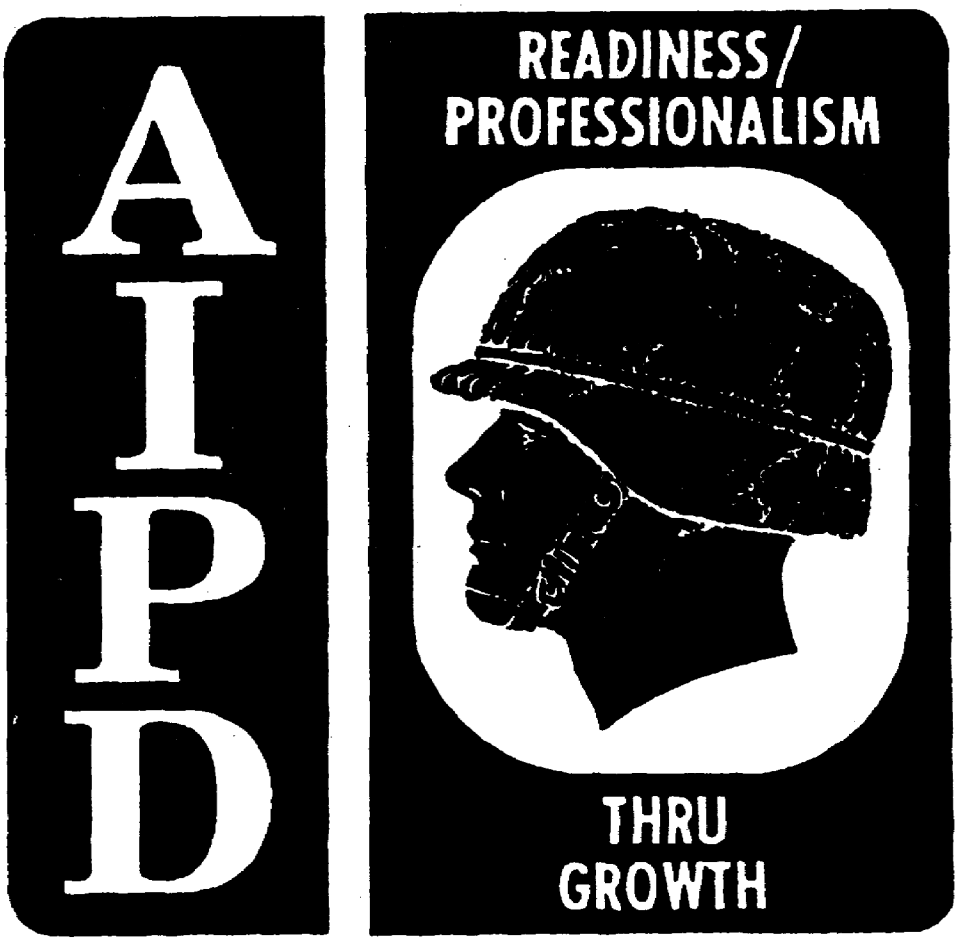
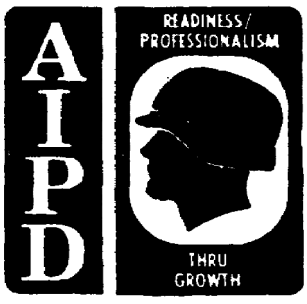
**SUBCOURSE** **EDITION**
QM0113 A

# BASIC MATHEMATICS I (ADDITION, SUBTRACTION, MULTIPLICATION, AND DIVISION)




THE ARMY INSTITUTE FOR PROFESSIONAL DEVELOPMENT
ARMY CORRESPONDENCE COURSE PROGRAM



# BASIC MATHEMATICS I (ADDITION, SUBTRACTION, MULTIPLICATION AND DIVISION)

Subcourse Number QM 0113

EDITION A

United States Army Quartermaster Center and School
Fort Lee, Virginia 28801-5086

3 Credit Hours

CONTENTS

**Page**



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

# INTRODUCTION

This subcourse is designed to train soldiers on how to do basic mathematics (addition, subtraction, multiplication, and division). It will cover each part of the task and your responsibilities.

Supplementary Training Material Provided: None.

Materials to be Provided be 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.

NOTE: This subcourse and QM0114, QM0115, and QMO116 have all been designed to strengthen the basic mathematical skills of all of the Quartermaster School MOSs.

GRADING AND CERTIFICATION INSTRUCTIONS

**Important: Electronic Examination Information**

This paper subcourse does not contain the examination. The examination response sheet is included only as a mailing label. You must go to the following web site to complete the examination and submit it for grading.

http ://www.aimsrdl.atsc.army.mil/accp/accp_top.htm

Registered students (those with ACCP userids and passwords) should key in the userid and password to LOGON, then click on the EXAM button to access the examination.

Students who have not yet registered should click on the REGISTER button on the lower right corner of the screen. Follow directions to create a userid and password. Then click on the EXAM button to access the examination.

*** IMPORTANT NOTICE ***

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

PLEASE DISREGARD ALL REFERENCES TO THE 75% REQUIREMENT.

## LESSON

TASK: Basic Mathematics I (Addition, Subtraction, Multiplication, and Division). As a result of successful completion of this subcourse, you will be able to perform the following performance measures:

1. Solve problems of addition and subtraction of whole numbers containing up to five digits.

2. Solve problems of multiplication of whole numbers up to five digits by using the multiplication table up to 9 x 9.

3. Solve problems of short division by two-digit whole numbers and long division by whole numbers up to five digits.

4. Solve problems of addition and subtraction of fractions and mixed numbers.

CONDITIONS: Given this subcourse, you will be able to do basic mathematics I (addition, subtraction, multiplication, and division).

STANDARD: You must answer 70 percent of the written exam questions correctly to receive credit for this subcourse.

CREDIT HOURS: See page ii, Introduction.

## 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 simple addition, subtraction, multiplication, and division of whole numbers and common fractions. We will ask you to take part in the program by answering questions, filling in blanks, and performing fundamental mathematical computations.

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 and 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 text. Remember, you will be graded on the examination exercises.

## WHOLE NUMBERS

## ADDITION, SUBTRACTION, MULTIPLICATION, AND DIVISION

Whole numbers are the regular numbers you use every day, like 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

You have used whole numbers since you started to learn arithmetic in school.

You have learned to solve problems by using the operations of addition, subtraction, multiplication, and division.

To start,

What do the following signs of operation tell you to do?

(1) + _____.

(2) - _____.

(3) x _____.

(4) ÷ _____.

ANSWERS:

(1) Add (+)

(2) Subtract (-)

(3) Multiply (x)

(4) Divide (÷)

---

## ADDITION OF WHOLE NUMBERS

When you see the sign to add (+), that means you must total the numbers together to come up with a sum.

| | |
|---|---|
| 2 4 7 | Addends |
| + 8 2 | |
| 3 2 9 | Sum |

To review addition, solve the following problem:

30 + 279 = _____.

ANSWER: 309

Remember, the problem 30 + 279 = ? can be written like this to make it easier to solve:

```
  3 0      Addends
+ 2 7 9
  3 0 9    Sum
```

---

Now, try these addition problems to test your addition skills:

(1) 2,175 + 24 = _____.

(2) 29,721 + 88 + 224 = _____.

(3) 856 + 409 + 735 = _____.

(4) 74,126 + 1,001 + 60 = _____.

(5) 34 + 72,100 + 8,169 = _____.

ANSWERS:

(1)
$$\begin{array}{r} 2,175 \\ +\quad 24 \\ \hline 2,199 \end{array}$$

(2)
$$\begin{array}{r} 29,721 \\ 88 \\ +\quad 224 \\ \hline 30,033 \end{array}$$

(3)
$$\begin{array}{r} 856 \\ 409 \\ +\quad 735 \\ \hline 2,000 \end{array}$$

(4)
$$\begin{array}{r} 74,126 \\ 1,001 \\ +\quad 60 \\ \hline 75,187 \end{array}$$

(5)
$$\begin{array}{r} 34 \\ 72,100 \\ +\quad 8,169 \\ \hline 80,303 \end{array}$$

---

If you did not make any mistakes in solving the problems on page 5, you probably do not need to spend any time in reviewing how to solve addition problems. If you did make mistakes, you should review your method of solving addition problems.

Which of these statements describes you best?

I made at least one mistake. -- Turn to page 7.

I made no mistakes. -- Turn to page 13.

To be able to add, you must know the addition table on page 64. Make certain you know all of this table before going ahead.

---

Which of the following statements describes you best?

I have the addition table memorized. -- Turn to page 8.

I'm not sure of the addition table and would like to see it again. -- Turn to page 64.

Let's look at the number 42,135. Each column in the number has a name.

42,135

| | |
|---|---|
| The 5 is in the units column. | 5 |
| The 3 is in the tens column. | 30 |
| The I is in the hundreds column. | 100 |
| The 2 is in the thousands column. | 2,000 |
| The 4 is in the ten thousands column. | 40,000 |
| When we total the columns, we have | 42,135 |

In addition, when you write

| | | |
|---|---|---|
| 4 7 | | 4 Tens + 7 Units |
| + 3 2 | | + 3 Tens + 2 Units |
| 7 9 | you are saying | 7 Tens + 9 Units |

You are adding units to units and tens to tens.

One big trouble spot in addition is carrying.

If you do not understand carrying, the following sample should help you.

## CARRYING IN ADDITION

Most of you are familiar with the idea of carrying in addition. In actual practice, you mentally carry a number into the next column. This example will show you why you carry.

Add the numbers:

| | | |
|---|---|---|
| 2 3 9 | The sum of the units column is | 2 6 |
| 5 4 2 | The sum of the tens column is | 1 3 0 |
| 8 1 9 | The sum of the hundreds column is | 1 8 0 0 |
| 3 5 6 | | 1 9 5 6 |
| ? | | |

When you find the sum of the units column to be 26, you write the 6 in the units column, but you have 2 tens also. So you must carry the 2 tens to the second, or tone, column.

The sum of the tens column is 1 hundred and 3 tens. So you write the 3 tens in the ___column and carry the 1 hundred to the _____column.

The sum of the hundreds column is 1 thousand and_____ hundreds. So you write the_____in the hundreds column and carry the _____thousands to the_____column.

ANSWERS:

Tens

Hundreds

8

8

1

Thousands

---

Good. Now let's see if you have the idea.

Add: (1)

$$\begin{array}{r} 289 \\ +\ 748 \\ \hline \end{array}$$

(2)

$$\begin{array}{r} 75,234 \\ 202 \\ 1,993 \\ +\ \ \ 21 \\ \hline \end{array}$$

ANSWERS: (1)

$$\begin{array}{r} 289 \\ +\ 748 \\ \hline 1,037 \end{array}$$

(2)

$$\begin{array}{r} 75,234 \\ 202 \\ 1,993 \\ +\ \ \ \ 21 \\ \hline 77,450 \end{array}$$

In each case you had to carry the 1 to the next column.

A few persons continue to write the carried number above the next column, as we have shown here. You should practice your addition until you are able to add without using this crutch.

---

## ADDITION REVIEW

Let's review what you have covered about addition.

1. When you add numbers together, your answer is called the _____.

2. The number 732 means:

   7 _____ + 3 Tens + 2 _____.

3. In order to add quickly and correctly, you must know the _____table.

4. Be sure to carry the proper amount into the next column. In this problem, what is the amount to be carried to the tens column? _____

$$\begin{array}{r} 38 \\ 19 \\ 27 \\ +\ 17 \\ \hline \end{array}$$

The sum is _____.

ANSWERS:

1. Sum

2. 7 hundreds + 3 tens + 2 units.

3. Addition table - on page 64.

4. Amount carried -- 3.

5. Sum -- 101.

---

Now, if you feel you need some extra practice in addition, turn to page 13 for additional problems.

If you think you have the idea and can add without mistakes, turn to page 15.

## EXTRA PRACTICE IN ADDITION

Work all of the practice problems before checking your answers.

ADDITION:

(1)
$$\begin{array}{r} 3 \\ 1 \\ 4 \\ 4 \\ 4 \\ 1 \\ +\ 7 \end{array}$$

(2)
$$\begin{array}{r} 8 \\ 4 \\ 5 \\ 0 \\ 9 \\ 7 \\ +\ 9 \end{array}$$

(3)
$$\begin{array}{r} 87 \\ 18 \\ 579 \\ +\ 6,383 \end{array}$$

(4)
$$\begin{array}{r} 7,994 \\ 60 \\ 692 \\ +\ 788 \end{array}$$

(5)
$$\begin{array}{r} 536 \\ 465 \\ 299 \\ +\ 508 \end{array}$$

(6)
$$\begin{array}{r} 8,975 \\ 8,637 \\ 7,294 \\ +\ 4,367 \end{array}$$

(7)
$$\begin{array}{r} 75,621 \\ 3,285 \\ 64,027 \\ +\ 208 \end{array}$$

(8)
$$\begin{array}{r} 10,001 \\ 692 \\ +\ 80,701 \end{array}$$

(9) A man worked five days building his garage. How many hours did he work if he worked the following number of hours each day?

12 hours, 14 hours, 7 hours, 16 hours, 10 hours.

ANSWERS:

(1) 2 4

(2) 4 2

(3) 7, 0 6 7

(4) 9, 5 3 4

(5) 1, 8 0 8

(6) 2 9, 2 7 3

(7) 1 4 3, 1 4 1

(8) 9 1, 3 9 4

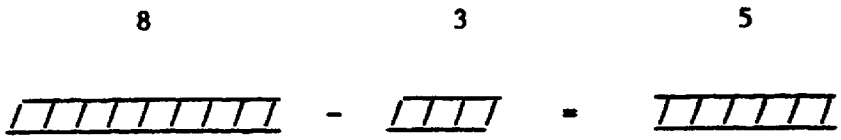
(9) 59 hours

TURN TO PAGE 15.

## SUBTRACTION OF WHOLE NUMBERS

Subtraction is the opposite of addition. The sign of operation looks like this (-).

The sign (-) tells you to "take away"; so in the problem, 8 blocks – 3 blocks = 5 blocks, you are "taking away" 3 blocks from the 8 blocks; and you have 5 blocks left.




This problem may also look like this:

```
   8   Minuend
 - 3   Subtrahend
   5   Difference
```

1. In this case the 8 is called the_____.

2. The 3 is called the_____.

3. The 5 is called the_____.

ANSWERS:

(1) Minuend 8 blocks

(2) Subtrahend - 3 blocks

(3) Difference 5 blocks

The reason we give the numbers a name is to make it easier to understand which number we are talking about.

---

Let's solve these problems to test your subtraction skills.

(1)
$$\begin{array}{r} 182 \\ -\ 34 \\ \hline \end{array}$$

(2)
$$\begin{array}{r} 1,386 \\ -\ 492 \\ \hline \end{array}$$

(3)
$$\begin{array}{r} 72,721 \\ -\ 10,487 \\ \hline \end{array}$$

(4) Subtract 73 from 141.

(5) 75,201 - 2,017 = _____.

ANSWERS:

(1)
$$\begin{array}{r} 182 \\ -\ 34 \\ \hline 148 \end{array}$$

(2)
$$\begin{array}{r} 1,386 \\ -\ 492 \\ \hline 894 \end{array}$$

(3)
$$\begin{array}{r} 72,721 \\ -\ 10,487 \\ \hline 62,234 \end{array}$$

(4) $141 - 73 = 68$ or
$$\begin{array}{r} 141 \\ -\ 73 \\ \hline 68 \end{array}$$

(5)
$$\begin{array}{r} 75,201 \\ -\ 2,017 \\ \hline 73,184 \end{array}$$

---

Which of the following statements best describes you?

1. I seem to be doing something wrong because my answers are not the same as yours! Turn to page 18.

2. 1 made only a few mistakes, but I would like some review on subtraction problems. Turn to page 22.

3. I made no mistakes in solving the problems on page 16, and I feel I understand how to solve subtraction problems properly. Turn to page 24.

## SUBTRACTION OF WHOLE NUMBERS

Just as you have an addition table, you have a subtraction table. If you do not understand the subtraction table, you must turn to page 64 and review it completely.

---

Which of these two statements best describes you?

1. I already understand the subtraction table and have it memorized. Turn to page 19.

2. I need to review the subtraction table. Turn to page 64.

## BORROWING IN SUBTRACTION

In addition you learn to carry; and, since subtraction is the opposite of addition, you will now use the idea of borrowing in subtraction.

When, for example, you write

| | | |
|---|---|---|
| 4 7 6 | | 4 hundreds + 6 tens + 16 units |
| - 2 5 9, | you must think | - 2 hundreds + 5 tens + 9 units |
| 2 1 7 | | 2 hundreds + 1 ten + 7 units |

You can see you changed the Minuend from

4 hundreds + 7 tens + 6 units

to

4 hundreds + 6 tens + 16 units

You borrowed 1 ten from the tens column and added it to the units column so that you can now subtract: 16 units - 9 units = 7 units.

Now, you try this one.

9 3 7
- 5 6 9

ANSWER:
$$\begin{array}{r} 937 \\ -\ 569 \\ \hline 368 \end{array}$$

---

**BORROWING REVIEW PROBLEM**

$$\begin{array}{r} 1,000,002 \\ -\ \ 99,999 \\ \hline \end{array}$$

STEP 1.
$$\begin{array}{r} 1,000,002 \\ -\ \ 99,999 \\ \hline ? \end{array}$$

STEP 2.
$$\begin{array}{r} 1,000,002 \\ -\ \ 99,999 \\ \hline 900,003 \end{array}$$

Before finding the difference for the above problem, you first must borrow 10 from the tens column so that you can subtract 9 from a number that is equal to it or larger than it. In this example, you have to go left all the way to the millions column to get the 10.

---

Do you understand the use of zero in subtraction?

1. Zero subtracted from any number is_____.
2. What is 25 - 0 =_____?
3. Subtract 278 – 100 =_____.
4. Subtract 0 - 0 =_____.

ANSWERS:

(1) that number, or the same number

(2) 25 - 0 = 25

(3)
```
  2 7 8
- 1 0 0
  1 7 8
```
8 minus 0 = 8
7 minus 0 = 7
2 minus 1 = 1

(4) 0 - 0 = 0

---

**SOLVE THESE PROBLEMS**

(1)
```
  7 5 6
- 2 3 4
```

(2)
```
  7 5 6
- 2 8 9
```

(3)
```
  1 0, 0 0 0
-   4, 2 0 6
```

(4)
```
  8 6, 3 7 5
- 2 8, 4 8 6
```

(5) Subtract 8,241 from 10,041.

ANSWERS:

(1)
$$\begin{array}{r} 756 \\ -\ 234 \\ \hline 522 \end{array}$$

(2)
$$\begin{array}{r} 756 \\ -\ 289 \\ \hline 467 \end{array}$$

(3)
$$\begin{array}{r} 10,000 \\ -\ 4,206 \\ \hline 5,794 \end{array}$$

(4)
$$\begin{array}{r} 86,375 \\ -\ 28,486 \\ \hline 57,889 \end{array}$$

(5)
$$\begin{array}{r} 10,041 \\ -\ 8,241 \\ \hline 1,800 \end{array}$$

## SUBTRACTION REVIEW

Let's review what we have learned about subtraction.

1. When you subtract two numbers, you call the answer the _____ _____.

2. To be able to subtract correctly, you must know the _____ table well.

3. Sometimes you have to borrow in order to subtract. How much will you borrow to solve this problem?_____

$$\begin{array}{r} 82 \\ -\ 64 \end{array}$$

What will the difference be?_____

ANSWERS:

(1) Difference

(2) Subtraction Table - page 64.

(3) 1 ten, or 10 units.

| | | | |
|---|---|---|---|
| | 8 2 | | 7 tens + 12 units |
| | - 6 4 | can be expressed | 6 tens + 4 units |
| Difference | 1 8 | | 1 ten + 8 units |

---

If you feel you need sore extra practice solving subtraction problems, turn to page 24.

If you are getting the correct answers and you are able to solve subtraction problems without any trouble, turn to page 26.

EXTRA PRACTICE IN SUBTRACTION

| | | | | | |
|---|---|---|---|---|---|
| (1) | 10,000<br>- 7,421 | (2) | 8,204<br>- 1,111 | (3) | 75,231<br>- 24,343 |
| (4) | 8,975<br>- 8,637 | (5) | 10,001<br>- 692 | (6) | 8,010<br>- 7,090 |
| (7) | 75,201<br>- 2,017 | (8) | 41,007<br>- 1,008 | (9) | 60,201<br>- 8,942 |

(10) Fred paid $350 for a motor bike at Store A; Bill paid $317 for the same bike at Store B. How much did Bill save by buying his bike at Store B?

_____

(11) A storage tank can hold a total of 10,000 gallons of gasoline. The tank now has 4,728 gallons in it. How much more gasoline can be put into the tank?

## ANSWERS FOR EXTRA PRACTICE IN SUBTRACTION

(1) 10,000 − 7,421 = 2,579

(2) 8,204 − 1,111 = 7,093

(3) 75,231 − 24,343 = 50,888

(4) 8,975 − 8,637 = 338

(5) 10,001 − 692 = 9,309

(6) 8,010 − 7,090 = 920

(7) 75,201 − 2,017 = 73,184

(8) 41,007 − 1,008 = 39,999

(9) 60,201 − 8,942 = 51,259

(10) $350 − 317 = $33 Bill saved $33.00.

(11) 10,000 − 4,728 = 5,272 gallons

GO ON TO PAGE 26.

# MULTIPLICATION OF WHOLE NUMBERS

Instead of adding 3 + 3 + 3 + 3 = 12, you usually write 3 x 4 = 12. You say that you have multiplied 3 by 4 and that 12 is the product of 3 times 4.

| | |
|---|---|
| 3 | multiplicand |
| x 4 | multiplier |
| 12 | product |

In the multiplication problem above, the 4 is called the _____, the 3 is called the_____ , and the answer you get is called the _____ _____.

The simplest way to avoid mistakes in multiplication is to form the habit of checking. To check multiplication, you use the principle that the order in which the numbers are multiplied does not affect the product. For example, 6 x 9 = 9 x 6. You can see that the answer is the same if you multiply 16 x 18 or 18 x 16.

| | | | | |
|---|---|---|---|---|
| Multiplicand | 18 | Check | 16 | Multiplicand |
| Multiplier | 16 | | 18 | Multiplier |
| | 108 | | 128 | |
| | 18 | | 16 | |
| Product | 288 | | 288 | Product |

Now, solve these multiplication problems to test your multiplication skills.

(1) 19 x 7

(2) 20 x 21

(3) 17 x 0

(4) 220 x 56

(5) 819 x 706

(6) 563 x 400

(7) 14,960 x 251

(8) 31,416 x 3,141

ANSWERS: Multiplier
Multiplicand
Product

Solutions to multiplication problems, page 26.

(1)
$$\begin{array}{r} 19 \\ \times\ 7 \\ \hline 133 \end{array}$$

(2)
$$\begin{array}{r} 20 \\ \times\ 21 \\ \hline 20 \\ 40\ \ \\ \hline 420 \end{array}$$

(3)
$$\begin{array}{r} 17 \\ \times\ 0 \\ \hline 0 \end{array}$$

When any number is multiplied by zero, the answer is zero.

(4)
$$\begin{array}{r} 220 \\ \times\ 56 \\ \hline 1320 \\ 1100\ \ \\ \hline 12{,}320 \end{array}$$

(5)
$$\begin{array}{r} 819 \\ \times\ 706 \\ \hline 4914 \\ 000\ \ \\ 5733\ \ \ \\ \hline 578{,}214 \end{array}$$

(6)
$$\begin{array}{r} 563 \\ \times\ 400 \\ \hline 225{,}200 \end{array}$$

(7)
$$\begin{array}{r} 14{,}960 \\ \times\ 251 \\ \hline 14960 \\ 74800\ \ \\ 29920\ \ \ \\ \hline 3{,}754{,}960 \end{array}$$

(8)
$$\begin{array}{r} 31{,}416 \\ \times\ 3{,}141 \\ \hline 31416 \\ 125664\ \ \\ 31416\ \ \ \\ 94248\ \ \ \ \\ \hline 98{,}677{,}656 \end{array}$$

If you had no trouble in solving these problems of multiplication, then you should not need additional review. However, if you did make mistakes and if you are not certain about how to multiply and check your answers, you should review.

Which of the following statements describes you best?

1. I made no mistakes and understand how to multiply. Turn to page 33.

2. I made several mistakes, and I went to review how to multiply properly. Turn to page 28.

## HOW TO USE THE MULTIPLICATION TABLE

As stated before, multiplication is just a quick way to do addition problems. To add 10 + 10 + 10 + 10 + 10 = 50 is the same as multiplying 10 x 5 = 50. However, to be able to solve more difficult problems quickly and accurately, you must understand and know the multiplication table below.

The same table can be found on page 65 for easy reference.

Here's how to use the table: Any number in the left-hand column multiplied by any number in the top line equals the number under the one in the top line and opposite the one in the left-hand column. Let's multiply 7 (left-hand column) by 8 (top line): 7 x 8 = 56. What is 9 x 9?

### MULTIPLICATION TABLE

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | (8) | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 |
| 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 |
| 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 |
| (7) | 14 | 21 | 28 | 35 | 42 | 49 | (56) | 63 | 70 | 77 | 84 |
| 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 88 | 96 |
| 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 | 99 | 108 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 |
| 11 | 22 | 33 | 44 | 55 | 66 | 77 | 88 | 99 | 110 | 121 | 132 |
| 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |

ANSWER: 9 x 9 = 81

---

## STEPS IN MULTIPLICATION

This example will show you the multiplication procedure one step at a time.

Multiply 232 by 3

(Also written 232 times 3, 232 x 3, or (232)(3))

| | |
|---|---|
| 2 3 2 | Multiplicand |
| x 3 | Multiplier |
| 6 9 6 | Product |

Step 1. Set the multiplier down under the number to be multiplied. Put the multiplier under the units digit of the multiplicand.

Step 2. Draw a line and start to multiply with the first (units) digit of the multiplicand.

3 x 2 = 6 put down 6 under 2

3 x 3 = 9 put down 9 under 3

3 x 2 = 6 put down _ under 2

ANSWER: 6

---

Here's another example:

Multiply 345 x 320

```
  3 4 5
x 3 2 0   multiplier
  6 9 0 0
1 0 3 5
1 1 0,4 0 0   product
```

You should know that 0 times any number is 0, but you cannot throw it away if it comes at the end of a number. If the multiplier ends with one or more zero, you can move the multiplier over to the right, so that the first figure comes under the first digit of the number to be multiplied. Draw a line, bring down the 0, and start to multiply from right to left.

| | |
|---|---|
| 2 x 5 = 10 | put down 0 under 2 and carry 1 |
| 2 x 4 = 8 | add I carried and put down 9 under 4 |
| 2 x 3 = 6 | put down 6 under the 3 |
| 3 x 5 = 15 | put down 5 under 3 and carry 1 |
| 3 x 4 = 12 | add 1 carried, put don 3 under 6, and carry 1 again |
| 3 x 3 = 9 | add 1 carried and put down 10 to the left of 3 |

Draw another line and add to get the product, _____.

ANSWER:

product = 110,400

---

**SOLVE THESE MULTIPLICATION PROBLEMS**

(1) 7 x 8 x 4 = _____

(2) 2 · 6 · 14 = _____

(3) 203 x 100 = _____

(4) 871 x 629 = _____

(5)
$$\begin{array}{r} 4\,0\,0{,}0\,0\,1 \\ \times\quad 2{,}7\,4\,2 \end{array}$$

(6)
$$\begin{array}{r} 1\,4{,}0\,1\,7 \\ \times\, 3{,}1\,4\,1 \end{array}$$

(7)
$$\begin{array}{r} 7\,5{,}4\,2\,1 \\ \times\, 6{,}2\,1\,0 \end{array}$$

(8)
$$\begin{array}{r} 2\,5{,}0\,0\,0 \\ \times\quad\; 5\,0 \end{array}$$

## SOLUTION TO MULTIPLICATION PROBLEMS, PACE 31

(1) 7 x 8 x 4 = 56 x 4 = 224

(2) 2 · 6 · 14 = 12.14 = 168

(3) 203 x 100 = 20,300

(4) 871 x 629 = 547,859

(5)

```
    4 0 0,0 0 1
  x   2,7 4 2
    8 0 0 0 0 2
  1 6 0 0 0 0 4
2 8 0 0 0 0 7
  8 0 0 0 0 2____
1,0 9 6,8 0 2,7 4 2
```

(6)

```
    1 4,0 1 7
  x 3,1 4 1
    1 4 0 1 7
  5 6 0 6 8
1 4 0 1 7
4 2 0 5 1_____
4 4,0 2 7,3 9 7
```

(7)

```
  2 5,0 0 0
x       5 0
1,2 5 0,0 0 0
```

(8)

```
    7 5,4 2 1
  x   6,2 1 0
    7 5 4 2 1 0
  1 5 0 8 4 2
4 5 2 5 2 6_____
4 6 8,3 6 4,4 1 0
```

Check your answers. If you were able to solve these problems, turn to page 33.

## ZERO IN MULTIPLICATION

One trouble spot in multiplication is the zero (0). You should know by now that the zero is not included in the multiplication table because any number times zero is zero.

So: 17 x 0 = 0

What is 0 x 17 = _____

Remember, the rule says that any number times zero is _____; zero times any number is_____.

Here are some ways that zeros are likely to appear in multiplication. Study each example carefully.

(a)
$$\begin{array}{r} 20 \\ \times\ 10 \\ \hline 200 \end{array}$$

(b)
$$\begin{array}{r} 53 \\ \times\ 203 \\ \hline 159 \\ 00 \\ 106\ \ \\ \hline 10{,}759 \end{array}$$

(c)
$$\begin{array}{r} 309 \\ \times\ 256 \\ \hline 1854 \\ 1545 \\ 618\ \ \ \\ \hline 79{,}104 \end{array}$$

See if you can solve these problems without a single mistake.

(1) 207 x 12 = _____

(2) 214 x 800 = _____

(3) 30,406 x 14 = _____

## SOLUTION TO MULTIPLICATION PROCEDURES, PAGE 33

ANSWERS:

a. 0 x 17 = 0

b. 0

c. 0

(1)
$$\begin{array}{r} 207 \\ \times\ 12 \\ \hline 414 \\ 207\_\_ \\ \hline 2{,}484 \end{array}$$

(2)
$$\begin{array}{r} 214 \\ \times\ 800 \\ \hline 171{,}200 \end{array}$$

(3)
$$\begin{array}{r} 30{,}406 \\ \times\ 14 \\ \hline 121624 \\ 30406\_\_ \\ \hline 425{,}684 \end{array}$$

If you got them correct -- good work!

---

## KEEPING THE UNITS STRAIGHT

While you have been multiplying numbers and getting answers, you have not been concerned with a unit of measure, like inches, feet, gallons, barrels.

When you have problems about measure, you must be very careful that the units you are using are correct, or you cannot get the right answer. For example, suppose you were told that a pipeline you were building was to be I mile long, but you now had 2,000 feet of pipe. Let's find how much more pipe you will need.

1. The first step is to change 1 mile into feet because you must have the unit of measure the same before you can work the problem.

   1 mile = 5,280 feet.

2. Then subtract the 2,000 feet of pipe on hand from 5,280 feet.

$$\begin{array}{rl} 5,280 & \text{feet} \\ -\ 2,000 & \text{feet} \\ 3,280 & \text{feet of pipe required.} \end{array}$$

As you can see, you used only one unit -- feet.

Now you try this one:

A pipe is 200 feet long. How many inches long is the pipe? _____

How many yards long is the pipe?_____

(HINT: 1 foot = 12 inches)
(1 yard = 3 feet)

ANSWER: Pipe is 200 feet long

(1) 200 x 12 inches (in each foot) = 2400 inches

(2) 200 ÷ 3 feet (in each yard) = 66 2/3 yards

You can see that, if the units are kept straight, finding the answer is very easy,

---

**MULTIPLICATION REVIEW**

(1)
```
    6   _____
x   2   _____
  1 2   _____
```
Fill in the correct names of the parts of No. (1).

(2) Zero times any number equals_____.

(3) Multiplication is a quick method of_____.

(4)
```
  5 6 0
x 2 7 0
```

(5)
```
  3 6 0
x 2 5 3
```

(6)
```
  6 7 3
x 9 0 1
```

(7)
```
  2 4 2
x   1 0
```

(8)
```
  2 4 2
x 1 0 0
```

(9)
```
  2 4 2
x 1 0 0 0
```

(10) A soldier can pump 50 gallons of gasoline in 1 minute (50 GPM). How many gallons can he pump in 1 hour?

## SOLUTIONS FOR MULTIPLICATION REVIEW

(1)
```
   6   Multiplicand
 x 2   Multiplier
 1 2   Product
```

(2) Zero

(3) Addition, or adding

(4)
```
   5 6 0
 x   2 7 0
   3 9 2 0 0
 1 1 2 0
 1 5 1,2 0 0
```

(5)
```
     3 6 0
   x 2 5 3
     1 0 8 0
   1 8 0 0
   7 2 0
   9 1,0 8 0
```

(6)
```
     6 7 3
   x 9 0 1
     6 7 3
 6 0 5 7 0
 6 0 6,3 7 3
```

(7)
```
   2 4 2
 x   1 0
   2,4 2 0
```

(8)
```
   2 4 2
 x 1 0 0
 2 4,2 0 0
```

(9)
```
   2 4 2
 x 1 0 0 0
 2 4 2,0 0 0
```

(10) 50 gallons x 60 (number of minutes in 1 hr) = 3,000 gallons\hour

This completes the review of multiplication; turn to page 38 to start the review of division.

## DIVISION OF WHOLE NUMBERS

Division is the reverse of multiplication. It is the method of finding out how many times one number goes into another number. To divide 8 by 4 means to find out how many tines 4 will go into 8.

As in multiplication, you have a division table; and you should be familiar with it. If you do not know the division table, turn to page 65 and review it now.

The sign for division is ÷ or )

When the division sign appears between two numbers, it means that the first number is to be divided by the second number. For example 16 ÷ 4, means to 16 by 4. 4 )16

Look at this division problem.

Divisor 3 )345 Dividend — Quotient: 115

or the same problem could be written like this:

Dividend $\frac{345}{3}$ = 115 Quotient
Divisor

In the problem 25 )125

The divisor is _____.

The dividend is _____.

The quotient is _____.

ANSWER: Divide

25

125

5

---

## SHORT AND LONG DIVISION

There are two methods of division, short division and long division. Both methods will be illustrated in the following problems.

To make the process quicker, short division is used when the divisor has only one digit. You should be able to do short division without writing anything except the quotient, or answer.

Solve the following problems by short division to test your division skills:

(1) $3\overline{)351}$ (2) $4\overline{)2404}$ (3) $6\overline{)2436}$

(4) $5\overline{)1040}$ (5) $7\overline{)1001}$ (6) $9\overline{)295857}$

Solve the following problems by long division:

(1) $15\overline{)225}$ (2) $8460 \div 36 =$ (3) $125\overline{)2750}$

(4) $75\overline{)900}$ (5) $30\overline{)25500}$ (6) $28\overline{)3754}$

**SOLUTIONS TO PROBLEMS ON SHORT AND LONG DIVISION**

Short Division:

(1) $3\overline{)351}$ = 117

(2) $4\overline{)2404}$ = 601

(3) $6\overline{)2436}$ = 406

(4) $5\overline{)1040}$ = 208

(5) $7\overline{)1001}$ = 143

(6) $9\overline{)295857}$ = 32873

Long Division:

(1) $15\overline{)225}$ = 15

15
75
75

(2) $36\overline{)8460}$ = 235

72
126
108
180
180

(3) $125\overline{)2750}$ = 22

250
250
250

(4) $75\overline{)900}$ = 12

75
150
150

(5) $30\overline{)25500}$ = 850

240
150
150
0
0

(6) $28\overline{)3754}$ = 134

28
95
84
114
112
2
Remainder

If you had no trouble solving these division problems and you feel you understand how to divide, then you should not need additional review. However, if you made some mistakes, you should review.

Which of these statements describes you best?

1. I made no mistakes and understand how to divide. Turn to page 46.

2. 1 made several mistakes, and I want to review how to divide. Turn to page 41.

## REVIEW OF DIVISION

$$12\overline{)60}\quad 5$$

In this division exercise, $12\overline{)60}$, you really ask and answer a question. The question is: How many twelves in 60?

The answer is_____.

The exercise $25\overline{)125}$ answers the question:

How many_____in_____?

You will now see that division is a quick way to do subtraction.

DIVIDE:

$$35\overline{)105}$$

You could solve the problem like this:

| | | |
|---|---|---|
| 105 | | |
| - 35 | (1) | But you can see that dividing 35 into 105 |
| 70 | | is faster than subtracting all those figures. |
| - 35 | (2) | |
| 35 | | |
| - 35 | (3) | |

ANSWER: 5

Twenty fives in 125

3

---

## LONG DIVISION

DIVIDE: 28 ) 3752

Could you solve this problem by repeated subtraction? Yes, but it will be a lot of work and take a lot of time.

You would not want to subtract like this:

```
 3752
-  28   (1)
 3724
-  28   (2)
 3696
-  28   (3)
```

You will be subtracting for a long time.

That is why division is such quicker

a.
```
    1
28 ) 3752
   28
    95
```

Step 1: See how many times 28 will go into 37? Answer _____ .

Step: 2: Subtract 28 from 37 and bring down the 5.

b.
```
    13
28 ) 3752
   28
    95
    84
    112
```

Step 3: Start with the same procedure in step 1. How many times will 28 to into 95? Answer _____ .

Step 4: Subtract again and bring down the 2.

c..
```
    134
28 ) 3752
   28
    95
    84
    112
    112
```

Step 5: Again, how many times will 28 go into 112? Answer _____ .

The quotient is _____ .

ANSWER: (a) 1

(b) 3

(c) 4

Quotient = 134.

---

When you divide, you often have a number left over that is too small to be divided by the divisor. This left-over number is called the remainder.

Example:

```
      42
15 ) 642
     60
     42
     30
     12        Remainder
```

## DIVISION PRACTICE

Solve the following:

(1) $3\overline{)288}$

(2) $37\overline{)1813}$

(3) $900\overline{)936728}0$

(4) $30\overline{)25410}$

HINT: Be careful, look for remainders:

(5) $131\overline{)304076}$

(6) $287\overline{)27774}$

## SOLUTIONS FOR DIVISION PRACTICE

(1)
```
    96
3 ) 288
    27
    18
    18
```

(2)
```
    49
37 ) 1813
   148
    333
    333
```

(3)
```
      1040
900 ) 936728 0
      9007
       36028
       36028
           0
           0
```

(4)
```
     847
30 ) 25410
     240
      141
      120
       210
       210
```

(5)
```
      2321    r 25
13 ) 304076     131
     262
      420
      393
       277
       262
        156
        131
         25
```

(6)
```
       96     r 222
287 ) 27774      287
      2583
       1944
       1722
        222
```

You should now be able to solve division problems.

If you now are able to solve division problems without making mistakes, turn to page. 46.

# ADDITION AND SUBTRACTION OF COMMON FRACTIONS

A fraction consists of two parts: an upper part and a lower part.

The upper part is called the numerator.

The lower part is called the denominator.

$$\text{Fraction} = \frac{\text{numerator}}{\text{denominator}}$$

(1) In the fraction $\frac{3}{4}$

3 is the _____ _____.

4 is the _____ _____.

(2) In the fraction $\frac{5}{9}$

the numerator is_____.

the denominator is_____.

(3) The upper part of the fraction is called the_____.

(4) The lover part of the fraction is called the_____.

ANSWER: (1) numerator

denominator

(2) 5

9

(3) numerator

(4) denominator

---

Solve the following problems to test your skills in adding and subtracting fractions:

(1) $\frac{1}{8} + \frac{3}{4} + \frac{1}{2} =$ _____

(2) $\frac{7 - 4 + 3}{4} =$ _____

(3) $\frac{3}{4} - \frac{3}{8} =$ _____

(4) $7\frac{1}{4} - 4\frac{5}{8} =$ _____

ANSWERS:

(1) $\frac{1}{8} + \frac{3}{4} + \frac{1}{2} = \frac{1}{8} + \frac{6}{8} + \frac{4}{8} + \frac{11}{8} = 1\frac{3}{8}$

(2) $\frac{7 - 4 + 3}{4} = \frac{6}{4} = 1\frac{2}{4} = 1\frac{1}{2}$

(3) $\frac{3}{4} - \frac{3}{8} = \frac{6}{8} - \frac{3}{8} = \frac{3}{8}$

(4) $7\frac{1}{4} - 4\frac{5}{8} = \frac{29}{4} - \frac{37}{8} = \frac{58}{8} - \frac{37}{8} = \frac{21}{8} = 2\frac{5}{8}$

---

If you were able to solve these problems without any mistakes, you probably do not need any more review of addition and subtraction of fractions.

However, if you made one or more mistakes or had trouble finding the answers, you should review fractions.

Which of the following statements describes you best?

1. I made at least one mistake and need to review fractions. Turn to page 49.

2. I did not make any mistakes and feel that I understand fractions completely. Turn to page 62.

## COMMON DENOMINATOR

When two or more fractions have the same denominator, we say that these fractions have a common denominator.

If fractions have a common denominator, it means that their denominators are the_____

_____.

The fractions $\frac{4}{7}$ , $\frac{21}{7}$ , and $\frac{6}{7}$ all have the same denominator.

Their common denominator is_____.

Which of the following fractions have a common denominator?

_____

$\frac{4}{3}$ $\frac{3}{6}$ $\frac{3}{7}$ $\frac{2}{3}$ $\frac{3}{4}$ $\frac{1}{2}$ $\frac{1}{3}$

ANSWER: same

7

$\frac{4}{3}$ , $\frac{2}{3}$ , $\frac{1}{3}$

---

## ADDING FRACTIONS

We may add fractions if they have a common denominator.

We may add: $\frac{3}{7} + \frac{2}{7} = \frac{3}{7}$ because $\frac{3}{7}$ and $\frac{2}{7}$ have the common

denominator_____.

May we add: $\frac{11}{9} + \frac{3}{9} + \frac{6}{9} = ?$ (Yes or No)

What is the common denominator?_____

Add the following fractions:

(1) $\frac{17}{11} + \frac{4}{11} + \frac{6}{11} + \frac{1}{11} =$

(2) $\frac{3}{4} + \frac{5}{4} + \frac{1}{4} =$

ANSWERS: 7

Yes

9

(1) $\frac{28}{11}$ or $2\ \frac{6}{11}$

(2) $\frac{9}{4}$ or $2\ \frac{1}{4}$

---

## SUBTRACTING FRACTIONS

We may subtract fractions if they have a common denominator.

We may subtract: $\frac{5}{8} - \frac{3}{8} \quad \frac{2}{8}$ because $\frac{5}{8}$ and $\frac{3}{8}$ have the common

denominator _____.

May we subtract $\frac{11}{12} - \frac{6}{12} = \quad ?$ (Yes or No)_____

The common denominator is_____.

Subtract the following fractions:

(1) $\frac{7}{13} - \frac{3}{13} =$

(2) $\frac{14}{10} - \frac{6}{10} - \frac{8}{10} =$

ANSWER: 8

Yes

12

(1) $\frac{4}{13}$

(2) 0

---

## ADDING AND SUBTRACTING FRACTIONS

We may both add and subtract fractions if they have a common denominator.

We may add and subtract: $\frac{6}{5} - \frac{2}{5} + \frac{4}{5} - \frac{3}{5} = \frac{5}{5}$, or 1, because they have the common denominator_____.

We may add and subtract: $\frac{12}{3} - \frac{10}{3} + \frac{2}{3} = \frac{4}{3}$ (True or False)

_____

The common denominator is_____.

Do the following examples:

(1) $\frac{9}{8} + \frac{4}{8} - \frac{9}{8} - \frac{1}{8} + \frac{3}{8} =$

(2) $\frac{11}{17} - \frac{12}{17} + \frac{4}{17} - \frac{2}{17} =$

ANSWERS: 5

True

3

(1) $\frac{6}{8}$ or $\frac{3}{4}$

(2) $\frac{1}{17}$

---

## FINDING THE LEAST COMMON DENOMINATOR (LCD)

We may add or subtract fractions only if they have a common denominator.

If they do not have a common denominator, they must be converted to a common denominator before adding or subtracting.

We may not add: $\frac{1}{4} + \frac{1}{2} + \frac{1}{6}$ yet, because the denominators are

_____ the same.

In order to add fractions such as $\frac{1}{4} + \frac{1}{2} + \frac{1}{6}$, we must change the

denominators to make them the_____.

The procedure for making the denominators the same is called finding the least common denominator.

The least common denominator is also called the lowest or smallest common denominator.

It is called least or lowest because it is the smallest number that we can use as a common denominator.

The smallest number that we can use as a common denominator is called the_____
_____ _____ _____.

ANSWERS: Not

same

least common denominator

---

There are several ways to find the common denominator, but the easiest way is simply to multiply the denominators together as in this example:

Let's try adding $\frac{1}{2} + \frac{1}{3}$

$2 \cdot 3 = 6$ Lowest common denominator is_____.

Now that you have 6 as the lowest common denominator, you must change the two numerators (1 + 1) to sixths.

You make this change by multiplying both numerator and denominator by the same number, so that the fraction will keep its se value.

To change $\frac{1}{2}$ to sixths, multiply both numerator and denominator by 3:

$$\frac{1}{2} \times \frac{3}{3} = \frac{3}{6}$$

To $\frac{1}{3}$ change to sixths, multiply both by 2:

$$\frac{1}{3} \times \frac{2}{2} = \frac{2}{6}$$

You can now add the fractions, because they have the same denominator.

$$\frac{2}{6} + \frac{2}{6} = \frac{5}{6}$$

ANSWER: 6

---

Another way to find the LCD is to divide the smaller denominator into the larger one. If it divides evenly, the larger number is the LCD.

Example:

$$\frac{3}{4} + \frac{1}{8}$$

4 will divide into 8 evenly. LCD is_____.

You must now change the $\frac{3}{4}$ to eighths.

$$\frac{6}{8} + \frac{1}{8} = \text{\_\_\_\_\_}$$

ANSWER: $\frac{7}{8}$

---

## MIXED NUMBERS

A mixed number is a whole number and a fraction written together.
An example would be $10\ \frac{3}{8}$

A whole number and a fraction written together is called a_____ _____ _____.

$9\ \frac{1}{3}$ is a mixed number because it is a_____ _____ __

and_____written together.

Which of the following are mixed numbers:

$7\ \frac{2}{3}$ , $4\ \frac{1}{8}$ , $16\ \frac{23}{32}$ , $5\ \frac{4}{9}$ , $1\ \frac{1}{100}$

ANSWERS: Mixed number

Whole number = Fraction

All of them.

---

## IMPROPER FRACTIONS

An improper fraction is a fraction whose numerator is greater than its denominator.

If the numerator of a fraction is greater than its denominator, it is called an ,_____

_____ _____.

The fraction $\frac{4}{3}$ is an_____ _____because the _____, 4, is greater than the_____, 3.

Which of the following is not an improper fraction?

$\frac{3}{1}$ , $\frac{7}{6}$ , $\frac{19}{20}$ , $\frac{193}{192}$ , $\frac{18}{17}$

ANSWERS: Improper fraction

Improper fraction

Numerator, denominator

$\frac{19}{20}$

---

## REDUCING IMPROPER FRACTIONS

An improper fraction may be reduced to a mixed number.

Example: Reduce the improper fraction $\frac{32}{7}$ to a mixed number.

We divide the denominator into the numerator.

The denominator is_____.

The numerator is_____.

So, we divide_____into_____.

(1)
$$7\overline{)32}\quad 4$$
$$28$$
$$4 \quad \text{remainder}$$

(2)
$$7\overline{)32}\quad 4\ \tfrac{4}{7}$$
$$28$$
$$4$$

The remainder is $\frac{4}{7}$.

Reducing $\frac{32}{7}$ to a mixed number, we have $\frac{32}{7} =$

ANSWERS: 7

32

7, 32

$4\ \frac{4}{7}$

---

Reduce the improper fraction $\frac{99}{27}$ to a mixed number.

We divide _____ into _____.

(1) $2\overline{)99}$

remainder

(2) $\frac{99}{27} =$

If you found that $\frac{99}{27} = 3\ \frac{18}{27}$, you are not finished.

Is $\frac{18}{27}$ in lowest terms? (Yes or No)_____

Let's reduce $\frac{18}{27}$ by factoring, that is, by finding what numbers multiplied together give us 18 and 27.

Factoring, we have: $\frac{18}{27} = \frac{9 \times 3}{9 \times 3} = \frac{2}{3}$

We can mark out the 9 because it appears in both the numerator and the denominator. So our complete answer should be_____.

$\frac{99}{27} =$

Reduce to mixed numbers:

(2) $\frac{73}{3} =$

(3) $\frac{92}{91} =$

(4) $\frac{156}{50}$

(5) $\frac{111}{10} =$

ANSWERS: 27, 99

(1) $3\ \frac{18}{27}$

No

$3\ \frac{2}{3}$

(2) $\frac{73}{3} = 24\ \frac{1}{3}$

(3) $\frac{92}{91} = 1\ \frac{1}{91}$

(4) $\frac{156}{50} = 3\ \frac{6}{50}$ or $3\ \frac{3}{25}$

(5) $\frac{111}{10} = 11\ \frac{1}{10}$

---

## REDUCING MIXED NUMBERS TO IMPROPER FRACTIONS

You have noticed that mixed numbers must be changed to improper fractions before you can add or subtract them. If you wanted to add $4\ \frac{1}{3}$ and $\frac{2}{3}$, you would first make $4\ \frac{1}{3}$ an improper fraction as follows:

$4 \times 3 = 12$ Multiply the whole number (4) by the denominator (3)

$+\ 1$ Add the numerator (1).

13 Place this answer over the denominator, and you have $\frac{13}{3}$

$$\frac{13}{3} + \frac{2}{3} = \frac{15}{3} = 5$$

Now change $2\ \frac{4}{5}$ to an improper fraction.

Answer_____.

ANSWER: $\frac{14}{5}$

---

If you did not get all the answers right, you should return to page 57 and review improper fractions once more.

If you are able to solve these problems and can work well with fractions, then turn to page 62 and solve the review problems.

After this review, you will have completed Basic Mathematics I.

REVIEW OF FRACTIONS

Solve the following problems:

(1) $\frac{1}{3} + \frac{1}{4} =$ _____

(2) $\frac{2}{3} + \frac{1}{8} + \frac{1}{12} =$ _____

(3) $7\frac{1}{8} - 4\frac{3}{8} =$ _____

(4) $4\frac{3}{8} - 3\frac{1}{2} =$ _____

(5) What is the lowest common denominator of the following problem:

$\frac{1}{2} + \frac{1}{3} + \frac{1}{5} =$ _____

(6) Reduce to lowest terms:

(a) $\frac{72}{5} =$

(b) $\frac{108}{3} =$

(7) Change to improper fractions:

(a) $7\frac{3}{5}$

(b) $3\frac{1}{16}$

## ANSWERS TO REVIEW OF FRACTIONS PROBLEM, PAGE 62

(1) $\frac{1}{3} + \frac{1}{4} = \frac{4}{12} + \frac{3}{12} = \frac{7}{12}$ *pp 52-55

(2) $\frac{2}{3} + \frac{1}{8} + \frac{1}{12} = \frac{16}{24} + \frac{3}{24} + \frac{2}{24} = \frac{21}{24}$ or $\frac{7}{8}$ pp 52-55

(3) $7\frac{1}{8} - 4\frac{3}{8} = \frac{57}{8} - \frac{35}{8} = \frac{22}{8} = 2\frac{6}{8}$ or $2\frac{3}{4}$ pp 52 & 60

(4) $4\frac{3}{8} - 3\frac{1}{2} = 4\frac{3}{8} - 3\frac{4}{8} = \frac{35}{8} - \frac{28}{8} = \frac{7}{8}$ pp 52 & 60

(5) LCD = $2 \cdot 3 \cdot 5 = 30$

$\frac{1}{2} + \frac{1}{3} + \frac{1}{5} = \frac{15}{30} + \frac{10}{30} + \frac{6}{30} = \frac{31}{30}$ or $1\frac{1}{30}$

pp 53 & 54

(6) (a) $\frac{72}{5} = 14\frac{2}{5}$ p 58

(b) $\frac{108}{3} = 36$

(7) (a) $\frac{38}{5}$ p 60

(b) $\frac{49}{16}$

*Page numbers show where you can find information about problems that gave you trouble.

## ADDITION TABLE

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | (9) | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 1 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| (2) | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | (11) | 12 |
| 3 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 4 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 5 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 6 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 7 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 8 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 9 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 10 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |

EXAMPLE
9 + 2 = 11

## SUBTRACTION TABLE

| | 1 | 2 | 3 | 4 | 5 | 6 | (7) | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| (2) | | 0 | 1 | 2 | 3 | 4 | (5) | 6 | 7 | 8 | 9 |
| 3 | | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 4 | | | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 5 | | | | | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 6 | | | | | | 0 | 1 | 2 | 3 | 4 | 5 |
| 7 | | | | | | | 0 | 1 | 2 | 3 | 4 |
| 8 | | | | | | | | 0 | 1 | 2 | 3 |
| 9 | | | | | | | | | 0 | 1 | 2 |
| 10 | | | | | | | | | | 0 | 1 |

EXAMPLE
7 – 2 = 5

## Multiplication Table

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | (8) | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 |
| 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 |
| 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 |
| (7) | 14 | 21 | 28 | 35 | 42 | 49 | (56) | 63 | 70 | 77 | 84 |
| 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 88 | 96 |
| 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 | 99 | 108 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 |
| 11 | 22 | 33 | 44 | 55 | 66 | 77 | 88 | 99 | 110 | 121 | 132 |
| 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |

EXAMPLE
7 x 8 = 56

**DIVISION TABLE** (EXAMPLE: $\frac{10}{2} = 5$

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | (10) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| (2) | 0 | 1/2 | 1 | 1 1/2 | 2 | 2 1/2 | 3 | 3 1/2 | 4 | 4 1/2 | (5) |
| 3 | 0 | 1/3 | 2/3 | 1 | 1 1/3 | 1 2/3 | 2 | 2 1/3 | 2 2/3 | 3 | 3 1/3 |
| 4 | 0 | 1/4 | 1/2 | 3/4 | 1 | 1 1/4 | 1 1/2 | 1 3/4 | 2 | 2 1/4 | 2 1/2 |
| 5 | 0 | 1/5 | 2/5 | 3/5 | 4/5 | 1 | 1 1/5 | 1 2/5 | 1 3/5 | 1 4/5 | 2 |
| 6 | 0 | 1/6 | 1/3 | 1/2 | 2/3 | 5/6 | 1 | 1 1/6 | 1 1/3 | 1 1/2 | 1 2/3 |
| 7 | 0 | 1/7 | 2/7 | 3/7 | 4/7 | 5/7 | 6/7 | 1 | 1 1/7 | 1 2/7 | 1 3/7 |
| 8 | 0 | 1/8 | 1/4 | 3/8 | 1/2 | 5/8 | 3/4 | 7/8 | 1 | 1 1/8 | 1 1/4 |
| 9 | 0 | 1/9 | 2/9 | 1/3 | 4/9 | 5/9 | 2/3 | 7/9 | 8/9 | 1 | 1 1/9 |
| 10 | 0 | 1/10 | 1/5 | 3 1/3 | 2 1/2 | 2 | 1 2/3 | 7/10 | 4/5 | 9/10 | 1 |

CONVERSION TABLE

| TO CONVERT FROM | TO | MULTIPLY BY | DIVIDE BY |
|---|---|---|---|
| Acres | Square Feet | 43,560 | |
| Acres | Square Miles | | 640 |
| Acres | Square Yards | 4,840 | |
| Barrels | Cubic Feet | 5.62 | |
| Barrels | Gallons | 42 | |
| Cubic Feet | Cubic Inches | 1,728 | |
| Cubic Feet | Cubic Yards | | 27 |
| Cubic Feet | Barrels | | 5.62 |
| Cubic Feet | Gallons | 7.48 | |
| Cubic Inches | Cubic Feet | | 1,728 |
| Cubic Inches | Cubic Yards | | 46,656 |
| Cubic Yards | Cubic Feet | 27 | |
| Cubic Yards | Cubic Inches | 46,656 | |
| Cubic Yards | Gallons | 202 | |
| Feet | Inches | 12 | |
| Feet | Miles (Statute) | | 5,280 |
| Feet | Yards | | 3 |
| Gallons (Liquid) | Barrels | | 42 |
| Gallons | Cubic Feet | | 7.48 |
| Gallons | Cubic Inches | 231 | |
| Inches | Feet | | 12 |
| Inches | Miles | | 63,360 |
| Inches | Yards | | 36 |
| Miles | Feet | 5,280 | |
| Miles | Inches | 63,360 | |
| Miles | Yards | 1,760 | |
| Square Feet | Acres | | 43,560 |
| Square Feet | Square Inches | 144 | |
| Square Feet | Square Yards | | 9 |
| Square Inches | Square Feet | | 144 |
| Square Inches | Square Yards | | 1,296 |
| Square Miles | Acres | 640 | |
| Square Yards | Acres | | 4,840 |
| Square Yards | Square Feet | 9 | |
| Square Yards | Square Inches | 1,296 | |
| Yards | Feet | 3 | |
| Yards | Inches | 36 | |
| Yards | Miles | | 1,760 |