

JAMES R. MEEHAN

How to Use the

CALCULATOR

and the

COMPTOMETER

Third Edition

GREGG PUBLISHING DIVISION

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How to Use the
CALCULATOR
and the
COMPTOMETER

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Third
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HOW TO USE THE CALCULATOR AND THE COMPTOMETER, Third Edition

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PREFACE

The third edition of *How to Use the Calculator and the Comptometer* includes instructional material on two new types of key-driven calculators, the Plus Adding Machine and the Burroughs Duplex Calculator. These machines have the following special features: The full-keyboard Plus Adding Machine, like the Comptometer, uses cutoff keys for subtraction. The Burroughs Duplex Calculator is equipped with two sets of answer dials, one above and one below the keyboard. Any amount shown in the answer dials below the keyboard may be transferred to the answer dials above the keyboard and accumulated until the grand total is obtained. Amounts may also be subtracted directly from the answer dials above the keyboard on duplex calculators without the use of complements—the small figures on the key tops ordinarily used for subtraction.

Addition, the most important of the arithmetic processes, is presented at the beginning of each of the forty lessons of this text. To develop speed and accuracy in addition, the student is expected to add each problem twice. The amounts have been carefully selected to assist the student in developing a touch technique in addition. Although the amounts range from two to five digits, they are to be added with the first and second fingers only. All introductory amounts are within easy reach of the 33, or first- and second-finger home position; and all numbers from 1 to 99 are covered at least twice in the first four lessons. The three-digit numbers from 100 to 999, starting with the numbers within easiest reach of the first finger, are covered in Lessons 5 through 16. The four- and five-digit amounts with the simplest horizontal and vertical reaches are presented first; furthermore, the four-digit amounts are graded on the basis of key strokes, which range from 550 key strokes in Lesson 20 to 900 key strokes in Lesson 25.

Multiplication, which ranks second only to addition as an arithmetic process and a calculating machine operation, is introduced in Lesson 6 of this text. The variations of multiplication such as discounts, percentages, and reciprocals—as well as the practical use of multiplication when figuring inventories, invoices, and payrolls—are presented in the last half of the text.

A special assignment, Lesson 15, is devoted to the subtraction of uneven amounts. To avoid confusion, detailed instructions are also given on the proper method of subtracting amounts starting with the figure 9 . . . also on amounts containing the figure 0.

Three types of division are presented in this text: cipher division, division by reduction, and trial-divisor division. Since all division problems can be solved by the trial-divisor method, this method is stressed far more in this text than the other two methods.

After every ten lessons, a test has been included to assist the teacher in reviewing and evaluating the work of the students. The fourth test, however, is a complete review of all work presented in the text. It is suggested that forty minutes be allowed for the completion of each of the tests.

The author gratefully acknowledges the illustrations and material supplied by the Felt & Tarrant Manufacturing Company, the Plus Computing Machines, Inc., and by Miss Gladys Routon of the Burroughs Adding Machine Company.

The author wishes to thank Mrs. Edward Conners Chickering, of Jamaica High School, Jamaica, Long Island, New York, for her assistance; and Miss Mary Ellen Mechan for her unfailing interest in the progress of this edition.

JAMES R. MEEHAN



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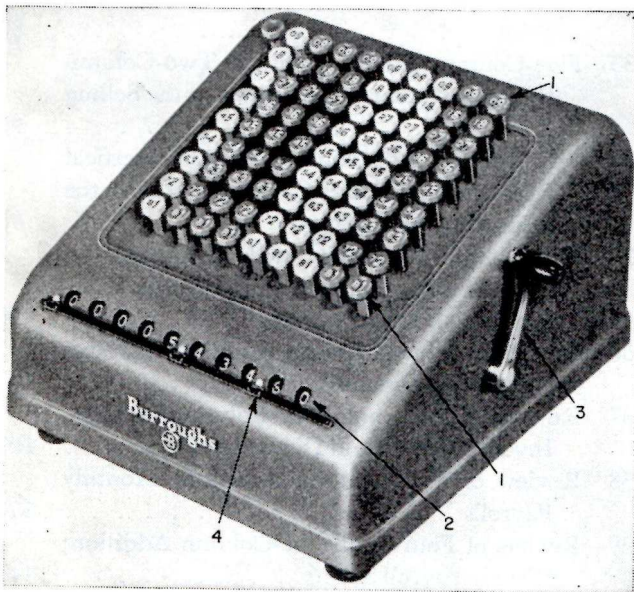
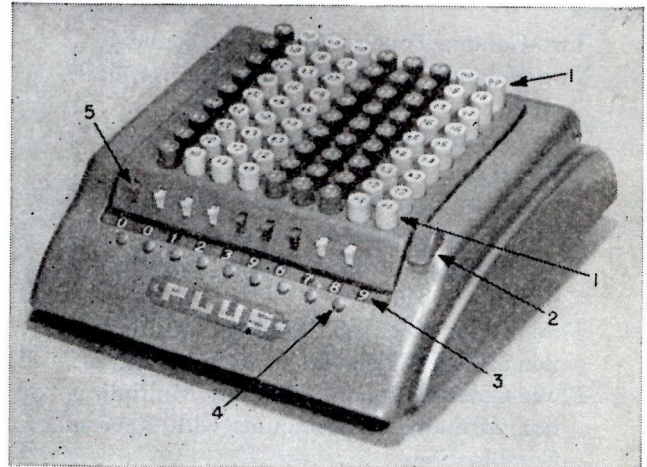


Burroughs Electric Calculator

- | | |
|---------------------|----------------------------|
| 1. Unit row of keys | 4. Decimal pointer |
| 2. Register dials | 5. Subtraction cutoff keys |
| 3. Clearing bar | |

Plus Figureflow Calculator

1. Unit column of keys
2. Dual control lever
 - (a) Clear answer dial—move forward
 - (b) Keyboard release—move rearward
3. Answer dials
4. Decimal pointers
5. Subtraction button



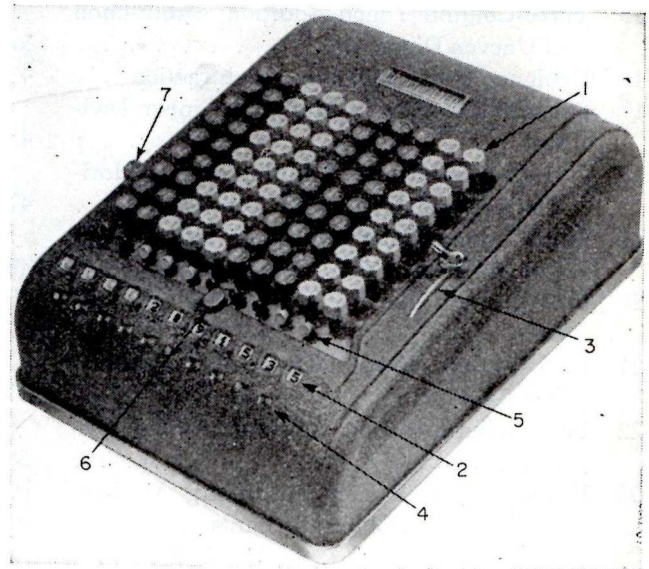
Burroughs Hand-Operated Calculator

- | | |
|---------------------|--------------------|
| 1. Unit row of keys | 3. Clearing handle |
| 2. Register dials | 4. Decimal pointer |

Felt & Tarrant Comptometer

(Both models are made in three sizes—8, 10, and 12 columns.)

1. Unit row of keys
2. Register dials
3. Clearing lever of canceling lever
4. Decimal pointer
5. Subtraction cutoff key or cipher cutoff key
6. Correction key or lock-release key
7. Latch key to be depressed during multiplication and division



INTRODUCTION

Key-driven calculators are made by three companies. The *Comptometer*, the trade name for the calculating machine patented in 1885 by Dorr E. Felt, is manufactured by Felt & Tarrant Manufacturing Company, of Chicago; the *Burroughs Calculator* was first offered for sale in 1911 by the Burroughs Adding Machine Company, of Detroit; and the *Plus* adding machine was introduced by Plus Computing Machines, Inc., of New York, in 1949. The three manufacturers produce a variety of electrically and hand-operated models, ranging from a five-column *Burroughs Calculator* designed to handle calculating work involving small amounts to a twenty-column *Comptometer* designed to handle heavy statistical and distributive work. The standard models of all three manufacturers are illustrated here. Identify the machine you are to operate, and give particular attention to the four parts of the machine used for addition—the keyboard, the clearing mechanism, the answer dials, and the decimal pointers.

The Keyboard. The keyboards of all key-driven calculators contain three contrasting features that should be particularly noted by the operator:

1. *Contrasting Surfaces.* To aid in the development of touch addition, the odd-numbered keys (1, 3, 5, 7, and 9) have a slightly curved, or concave, surface; while the even-numbered keys (2, 4, 6, and 8) are flat-topped.

2. *Contrasting Colors.* The contrasting colors of the keys in the second and third columns from the right, also in the fifth and sixth columns from the right (green and white on the *Comptometer* keyboard and black and white on the other keyboards), are employed to emphasize the difference between the dollars and cents columns, and the hundreds and thousands columns.

3. *Contrasting Figures.* Two figures are stamped on all key tops. The large figure on the key top is used for *increasing* amounts when adding or multiplying, and the small figure, the complement of the large

figure, is used for *decreasing* amounts when subtracting or dividing.

The Clearing Mechanism. The machine must be cleared—all answer dials returned to zeros—before any problem can be solved accurately.

1. Hand-operated machines are cleared by bringing the clearing lever at the right side of the machine forward with the second finger of the right hand. When the lever is brought forward (toward the operator) as far as it will go and then released, all the answer dials below the keyboard should read zero.

2. Electrically operated machines are cleared by depressing the black bar at the right of the keyboard. If an electrically operated machine fails to clear when the bar is depressed, check the wiring; the machine may not be connected to an electrical outlet.

3. The Burroughs Duplex Calculator is cleared by depressing the operating key marked "Clear" at the upper right of the keyboard.

The Answer Dials. The answer dials are located directly below the key columns on the keyboard. Each dial carries ten figures, 0 to 9. The answer dials turn in one direction only—forward; therefore, the small figures, or complements, of the key tops are used when amounts are reduced in subtraction and division.

The Decimal Pointers. The decimal pointers are used to insure accuracy in recording answers. For the first five lessons, the decimal pointer at the right should be set between the second and third columns. The decimal pointers vary slightly on all three calculators:

1. On all Burroughs Calculators, the decimal pointers are located on a rail below the answer dials. They may be moved in either direction. Place the decimal pointer at the right between the second and third columns.

2. On all Comptometers, the decimal pointers are stationary. They are located just above the

answer dials and between the key columns. Turn down the second decimal pointer from the right—between the second and third columns from the right.

3. On the Plus machines, the decimal pointers

are stationary. They are located just below the answer dials and between the key columns. Turn up the second decimal pointer from the right—between the second and third columns from the right.

PRELIMINARY INSTRUCTIONS

The following instructions apply to all assignments. They should be reviewed at the beginning of each lesson.

Arrangement of Materials

1. The machine should be placed on the desk in front, and slightly to the right, of the operator and turned at an angle slightly to the right so that the forearm will be in line with the white line in the illustration.

2. The textbook should be placed to the left of the calculator.

3. A pencil should be held between the thumb and palm of the hand while operating. This saves time in recording answers. The point should be away from the operator. See the illustration.



Correct finger positions for touch addition.



Courtesy Felt & Tarrant Mfg. Co.

Correct arrangement of materials.

Posture of the Operator

1. To reduce fatigue and the errors caused by physical fatigue, the operator should sit erect with both feet flat on the floor.

2. The keyboard of the machine should be low enough to permit operation with a minimum of arm fatigue. In many cases, an especially designed calculating machine desk or stand having a well for the machine is used.

3. The light in the classroom should be strong enough to permit reading the answer dials without eyestrain.

Name.....Date.....

Period.....Errors.....Scoring.....

LESSON 1. TWO-COLUMN TOUCH ADDITION—2, 3, and 4

DETAILED INSTRUCTIONS FOR ADDITION

At least 60 per cent of all figure work performed on the key-driven calculators includes some form of addition. The other arithmetic operations (multiplication, which ranks second; subtraction, which ranks third; and division, which ranks fourth) will be presented in the order of their importance; but the first five lessons consist entirely of selected addition problems. These problems, like the first exercises in touch typewriting, are designed to help the operator acquire a *touch* technique.

The following points should be observed in adding:

Fingering. The first and second fingers of the right hand are the only fingers used in touch addition.

1. The keys in the extreme right-hand column are depressed with the second, or middle, finger.

2. The keys in all other columns are depressed with the first finger. The first finger, or index finger (as it is often called), possesses the greatest dexterity; therefore, it is the ideal finger for reaching from column to column.

The Home Position. The home position in touch addition, comparable to the home position in touch typewriting, is over the 30 and the 3 keys in the two columns at the extreme right of the keyboard.

1. The first finger should rest over the 30 key.

2. The second finger should rest over the 3 key.

Key Stroking. Each key is depressed separately; never two simultaneously.

1. Each key should be driven down as far as it will go. If a key is not driven all the way down, it will not move the dial the full distance. For example, a partially depressed 5 key may result in a reading of 1, 2, 3, or 4 in the answer dial.

2. The keys must be depressed with a rhythmic action. Rhythmic action is just as essential in learning to operate a calculating machine as it is in learning to operate a typewriter. An even pace should be maintained between strokes; a tendency to race usually results in fumbling errors.

For Comptometer Operators. The Comptometer uses a Controlled-Key, a red key at the upper right of the keyboard, to correct a partial key stroke. One of two rules apply to all partial strokes on the Comptometer:

a. When a key locks, the operator must go back and try to operate the last key depressed. If this key goes down, the red correction key should be touched and the addition continued, starting on the key that locked and signaled the error.

b. If the last key depressed is found locked, the red correction key should be depressed and the previous key added in; then the addition may be continued, starting on the key that locked and signaled the error.

Summary of Instructions for Lesson 1

1. *Arrangement of Materials.* See that the machine is at a slight angle to the right, that the textbook is at the left of the machine, and that a pencil is held between the palm and thumb of the right hand.

2. *Posture.* Sit erect with your back against the back of the chair and with both feet flat on the floor.

3. *Position of Fingers.* The first and second fingers of the right hand should rest on the 30 and 3 keys in the columns at the extreme right.

4. *Key Stroking.* Strike each key separately. Drive each key down as far as it will go to avoid partial stroking and incorrect answers. Maintain an even, rhythmic pace in depressing the keys.

5. *Clear the Machine* before starting Lesson 1.

On hand-operated calculators, bring the clearance lever at the right as far forward as it will go, then release it.

On electrically operated calculators, depress the black bar at the right.

On the Burroughs Duplex Calculator, depress the *Clear* key at the upper right.

6. *Clear the Machine* and start over if you find that you have made a mistake while adding a problem.

Name.....Date.....

Period.....Errors.....Scoring.....

LESSON 2. TWO-COLUMN TOUCH ADDITION—2, 3, 4, 6, 7, and 8

At the beginning of each lesson, check the placement of your equipment, your posture, and the reading of the answer dials.

1. The machine should be at a slight angle to the right. The textbook should be at the left of the calculator. The recording pencil should be held between the thumb and palm of the right hand.

2. To reduce physical fatigue and the errors caused by fatigue:

a. Sit erect and back far enough on your chair so that your spine is supported by the back of your chair.

b. Sit with both feet flat on the floor.

c. Adjust your chair so that you are able to operate the machine with your elbows in a natural position—at your sides.

d. See that you have enough light to allow you to read the answer dials without eyestrain.

e. Curve the first and second fingers of the right hand slightly and place them over the home keys—the 30 and 3 keys in the two columns at the extreme right of the keyboard.

3. Clear the calculator at the beginning of the lesson and after each answer has been recorded.

The figures 6, 7, and 8 are introduced here.

No key above 5 is depressed in touch addition. It would be impossible to add by touch if the operator had to reach from the 1 key to the 9 key. (The Plus Computing Company manufactures a calculator with only five keys in a column. It is called the Part Keyboard Machine.)

The longest reach in touch addition is only two keys—up two from 3 to 5 or down two from 3 to 1.

To add 6, depress 3 *twice*. Depress and release the 3 key completely on each stroke. Keep an even rhythm between strokes to avoid errors.

To add 7, depress 4 and 3. In depressing the 4 and 3 keys for 7, it makes no difference in the accuracy of the work whether the lower or the higher key is depressed first. It is recommended, however, that the higher key be depressed first.

To add 8, depress 4 *twice*. Note that 4 is a flat-topped key.

After your fingers are placed on the home keys—30 and 3—keep your eyes fixed on the textbook rather than on the keyboard.

Repeat an addition problem immediately if you sense that you have made an error.



Courtesy Kearney & Trecker Corporation

The figure work of industry is computed on key-driven calculators.

Name.....Date.....

Period.....Errors.....Scoring.....

LESSON 6. THREE-COLUMN TOUCH ADDITION; MULTIPLICATION

At the beginning of each lesson, be sure to:

1. Check your equipment for efficient operation of the calculator.
2. Check your posture to reduce physical fatigue.
3. Check the answer dials to be sure that they are clear.

Set the decimal pointer between the dollars and cents (second and third) columns at the right of the keyboard before adding the following columns.

1	2	3	4	5
\$4.04	\$2.02	\$3.08	\$3.05	\$7.05
7.04	5.03	2.05	6.06	4.02
9.08	3.06	8.03	2.05	2.09
8.08	4.02	4.05	1.05	9.08
9.04	7.07	3.03	2.00	8.08
6.05	2.07	2.01	4.04	5.04
3.05	3.01	2.06	5.04	8.06
1.03	4.05	6.04	2.06	4.02
2.00	4.04	4.07	7.02	6.03
6.05	3.07	7.05	4.05	2.04
1.03	6.06	4.04	4.09	8.03
3.04	7.02	5.00	6.07	9.05
2.02	5.03	7.09	3.05	5.03
3.07	4.09	4.05	7.06	8.08
2.02	3.03	2.09	6.03	2.04
.....

Multiplication

Multiplication ranks second only to addition in the machine calculating work performed in the average office. The ordinary multiplication problem—multiplying three digits by two digits—can be completed by an experienced operator in about three seconds: slightly less time than it takes to set the two factors down on paper before multiplying them by the pencil-and-paper method.

To attain a high speed in machine multiplication with the highest degree of accuracy, the operator must use both hands, all the keys, a flexible wrist movement, and rhythmic action. See the illustration on page 14 for proper position of the fingers when multiplying.

Fingers Used in Multiplication

1. In most cases, the first and second fingers of both hands are used to depress, at the same time, the amount to be multiplied.
2. As a general rule, the highest number is held with the longest finger—the second finger.
3. The thumb is not used in multiplication because it is so much shorter than the fingers that its use would result in the partial depression of keys.

Keys Used in Multiplication

1. All the keys in a column, from 1 to 9 inclusive, are used in multiplication.
2. The rules for touch addition do not apply to multiplication.



Position of fingers of both hands for holding 267.

Proper Position for Multiplication

1. The arms should be held slightly above the keyboard, fingers curved.
2. The wrists should be flexible and allowed to move freely while multiplying.
3. The fingers should be lifted slightly above the key tops after each depression.

Calculating Machine Multiplication

1. *Hold* 267, the multiplicand, in the last three columns at the extreme right of the keyboard. (Hold the figure 2 with the first finger of the *left hand* in the third column from the right, the figure 6 with the first finger of the *right hand* in the second column from the right, and the figure 7 with the second finger of the *right hand* in the last column at the right.)
2. *Depress* the 267 keys simultaneously four times for the last figure in the multiplier, the 4 in 34.
3. The answer dial reading becomes 1068. *Do not clear the answer dials.*
4. *Move* the multiplicand, 267, one column to the *left* so that the 2 is held in the fourth column, the 6 in the third column, and the 7 in the second column from the right of the keyboard.
5. *Depress* the keys three times for the first figure in the multiplier, the 3 in 34. The answer dial reading should check with the pencil-and-paper answer, 9078. No addition is required in calculating machine multiplication.

$$\begin{array}{r}
 267 \text{ (multiplicand)} \\
 \times 34 \text{ (multiplier)} \\
 \hline
 1068 \text{ (267} \times 4) \\
 801 \text{ (267} \times 3) \\
 \hline
 9078 \text{ (answer)}
 \end{array}$$

In solving the following multiplication problems, remember to:

1. Use the first fingers of both hands in holding down the multiplier.
2. Raise the fingers above the key tops after each depression.
3. Depress the keys at the same time and move from column to column with a rhythmic action.

6. $56 \times 72 = \dots\dots\dots$
7. $45 \times 26 = \dots\dots\dots$
8. $78 \times 23 = \dots\dots\dots$
9. $35 \times 57 = \dots\dots\dots$
10. $75 \times 86 = \dots\dots\dots$

11. $37 \times 57 = \dots\dots\dots$
12. $65 \times 53 = \dots\dots\dots$
13. $91 \times 24 = \dots\dots\dots$
14. $79 \times 35 = \dots\dots\dots$
15. $75 \times 68 = \dots\dots\dots$

Name.....Date.....

Period.....Errors.....Scoring.....

LESSON 7. THREE-COLUMN TOUCH ADDITION; MULTIPLICATION OF THREE-DIGIT NATURAL COMBINATIONS

At the beginning of each lesson, be sure to check:

1. The position of your operating equipment.
2. The proper operating position.
3. The answer dials, to be sure that they are clear.

Before adding the following columns, set a decimal pointer between the dollars and cents columns. These problems contain the figures 3, 4, 6, 7 and 8.

1	2	3	4	5
\$8.73	\$7.88	\$7.48	\$7.74	\$3.73
6.73	4.38	8.34	8.46	6.74
3.86	3.78	3.74	3.78	7.46
6.38	8.34	6.43	4.68	3.87
7.78	7.37	6.74	7.48	6.78
4.73	7.88	8.87	4.73	4.38
3.47	8.34	6.48	6.43	8.37
6.63	4.74	4.78	3.78	6.37
6.44	6.43	8.34	8.64	3.47
7.84	3.76	4.78	7.37	6.78
3.78	6.64	7.46	6.47	8.48
7.37	4.68	3.46	3.86	3.74
3.46	7.66	7.37	6.74	3.46
6.38	3.84	6.68	4.38	6.83
8.47	3.78	7.47	7.47	3.87
.....

6	7	8	9	10
\$3.46	\$7.46	\$7.88	\$8.73	\$4.37
6.83	3.73	4.43	4.37	7.73
6.84	6.46	3.43	8.43	3.44
3.43	3.67	6.44	3.74	6.34
6.87	4.37	7.47	7.36	7.33
6.46	3.78	6.84	6.37	6.43
3.43	3.44	3.43	3.43	6.86
7.47	6.48	8.63	6.48	3.84
7.43	6.83	4.63	4.47	8.68
6.48	7.38	3.87	3.87	4.77
6.43	7.83	6.78	6.73	8.37
6.87	6.88	3.76	3.87	6.48
6.47	6.43	3.68	3.34	3.43
3.43	3.48	8.43	7.33	6.38
3.84	6.67	4.47	6.43	6.73
.....

**Multiplication of Three-Digit
Natural Combinations**

Either of the two amounts may be held on the keyboard to serve as the multiplier in three-digit multiplication. The amount to be held on the keyboard should be determined by:

1. The ease with which an amount can be held.
2. The number of key depressions required.

To multiply 845 by 951, for example, it is easier to hold 845 on the keyboard than it would be to hold 951. The 845 should be held in this manner:

LEFT HAND		RIGHT HAND	
<i>Figure</i>	<i>Finger</i>	<i>Figure</i>	<i>Finger</i>
8	first	4	first
		5	second

If 845 is held, 15 key depressions will be required to multiply by 951; but if 951 is held, 17 key depressions will be required to multiply by 845.

In multiplying the following problems, remember that when two keys are held with the same hand the higher key is held with the longer finger—the second finger.

- | | |
|-----------------------|-----------------------|
| 11. 735 × 734 = | 16. 312 × 857 = |
| 12. 497 × 535 = | 17. 849 × 845 = |
| 13. 862 × 623 = | 18. 137 × 256 = |
| 14. 276 × 757 = | 19. 412 × 368 = |
| 15. 519 × 679 = | 20. 824 × 429 = |

Name.....Date.....
 Period.....Errors.....Scoring.....

LESSON 8. THREE-COLUMN TOUCH ADDITION; MULTIPLICATION OF FOUR-DIGIT AMOUNTS WITH REVERSE COMBINATIONS

At the beginning of this lesson, check:

1. The position of your equipment for efficient operation of the calculator.
2. Your posture (distance of the chair from the calculator, position of fingers, arms, elbows, and feet).
3. The machine (the reading of the answer dials and the electrical connection for electric calculators).

The following problems should be added with a rhythmic touch. Each problem should be added accurately in slightly less than 50 seconds. They include the figures 3, 4, 5, 6, 7, 8, 9.

1	2	3	4	5
3.78	4.43	5.44	4.54	5.43
6.43	8.66	4.57	6.45	3.85
7.66	4.58	6.45	4.57	4.54
4.37	6.73	7.67	8.49	3.35
3.83	4.57	3.49	3.45	7.96
4.86	7.37	4.96	5.95	3.45
3.49	4.98	9.58	9.59	5.76
4.37	8.67	4.95	8.58	4.95
5.53	3.69	6.79	5.69	6.94
5.65	4.35	9.35	4.35	7.53
4.39	5.69	3.56	5.39	4.69
8.65	7.85	5.35	6.56	3.97
7.69	4.39	6.53	7.53	6.79
6.53	3.56	5.65	4.35	3.35
6.56	7.78	6.53	7.34	5.64
—	—	—	—	—
.....

6	7	8	9	10
6.85	7.37	4.96	5.95	3.45
9.87	8.66	4.57	3.85	9.66
3.49	4.98	5.95	7.37	6.45
5.59	6.73	7.67	8.49	4.95
5.46	4.54	8.97	7.78	4.57
3.76	9.89	9.54	3.49	5.95
7.37	8.94	7.65	6.78	4.96
3.49	6.68	5.45	9.46	4.54
4.57	6.63	4.95	5.67	6.45
7.78	6.76	8.54	9.59	3.85
3.96	3.97	3.53	3.56	7.56
7.38	6.53	6.57	5.65	4.39
4.58	8.35	6.53	6.53	4.65
3.56	8.34	4.56	5.65	3.53
5.35	3.53	6.38	6.35	3.55
.....

**Multiplication of Four-Digit Amounts
with Reverse Combinations**

In this lesson, the operator uses both hands to hold the four-digit amount on the keyboard. To hold the highest number with the longest fingers, the fingers must be reversed. The first finger is held on the lower number below and inside the second finger, the hands are turned inward, and the elbows are raised slightly. In multiplying $4,664 \times 35$, both 6's are held with the second fingers and both 4's with the first fingers, as illustrated.



Position of fingers for holding reverse combinations such as 4664. The hands are turned in; both 4's are held with the first fingers; both 6's, with the second fingers. →

In multiplying the following problems hold the larger amount, the four-digit number, on the keyboard with both hands.

- | | | |
|-------------------------------|-------------------------------|-------------------------------|
| 11. $2,475 \times 34 =$ | 18. $1,332 \times 84 =$ | 25. $3,696 \times 27 =$ |
| 12. $1,463 \times 52 =$ | 19. $2,463 \times 96 =$ | 26. $3,587 \times 41 =$ |
| 13. $3,696 \times 73 =$ | 20. $4,631 \times 72 =$ | 27. $2,531 \times 74 =$ |
| 14. $2,498 \times 79 =$ | 21. $7,996 \times 64 =$ | 28. $5,732 \times 28 =$ |
| 15. $5,775 \times 38 =$ | 22. $5,742 \times 48 =$ | 29. $1,375 \times 31 =$ |
| 16. $6,887 \times 85 =$ | 23. $3,586 \times 36 =$ | 30. $7,943 \times 35 =$ |
| 17. $3,597 \times 57 =$ | 24. $2,442 \times 18 =$ | |

Name..... Date.....

Period..... Errors..... Scoring.....

LESSON 9. THREE-COLUMN TOUCH ADDITION; MULTIPLICATION OF DECIMALS AND COMMON FRACTIONS

At the beginning of this lesson, check your posture and your operating equipment:

1. The desk should be low enough to permit the fingers to rest comfortably on the key tops.
2. The seat of the chair should be high enough to permit both feet to rest comfortably on the floor.
3. For ease in operation, the calculator should be placed at an angle to the right. It should be placed so that the left edge of the machine is in line with with the center of the body.

Each of the following three-column touch-addition problems may be added accurately in about forty seconds if the operator uses an even, rhythmic touch. They include all the figures except 0.

1	2	3	4	5	6	7	8	9	10
3.56	4.35	3.94	1.37	6.79	4.65	6.93	4.14	5.26	7.52
5.65	3.12	8.28	4.31	6.79	2.52	4.84	7.25	3.37	2.52
6.56	8.92	2.45	6.16	4.28	4.25	4.37	4.64	3.14	4.56
5.65	4.56	1.64	2.49	4.27	2.52	2.42	1.25	2.52	3.74
2.83	4.69	3.16	2.48	8.24	4.29	5.54	3.41	4.18	1.25
1.31	1.69	2.79	1.69	6.94	4.14	5.24	8.43	8.23	3.14
2.45	4.27	4.31	4.28	7.16	1.81	3.29	5.35	3.75	1.54
4.27	7.98	2.83	7.82	8.28	4.14	4.63	9.38	6.44	5.25
1.65	4.24	5.79	4.56	2.87	1.12	3.37	1.43	5.44	5.55
2.82	4.65	6.31	8.42	9.43	6.74	8.45	6.78	3.73	4.21
2.39	9.93	5.33	9.38	5.43	2.38	4.32	8.45	3.44	4.53
6.17	4.56	4.35	3.57	7.24	3.74	1.23	4.37	4.83	3.85
4.53	7.24	3.49	4.65	8.51	4.97	1.33	4.87	6.87	2.32
5.87	3.94	4.26	1.61	5.31	8.55	3.86	4.68	4.59	3.46
6.79	4.28	4.69	7.53	1.69	9.83	8.97	8.95	7.83	4.78
—	—	—	—	—	—	—	—	—	—
....

Multiplication of Decimals

The multiplication of decimals is performed on the key-driven calculator in the same manner as the multiplication of whole numbers, except that the decimal pointer is used to indicate the decimal point in the answer. The placing of the decimal pointer is determined in the same manner as in pencil-and-paper decimal multiplication:

Starting at the extreme *right* of the answer dials, *point off* (move the decimal pointer) one place to the *left* for *each* decimal place in *both* factors.

For example, 4.25×6.3 equals 26.775.

Before multiplying, point off three places from the right—two for the decimal .25 in the first factor and one for the decimal .3 in the second factor.

Point off the required number of places from the right before multiplying each of the following problems:

- | | |
|--------------------------------|--------------------------------|
| 11. $5.25 \times 4.5 =$ | 16. $4.125 \times 2.5 =$ |
| 12. $7.75 \times 8.2 =$ | 17. $3.333 \times 7.6 =$ |
| 13. $4.5 \times 14.5 =$ | 18. $6.667 \times 2.3 =$ |
| 14. $22.4 \times 33.2 =$ | 19. $4.375 \times 5.5 =$ |
| 15. $3.25 \times 8.75 =$ | 20. $6.625 \times 3.5 =$ |

Multiplication of Common Fractions

When common fractions are included in multiplication problems, the fractions are changed to their decimal equivalents and the rules for pointing off in decimal multiplication are followed.

For example, $4\frac{1}{2} \times 6\frac{1}{4}$ becomes 4.5 (one decimal place)
 $\times 6.25$ (two decimal places)

 28.125 (three decimal places)

To save time in multiplying, the decimal equivalents of the following common fractions should be committed to memory:

Fourths and Eighths	Decimal* Equivalents	Thirds, Sixths, and Twelfths	Decimal* Equivalents
$\frac{1}{4}$ or $\frac{1}{8}$	.125	$\frac{1}{3}$ or $\frac{1}{6}$ or $\frac{1}{12}$	.08333
$\frac{2}{4}$ or $\frac{2}{8}$	.25	$\frac{2}{3}$ or $\frac{2}{6}$ or $\frac{2}{12}$ ($\frac{1}{4}$)	.16667
$\frac{3}{4}$ or $\frac{3}{8}$	.375	$\frac{4}{3}$ or $\frac{4}{6}$ or $\frac{4}{12}$ ($\frac{1}{3}$)	.25
$\frac{4}{4}$ or $\frac{4}{8}$	.5	$\frac{5}{3}$ or $\frac{5}{6}$ or $\frac{5}{12}$ ($\frac{5}{12}$)	.33333
$\frac{5}{4}$ or $\frac{5}{8}$	.625	$\frac{6}{3}$ or $\frac{6}{6}$ or $\frac{6}{12}$ ($\frac{1}{2}$)	.41667
$\frac{6}{4}$ or $\frac{6}{8}$	.75	$\frac{7}{3}$ or $\frac{7}{6}$ or $\frac{7}{12}$	.58333
$\frac{7}{4}$ or $\frac{7}{8}$	.875	$\frac{8}{3}$ or $\frac{8}{6}$ or $\frac{8}{12}$ ($\frac{2}{3}$)	.66667
		$\frac{9}{3}$ or $\frac{9}{6}$ or $\frac{9}{12}$ ($\frac{3}{4}$)	.75
		$\frac{10}{3}$ or $\frac{10}{6}$ or $\frac{10}{12}$	.83333
		$\frac{11}{3}$ or $\frac{11}{6}$ or $\frac{11}{12}$	.91667

* Decimal equivalents of fractions not appearing on the chart can be found by dividing the numerator of the fraction by the denominator:
 For example, $\frac{2}{5}$ becomes 2.0 divided by 5. equals .4
 $\frac{3}{20}$ becomes 3.00 divided by 20. equals .15
 $\frac{5}{16}$ becomes 5.0000 divided by 16. equals .3125

In multiplying the following problems, carry the decimal equivalents three places. If the fourth decimal is 5 or more, add 1 to the third decimal. For example, for the decimal equivalent of $\frac{5}{12}$ (.41667), hold .417.

- | | |
|--|---|
| 21. $4\frac{1}{4} \times 5\frac{1}{2} =$ | 26. $2\frac{1}{6} \times 4\frac{1}{2} =$ |
| 22. $6\frac{1}{2} \times 3\frac{1}{8} =$ | 27. $\frac{1}{12} \times 4\frac{3}{12} =$ |
| 23. $\frac{3}{4} \times 4\frac{3}{8} =$ | 28. $8\frac{5}{8} \times 5\frac{6}{12} =$ |
| 24. $5\frac{1}{2} \times 6\frac{5}{8} =$ | 29. $3\frac{1}{3} \times 7\frac{9}{12} =$ |
| 25. $\frac{1}{4} \times 6\frac{7}{8} =$ | 30. $\frac{1}{12} \times 5\frac{7}{12} =$ |

Name..... Date.....
 Period..... Errors..... Scoring.....

LESSON 10. THREE-COLUMN TOUCH ADDITION; DECIMAL MULTIPLICATION FROM THE LEFT OF THE KEYBOARD

1. For efficiency and ease in operation, see that your equipment is placed properly.

2. Select a chair of the proper height and sit in a comfortable and erect position.

3. There should be sufficient light to permit you to read the answer dials accurately and with ease.

Clear the answer dials before beginning the following addition problems. They contain all the figures. Each column should be added in approximately 38 seconds.

1	2	3	4	5	6	7	8	9	10
6.41	4.48	3.54	1.93	4.27	2.03	1.08	.98	3.45	.49
7.42	2.42	1.04	2.49	3.15	1.83	6.92	4.16	5.61	3.52
5.02	3.34	5.40	5.31	.42	8.19	5.64	2.93	4.82	3.07
3.40	1.50	2.35	4.43	4.51	.59	.57	4.04	7.43	4.16
2.54	1.53	5.34	.35	4.50	8.16	9.24	3.35	.70	6.91
5.13	3.03	4.24	4.71	4.24	6.05	6.01	.54	6.55	2.65
1.33	4.51	2.46	5.00	5.04	8.27	4.56	8.16	7.18	7.16
.54	7.54	4.38	2.42	5.12	1.42	4.92	2.75	1.90	.84
9.37	7.15	.43	1.53	6.26	.69	.53	3.92	2.86	8.25
2.91	4.29	9.25	9.26	8.37	3.27	4.78	2.39	.44	3.91
9.25	3.48	3.04	5.64	4.26	4.02	5.03	4.04	5.03	4.09
6.91	2.49	5.13	2.48	5.91	6.51	.56	8.15	4.92	3.91
2.09	.53	7.31	9.05	4.23	5.31	5.13	.69	1.35	4.37
1.94	9.72	5.47	1.53	1.83	.52	4.14	3.24	3.34	5.38
2.35	1.03	1.35	4.28	5.01	4.24	1.85	5.31	.55	.68
—	—	—	—	—	—	—	—	—	—
....

Decimal Multiplication from the Left of the Keyboard

The amounts multiplied in business usually consist of four figures multiplied by three figures. Decimal multiplication problems, however, often include as many as five or six figures in each amount, resulting in answers that go far beyond the capacity of the standard calculator.

The operator should begin the problem at the left side of the keyboard and work toward the right

when the answer contains more figures than there are answer dials on the calculator. This is just the reverse of the method used in previous lessons, but left-to-right multiplication retains the accuracy of the most important part of the answer—the whole numbers and the three decimals just to the right of the decimal pointer.

Decimals that are more than three places to the

right of the decimal pointer have no commercial importance and should be disregarded in recording

the answer. If the fourth decimal is 5 or more, add one to the third decimal.

Example: $61.125 \times 8.75 = 534.84375$ (*dial reading*), or 534.844.

Solution:

1. Set the decimal pointer three places from the extreme left of the answer dials. The decimal pointer is moved one place to the right for each whole number in each factor. There are two whole numbers in 61.125; there is one whole number in 8.75; hence, the three places.

2. Hold 8.75 in the columns at the extreme left:

LEFT HAND		RIGHT HAND	
<i>Figure</i>	<i>Finger</i>	<i>Figure</i>	<i>Finger</i>
8	second	5	first
7	first		

3. Multiply and move to the *right* by 6-1-1-2-5.

4. The dial reading is 534.84375; the recorded answer is 534.844.

Dropping Figures off the Keyboard at the Right. When a multiplication problem exceeds the capacity of most standard calculators, the amount is held at the left of the keyboard and moved to the right with the multiplication of each figure in the other factor. One figure must be dropped from the amount held as the fingers move

from the left to the right side of the keyboard.

The recorded answer is carried three decimal places; but if the fourth decimal is 5 or more, add one to the third decimal.

Starting at the extreme left of the answer dials, move the decimal pointer one place to the right for each whole number in each factor.

Set the decimal pointer before calculating each of the following decimal multiplication problems:

- | | |
|---|---|
| 11. $42.35 \times 81.75 = \dots\dots\dots$ | 16. $465.833 \times 53.25 = \dots\dots\dots$ |
| 12. $5.625 \times 12.167 = \dots\dots\dots$ | 17. $321.417 \times 874.5 = \dots\dots\dots$ |
| 13. $75.875 \times 7.667 = \dots\dots\dots$ | 18. $432.583 \times 97.75 = \dots\dots\dots$ |
| 14. $32.375 \times 4.333 = \dots\dots\dots$ | 19. $66.1875 \times 5.375 = \dots\dots\dots$ |
| 15. $16.917 \times 6.625 = \dots\dots\dots$ | 20. $275.3125 \times 86.89 = \dots\dots\dots$ |

Use the decimal equivalents of common fractions in multiplying the following problems. Carry the equivalent three decimal places; but if the fourth decimal is 5 or more, add one to the third. For example for $\frac{5}{12}$ hold .417; for $\frac{2}{3}$ hold .667; for $\frac{1}{2}$ hold .917.

- | | |
|---|--|
| 21. $679\frac{1}{2} \times 44\frac{3}{4} = \dots\dots\dots$ | 26. $22\frac{1}{3} \times 8\frac{1}{12} = \dots\dots\dots$ |
| 22. $345 \times 88\frac{1}{12} = \dots\dots\dots$ | 27. $99\frac{1}{2} \times 77\frac{3}{4} = \dots\dots\dots$ |
| 23. $125\frac{1}{8} \times 4\frac{1}{3} = \dots\dots\dots$ | 28. $156\frac{5}{6} \times 3.65 = \dots\dots\dots$ |
| 24. $38\frac{5}{8} \times 5\frac{7}{12} = \dots\dots\dots$ | 29. $45\frac{5}{12} \times 7\frac{7}{8} = \dots\dots\dots$ |
| 25. $22\frac{1}{11} \times 8\frac{7}{8} = \dots\dots\dots$ | 30. $66\frac{2}{3} \times 3\frac{3}{8} = \dots\dots\dots$ |

Name.....Date.....

Period.....Errors.....Scoring.....

TEST 1 (COVERING LESSONS 1 THROUGH 10)

Clear the answer dials before starting the test and after each answer has been recorded.

The first ten columns are to be added by the touch method.

1	2	3	4	5	6	7	8	9	10
33	34	45	30	22	4.04	7.88	4.54	4.14	1.08
42	38	63	56	78	7.04	8.34	6.45	7.25	6.92
24	44	55	13	19	9.08	4.38	4.57	4.64	5.64
33	84	66	17	70	8.08	3.78	8.49	1.25	.75
43	38	73	67	16	2.07	4.74	3.45	3.41	9.25
44	34	45	20	3					
33	48	55	84	43	6.05	3.47	5.95	8.43	6.01
23	84	22	90	98	3.05	6.46	9.59	5.24	4.56
32	88	44	75	10	1.03	3.43	8.58	3.29	8.92
43	36	82	70	41	2.00	6.78	4.35	4.63	.35
—	—	—	—	—	6.05	4.37	7.34	3.37	4.85
..					
					5.05	7.48	4.96	4.32	5.03
					7.04	3.68	9.58	1.33	.65
					4.09	7.36	4.95	3.86	5.13
					3.02	3.37	6.79	8.97	4.14
					8.09	8.84	9.35	4.69	1.85
					—	—	—	—	—
				

Multiply:

- | | |
|-------------------------------|---|
| 11. $56 \times 75 =$ | 26. $3,696 \times 25 =$ |
| 12. $78 \times 35 =$ | 27. $5,732 \times 31 =$ |
| 13. $98 \times 53 =$ | 28. $1,375 \times 24 =$ |
| 14. $19 \times 83 =$ | 29. $4,631 \times 72 =$ |
| 15. $91 \times 24 =$ | 30. $5,732 \times 36 =$ |
| 16. $37 \times 57 =$ | 31. $4.25 \times 8.75 =$ |
| 17. $845 \times 429 =$ | 32. $6.625 \times 2.3 =$ |
| 18. $412 \times 368 =$ | 33. $7\frac{1}{2} \times 4\frac{3}{8} =$ |
| 19. $824 \times 256 =$ | 34. $3\frac{1}{3} \times 9\frac{9}{12} =$ |
| 20. $735 \times 952 =$ | 35. $8\frac{5}{6} \times 4\frac{1}{4} =$ |
| 21. $5,775 \times 35 =$ | 36. $61.125 \times 7.75 =$ |
| 22. $1,463 \times 62 =$ | 37. $56.3125 \times 53.25 =$ |
| 23. $6,886 \times 85 =$ | 38. $66\frac{2}{3} \times 6\frac{5}{8} =$ |
| 24. $1,332 \times 79 =$ | 39. $89\frac{11}{12} \times 36.5 =$ |
| 25. $7,943 \times 55 =$ | 40. $75\frac{3}{4} \times 32\frac{7}{12} =$ |



Name.....Date.....
 Period.....Errors.....Scoring.....

LESSON 11. THREE-COLUMN TOUCH ADDITION; THREE-FACTOR MULTIPLICATION

All the numbers from 301 to 450 are included in the addition problems of this lesson. Practice the reach to 3 and 4 in the third column with the first finger of the right hand before adding the following problems.

1	2	3	4	5	6	7	8	9	10
3.80	4.21	4.18	3.74	3.94	4.07	4.44	3.01	3.33	3.59
3.08	4.47	3.40	3.50	3.61	3.14	4.38	4.22	3.47	4.03
3.96	4.24	3.36	4.15	3.67	4.25	3.09	3.97	4.34	3.21
4.06	3.60	3.85	4.04	3.99	3.24	3.49	4.14	4.46	3.90
3.11	4.01	4.32	4.13	3.98	3.58	3.19	4.28	4.02	3.82
3.20	4.10	3.88	3.17	4.16	4.41	3.02	4.12	3.54	3.73
3.91	3.89	4.17	3.27	3.69	4.27	3.25	3.06	4.00	3.42
3.64	3.29	3.07	3.76	3.83	3.44	4.30	3.39	4.19	3.86
3.41	3.52	3.71	4.11	4.39	4.48	3.04	3.31	3.92	3.66
3.46	3.18	4.05	3.62	3.35	4.23	4.28	3.55	3.81	3.95
3.78	4.08	3.16	4.35	3.79	4.20	3.22	3.72	4.33	3.28
4.43	3.26	3.13	3.77	4.45	3.03	3.51	4.09	3.10	4.29
3.38	3.32	3.70	4.49	3.37	4.40	3.12	4.37	3.05	4.50
4.26	3.57	3.48	3.43	4.36	3.15	3.23	4.34	3.30	3.75
4.31	3.45	3.53	3.63	3.93	3.84	3.68	3.56	3.65	4.42
—	—	—	—	—	—	—	—	—	—
....

Three-Factor Multiplication

When three factors are multiplied, $35 \times 25 \times .75$, for example, one step in multiplication is saved if the last two factors are multiplied from the right to the left of the keyboard and the third factor is multiplied from the left to the right of the keyboard. The following timesaving steps should be taken for the multiplication of three factors:

1. Set a decimal pointer two places from the extreme right of the answer dials to allow for the third factor, .75

2. Starting at the extreme right of the keyboard, multiply the last two factors, $25 \times .75$. Use ordinary, or right-to-left, multiplication. The product is 18.75. *Do not clear the answer dials.*

3. Since 18.75 remains in the answer dials, it has been multiplied once; therefore, hold *one less* than

35, the third multiplication factor—hold 34.

4. The 34 is held in the fifth and fourth columns from the right, the 3 in the fifth and the 4 in the fourth. The 4 is held directly above the 1 in the answer dials. See the illustration.

5. Depress the 34 *once* for the 1 in 18.75.

6. Move the 34 one column to the right so that the 4 in 34 is directly above the 8 in the third answer dial from the right. Depress the 34 eight times.

7. Move the 34 one column to the right so that the 4 is directly above the 7 in the second answer dial from the right. Depress the 34 seven times.

8. Move one column to the right so that the 4 in 34 is directly above the 5 in the last answer dial at the right. Depress the 34 five times.

9. If the product of the last two factors is 18.75, and if it has been multiplied by the third factor, 34, 1-8-7-5 times, the answer is 656.25.

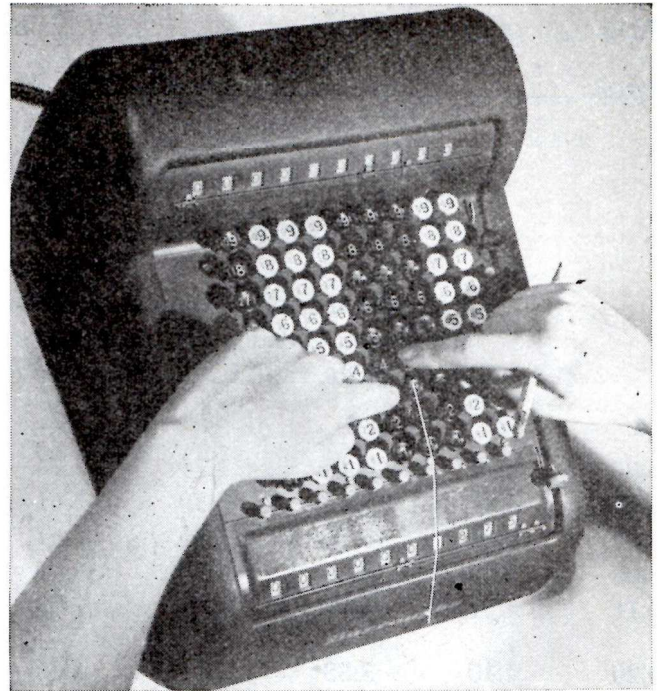
Four operating steps are followed in three-factor multiplication:

1. Set the decimal pointer before multiplying.
2. Multiply two of the factors from right to left (Just as you would in pencil-and-paper multiplication).

3. To multiply by the third factor, hold an amount *one number less* than the third factor because the product of the first two factors has already been added in the answer dials.

4. The third factor is multiplied from left to right—backwards—and the number of key depressions is determined by the numbers in the answer dials, the product of the first two factors.

In the illustration, the product was 18.75; therefore, the key depressions from left to right were 1-8-7-5.



Correct starting position for multiplying the third factor, using left-to-right multiplication.

Multiply:

11. $63 \times 47 \times .76 = \dots\dots\dots$
12. $83 \times 35 \times .65 = \dots\dots\dots$
13. $62 \times 23 \times .98 = \dots\dots\dots$
14. $31 \times 65 \times .59 = \dots\dots\dots$
15. $41 \times 45 \times .89 = \dots\dots\dots$

16. $25 \times 39 \times .75 = \dots\dots\dots$
17. $19 \times 36 \times .80 = \dots\dots\dots$
18. $47 \times 32 \times .79 = \dots\dots\dots$
19. $14 \times 50 \times .29 = \dots\dots\dots$
20. $39 \times 33 \times .19 = \dots\dots\dots$

21. 24 bolts 50 yds. each @ \$.75 yd. =
22. 36 bolts 48 yds. each @ \$.89 yd. =
23. 24 cases 36 articles @ \$.45 each =
24. 48 cases 72 articles @ \$.75 each =
25. 96 cases 60 articles @ \$.25 each =

26. 52 cases 48 articles @ \$.35 each =
27. 72 boxes 12 pieces @ \$.85 a piece =
28. 84 boxes 18 pieces @ \$.55 a piece =
29. 60 boxes 24 pieces @ \$.95 a piece =
30. 30 boxes 36 pieces @ \$.45 a piece =

Name.....Date.....
 Period.....Errors.....Scoring.....

LESSON 12. THREE-COLUMN TOUCH ADDITION; MULTIPLICATION OVER A FIXED DECIMAL POINT

The numbers from 601 to 750 are included in this lesson. Arrange all your equipment properly. Practice the key depressions for 6 and 7 in the third column with the first finger before starting the lesson.

The key depression for 6 is 3 and 3.

The key depression for 7 is 4 and 3.

1	2	3	4	5	6	7	8	9	10
6.10	6.19	6.37	6.27	6.41	7.01	6.51	6.62	7.19	7.22
6.02	6.12	6.22	6.33	6.44	6.52	7.15	6.72	7.36	6.91
6.04	6.13	6.21	6.31	6.42	7.03	6.61	7.12	6.81	7.31
6.03	6.11	6.23	6.32	6.43	6.60	7.17	6.71	7.30	6.94
6.05	6.14	6.26	6.34	6.46	7.07	6.70	7.13	6.76	7.23
6.07	6.16	7.21	7.32	6.45	7.00	6.89	7.25	7.35	7.44
6.09	6.18	7.24	6.35	7.41	7.04	6.74	7.26	6.83	7.38
6.06	6.20	7.27	7.34	6.50	7.09	6.63	6.64	6.66	6.55
6.08	6.17	7.28	6.36	7.43	6.80	6.79	6.58	6.78	6.97
6.01	6.15	7.29	7.37	6.47	6.56	7.39	7.42	7.46	7.47
7.02	7.11	6.24	7.40	7.45	7.49	6.53	6.54	6.57	6.59
7.05	7.14	6.28	6.38	6.48	6.65	6.85	6.96	6.77	6.68
7.10	7.18	6.25	7.33	7.50	6.82	6.99	6.88	6.69	6.67
7.06	7.16	6.29	6.39	7.48	6.73	6.95	6.98	6.87	6.93
7.08	7.20	6.30	6.40	6.49	6.75	6.84	6.86	6.90	6.92
—	—	—	—	—	—	—	—	—	—
....

Multiplication over a Fixed Decimal Point

Multiplication over a fixed decimal point saves the time required for pointing off after each multiplication problem that includes dollars and cents, the decimal equivalents of common fractions, or other decimals. A decimal pointer is set, or fixed, between the fifth and sixth columns (between the contrastingly colored keys in the hundreds and thousands columns) on all calculators except the five-column machines; the decimal pointer must, of necessity, be set between the third and fourth

columns from the right on these machines.

There are but three simple rules to be followed in fixed-decimal-point multiplication:

Rule 1. Always hold the price on the keyboard with the dollars to the left of the decimal pointer and the cents to the right.

Rule 2. Use left-to-right multiplication when multiplying the price by the quantity.

Rule 3. Clear the answer dials after recording each answer.

Example:

FIXED-DECIMAL-POINT MULTIPLICATION

Line	Quantity	×	Price	Answer Dials	Recorded Ans.	Operator's Ans
1	4		\$3.25	13.00	\$ 13.00	.....
2	24		3.25	78.00	78.00	.....
3	124		3.25	403.00	403.00	.....
4	4.5		3.25	14.625	14.63	.....
5	4.25		3.25	13.8125	13.81	.....
6	Total				\$522.44	.....

Solution:

Line 1. Hold the price in the units position—3 in the sixth column, 2 in the fifth column, and 5 in the fourth column.

Multiply by the quantity, 4.

Record the answer and clear the dials.

Line 2. Start by holding the price in the tens position, one to the left of the units position. Multiply from left to right by the quantity, 2-4. Record the answer and clear the dials.

Line 3. Hold the price in the hundreds position, two columns to the left of the units position. Multiply from left to right by the quantity 1-2-4. Record the answer and clear the answer dials.

Line 4. Hold the price in the units position. Multiply from left to right by 4.5, record and clear.

Line 5. Hold the price in the units position. Multiply by 4.25, record and clear.

Line 6. Add the recorded amounts. The total is \$522.44.

Burroughs Duplex Calculator operators need not add the recorded amounts. Press the Plus Bar after each answer has been recorded, this step clears the front register and automatically transfers and adds the amount in the rear register.



Unit position for multiplication over a fixed decimal point. Always hold the price on the keyboard, with dollars to the left of the fixed decimal point and cents to the right.

Summary:

Quantity
1 through 9
10 through 99
100 through 999
.5
.05
.005

Starting Position of the Price

Units position
Tens position
Hundreds position
One column to the right of units
Two columns to the right of units
Three columns to the right of units

Name.....Date.....

Multiply:

11. 5 yds. @ \$ 4.35 =
 9 yds. @ 7.55 =
 7 yds. @ 2.25 =

 Total

16. 25 yds. @ \$12.55 =
 109 yds. @ 1.25 =
 91 yds. @ 15.00 =
 8 yds. @ 2.375 =
 80 yds. @ 2.05 =

 Total

12. 6 yds. @ \$ 8.75 =
 16 yds. @ 3.45 =
 44 yds. @ 4.67 =
 78 yds. @ 2.25 =

 Total

17. 5 yds. @ \$13.50 =
 435 yds. @ .39 =
 39 yds. @ .125 =
 403 yds. @ 3.25 =
 24 yds. @ .0625 =

 Total

13. 3 yds. @ \$ 1.75 =
 57 yds. @ 3.45 =
 163 yds. @ 3.23 =
 234 yds. @ 3.75 =
 346 yds. @ 2.12 =

 Total

18. 3.5 yds. @ \$ 1.55 =
 23.25 yds. @ 24.50 =
 145.125 yds. @ 2.50 =
 9.75 yds. @ 1.08 =
 225. yds. @ .1875 =

 Total

14. 7 yds. @ \$21.75 =
 9 yds. @ .59 =
 6 yds. @ 1.05 =
 8 yds. @ .625 =
 5 yds. @ 11.50 =

 Total

19. $4\frac{1}{2}$ yds. @ \$ 1.87 =
 $22\frac{3}{4}$ yds. @ 2.25 =
 $12\frac{1}{8}$ yds. @ 3.50 =
 $16\frac{5}{8}$ yds. @ 2.40 =
 $33\frac{3}{8}$ yds. @ 2.50 =

 Total

15. 155 yds. @ \$ 1.125 =
 10 yds. @ 1.78 =
 4 yds. @ 1.50 =
 220 yds. @ 2.25 =
 24 yds. @ 3.50 =

 Total

20. $20\frac{1}{4}$ yds. @ \$ 1.125 =
 $8\frac{3}{4}$ yds. @ .625 =
 $13\frac{1}{2}$ yds. @ 2.105 =
 145 yds. @ 1.375 =
 $11\frac{1}{8}$ yds. @ 1.06 =

 Total

Name..... Date.....
 Period..... Errors..... Scoring.....

LESSON 13. THREE-COLUMN TOUCH ADDITION; FIXED-DECIMAL-POINT ACCUMULATION

The addition problems in Lesson 13 contain all the numbers from 451 to 600. Use the index finger to depress the 4, 5, and 6 keys in the hundreds column.

1	2	3	4	5	6	7	8	9	10
5.53	4.70	5.84	4.78	5.48	4.98	5.83	5.24	5.07	4.73
5.00	5.69	5.96	5.11	4.85	5.66	5.19	4.91	5.74	5.46
4.90	5.81	4.59	5.04	5.89	5.34	4.81	5.50	4.93	5.09
5.44	5.97	5.68	5.55	4.65	4.75	5.98	5.33	5.21	4.88
5.86	4.71	5.37	4.63	5.10	5.27	5.18	4.56	5.92	4.51
5.70	5.39	4.84	4.95	5.45	4.79	5.90	5.65	4.57	5.06
4.80	5.25	5.99	5.03	4.89	4.66	5.36	4.99	5.38	5.80
5.63	4.54	5.71	4.96	5.05	5.78	5.59	5.20	4.60	5.08
5.67	5.42	5.91	4.97	5.16	5.72	4.62	5.47	5.29	5.94
6.00	5.75	4.87	5.56	5.22	4.53	5.31	5.77	5.17	4.67
5.95	5.58	5.51	5.23	4.74	5.62	5.30	5.87	4.69	5.15
5.35	4.64	5.93	5.57	5.61	5.54	4.68	5.73	5.32	4.61
5.12	4.94	5.11	5.40	4.52	5.01	4.92	5.60	5.88	5.49
4.76	5.14	5.76	4.86	5.82	5.02	5.13	4.82	5.79	4.72
5.26	5.43	4.77	5.28	5.85	4.55	5.64	4.58	5.52	4.83
_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
.....

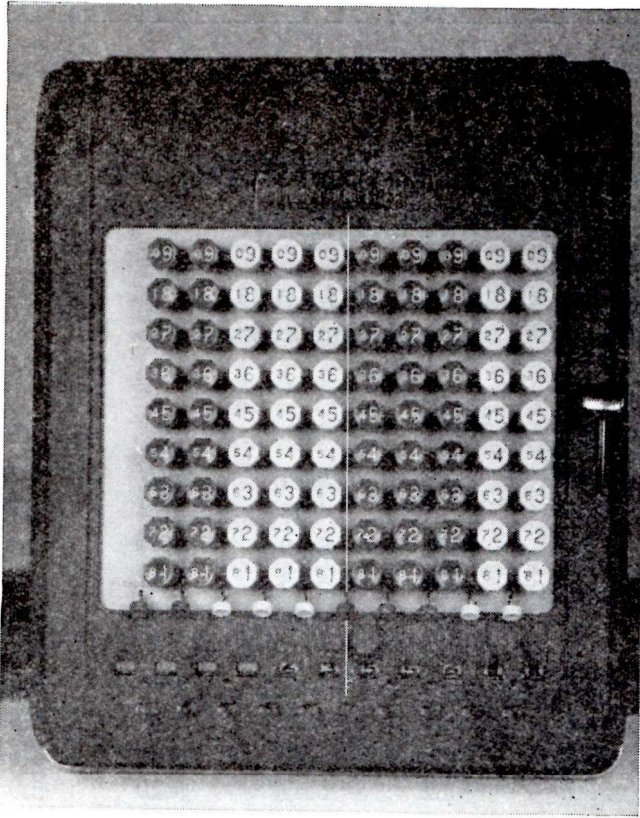
Fixed-Decimal-Point Accumulation

Fixed-decimal-point accumulation is used extensively to check the accuracy of completed invoices. The prices are multiplied by the quantities

in succession without clearing the answer dials; therefore, the accumulated total of all separate items becomes the total of the invoice.

Illustration of separate and accumulated answers:

<i>Quantity</i>	<i>Description</i>	<i>Price</i>	<i>Separate Answers</i>	<i>Accumulated Answers</i>
7	Shirts	\$3.75	\$ 26.25	\$ 26.25
18	Shirts	2.25	40.50	66.75
25	Shirts	4.50	112.50	179.25
132	Rayon ties	1.69	223.08	402.33
144	Silk ties	1.89	272.16	674.49
			_____	_____
Total of invoice (added).....			\$674.49	
Total of invoice (accumulated).....				\$674.49



The fixed decimal point is located between the fifth and sixth columns of keys, directly over decimal pointer No. 5.

The illustrated problem is solved according to the fixed-decimal-point method used in Lesson 12, and then by the accumulation method presented in this lesson.

Note that the answers are added automatically when the accumulation method is employed and that only the last answer is recorded.

Use the fixed-decimal-point accumulation method to find the totals of Problems 11 through 20:

- 11. 7 doz. @ \$3.50 =
- 14 doz. @ 1.75 =
- 15 doz. @ 1.25 =
- 36 doz. @ 2.25 =
- 132 doz. @ 1.35 =

Accumulated total

- 12. 13 yds. @ \$1.25 =
- 79 yds. @ .75 =
- 125 yds. @ .69 =
- 8 yds. @ 2.49 =
- 64 yds. @ 1.50 =

Accumulated total

- 13. 48 yds. @ \$ 1.125 =
- 96 yds. @ 1.375 =
- 64 yds. @ .625 =
- 32 yds. @ .875 =
- 49 yds. @ 10.20 =

Accumulated total

- 14. $24\frac{7}{8}$ lbs. @ \$.72 =
- $34\frac{9}{12}$ lbs. @ .84 =
- $14\frac{5}{12}$ lbs. @ 1.20 =
- $56\frac{1}{2}$ lbs. @ .98 =
- $27\frac{3}{4}$ lbs. @ .76 =

Accumulated total

Name..... Date.....

- 15. $6\frac{1}{2}$ doz. @ \$3.50 =
- $18\frac{1}{4}$ doz. @ 2.24 =
- 213 doz. @ 3.60 =
- 7 doz. @ 2.55 =
- $22\frac{9}{12}$ doz. @ .48 =

Accumulated total

- 16. 303 articles @ \$2.28 =
- 35 articles @ 5.50 =
- 109 articles @ 2.05 =
- 74 articles @ .875 =
- 28 articles @ 3.15 =

Accumulated total

- 17. 21 yds. @ \$1.05 =
- 35 yds. @ 1.25 =
- 234 yds. @ 4.80 =
- 8 yds. @ .63 =
- 18 yds. @ 1.48 =

Accumulated total

- 18. $44\frac{5}{8}$ yds. @ \$1.44 =
- $35\frac{1}{2}$ yds. @ .78 =
- 119 yds. @ 2.20 =
- $23\frac{3}{8}$ yds. @ 1.04 =
- 9 yds. @ .27 =

Accumulated total

- 19. 72 doz. @ \$.7625 =
- 9 doz. @ 1.73 =
- 18 doz. @ 1.27 =
- 110 doz. @ 9.755 =
- 7 doz. @ 9.755 =
- 7 doz. @ .19 =

Accumulated total

- 20. 16 doz. @ \$7.55 =
- 32 doz. @ .4525 =
- 48 doz. @ 1.50 =
- 200 doz. @ 6.0625 =
- 25 doz. @ 1.09 =

Accumulated total

Name..... Date.....

Period..... Errors..... Scoring.....

LESSON 14. THREE-COLUMN TOUCH ADDITION; SUBTRACTION

Before adding columns 1 through 10, check:

1. The arrangement of all equipment.
2. Your position at the calculator.
3. The position of the decimal pointer, and the reading of the answer

dials.

1	2	3	4	5	6	7	8	9	10
7.55	8.22	8.64	7.97	8.42	7.99	8.28	8.75	7.82	8.37
8.76	7.80	8.18	8.98	7.61	8.62	7.56	8.34	8.51	7.59
8.31	8.89	7.74	8.09	8.91	8.40	8.96	7.90	8.41	8.82
7.89	8.35	8.61	7.60	8.02	7.73	8.16	8.85	8.50	7.65
8.59	7.91	8.66	7.85	8.25	8.80	7.87	8.20	8.72	7.57
8.84	7.69	8.21	8.94	7.66	8.04	8.92	7.54	8.15	8.88
8.30	8.71	7.63	8.11	8.53	7.67	8.10	8.99	7.75	8.24
7.51	8.05	8.87	7.77	8.44	8.69	7.92	8.01	8.60	7.76
8.54	7.93	8.14	8.56	7.52	8.46	8.83	8.38	7.81	8.17
7.64	8.23	8.65	7.95	8.48	8.67	7.62	8.07	8.55	7.86
8.70	7.58	8.19	8.73	7.68	8.36	8.95	7.98	7.84	7.72
8.33	8.81	7.83	8.12	8.78	7.94	7.96	7.78	8.06	8.08
7.88	8.86	8.00	8.39	8.90	8.27	8.29	8.32	8.43	8.47
7.53	8.13	8.57	7.70	8.26	8.49	8.58	8.52	8.63	8.74
8.68	7.79	8.03	8.77	7.71	8.79	8.93	8.97	9.00	8.45
—	—	—	—	—	—	—	—	—	—
.....

Subtraction

The *large* and *small* figures on the key tops are used to solve all subtraction problems. The *large* figures are depressed to add the first amount, and the *small* figures are depressed to deduct the amount subtracted. The small figures range from a cipher on the 9 key to a small figure 8 on the large 1 key. There are no small 9's on the key tops because small 9's are deducted automatically. To deduct an amount, depress one *less* than the amount in small figures. For example, to deduct 12, depress small 11 (12 less 1).

The remaining steps in subtraction vary slightly on the different types of calculators. Study the the steps in subtraction for the model you are now operating.

Example: 44 (the minuend, the amount added on the large keys)
 - 12 (the subtrahend, the amount deducted on the small keys)
 32 (the remainder, the amount appearing in the answer dials)

Hand-Operated Burroughs Calculator

Step 1. Add *large* 44 at the extreme right of the keyboard.

Step 2. Depress *small* ciphers (the small 0's on the same key tops with the large 9's) in *all* columns to the left of the amount subtracted. Since the amount subtracted, 12, occupies two columns, start depressing ciphers in the third column from the right

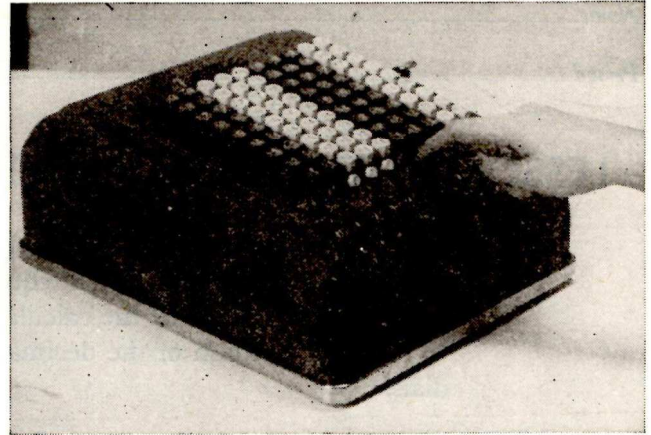
Step 3. Depress *small 11* (12 less 1) in the last two columns at the right of the keyboard. The remainder in the answer dials is 32.

Electrically Operated Burroughs Calculator

Step 1. Add *large 44* in the two columns at the extreme right of the keyboard.

Step 2. Depress the red subtraction control key (just below the numbers on the keyboard) in the third column from the right. The red subtraction control key is always depressed in the column immediately to the left of the amount subtracted.

Step 3. Depress *small 11* (12 less 1) in the last two columns at the right of the keyboard. The remainder in the answer dials is 32.



The cut-off key which is held while subtracting on the Comptometer.



Subtract on the right side of the keyboard.

The Comptometer and the Plus Calculator

Step 1. Add *large 44* in the last two columns at the extreme right of the keyboard.

Step 2. Hold the second cutoff key forward—toward the keyboard. The cutoff keys are between the columns just below the number keys on the keyboard. Always hold the cutoff key just to the left of the amount added.

Step 3. Depress *small 11* (12 less 1) in the last two columns at the right of the keyboard. The remainder in the answer dials is 32.

In the following subtraction problems, the asterisk (*) is used to indicate the position for:

1. Starting to depress ciphers on the Burroughs hand-operated calculator
2. Depressing the subtraction control key on the Burroughs electrically operated calculator
3. Holding the cutoff key on the Comptometer and the Plus Calculator

Subtract all amounts followed by “-.” The *small* figures are given for Problems 11 through 20. You must determine them for Problems 21 through 30.

11
 4.75
 2.25 - (Small *224)

12
 4.56
 1.39 - (Small *138)

13
 5.50
 3.47 - (Small *346)

Name Date

Note that the small cipher is depressed in subtraction:

14	15	16
5.00	5.75	7.50
3.11 — (Small *310)	3.01 — (Small *300)	6.09 — (Small *608)
_____	_____	_____
.....

Note that small 9's are automatic in subtraction; therefore, they are omitted. Small 9 is indicated by an x

17	18	19
35.00	89.11	105.50
28.97 — (Small *28x6)	69.92 — (Small *6xx1)	102.95 — (Small *102x4)
_____	_____	_____
.....

20	21	22
745.30	942.14	841.01
609.10 — (Small *60x0x)	805.22 —	740.19 —
_____	_____	_____
.....

23	24	25	26
853.02	384.21	654.23	853.13
698.87 —	158.10 —	105.07 —	804.19 —
_____	_____	_____	_____
.....

27	28	29	30
485.58	958.38	250.95	950.13
309.09 —	594.21 —	202.00 —	879.01 —
_____	_____	_____	_____
.....



Subtraction of Uneven Digits

When amounts of uneven digits are subtracted—for example, the subtraction of a three-digit amount from an amount of four digits—a small cipher precedes the amount subtracted if either the Comptometer or the Plus calculator is used. Follow the steps in subtraction for the type of calculator you are now operating.

Example:

$$\begin{array}{r} 23.80 \\ 8.71 - \\ \hline 15.09 \end{array}$$

Solution:

	<i>Burroughs Hand-Operated</i>	<i>Burroughs Electric</i>	<i>Burroughs Duplex</i>	<i>Comptometer and Plus Calculator</i>
<i>Step 1.</i>	Add <i>large</i> 2380.	Add <i>large</i> 2380.	Add <i>large</i> 2380.	Add <i>large</i> 2380.
<i>Step 2.</i>	Depress the <i>small</i> 0's starting in the <i>fourth</i> column from the right, directly above the 2 in 2380.	Depress the <i>red subtraction control key</i> in the fourth column from the right, directly above the 2 in 2380.	Depress the <i>plus bar</i> to transfer the amount to the dials above the keyboard.	Hold the cutoff key immediately to the left of the 2 in 2380—the <i>fourth</i> cutoff key from the right.
<i>Step 3.</i>	Depress <i>small</i> *870.	Depress <i>small</i> *870.	Depress <i>large</i> 871, then the <i>subtraction bar</i> .	Depress <i>small</i> *0870.

In Problems 11 through 15 the column for depressing the ciphers, the subtraction control key, or the cutoff key is indicated by an asterisk (*). The figures to be deducted are indicated for each type of calculator.

	<i>Burroughs Hand-Operated</i>	<i>Burroughs Electric</i>	<i>Burroughs Duplex</i>	<i>Comptometer and Plus Calculator</i>
11.	5.00 1.25 — <i>Small</i> *124 <hr/>	<i>Small</i> *124	<i>Large</i> 125	<i>Small</i> *124
12.	5.00 .25 — <i>Small</i> *24 <hr/>	<i>Small</i> *24	<i>Large</i> 25	<i>Small</i> *024
13.	5.00 .05 — <i>Small</i> *4 <hr/>	<i>Small</i> *4	<i>Large</i> 5	<i>Small</i> *004

Name Date

14. 5.00
 .95— *Small *x4* *Small *x4* *Large 95* *Small *0x4*

15. 5.00
 .10— *Small *x* *Small *x* *Large 10* *Small *00x*

16
 435.92
 55.51—

17
 352.09
 48.50—

18
 845.41
 88.09—

19
 453.58
 66.93—

20
 876.10
 58.92—

21
 480.43
 48.90—

22
 943.93
 90.09—

23
 485.03
 89.95—

24
 821.25
 99.25—

25
 432.01
 90.01—

26
 304.66
 21.67—

27
 199.50
 9.59—

28
 516.25
 89.00—

29
 462.71
 61.91—

30
 191.74
 92.03—

Name.....Date.....

Period.....Errors.....Scoring.....

LESSON 16. DEBIT AND CREDIT BALANCES IN SUBTRACTION

Practice the first-finger reach from 30 to 100 and 200 before adding Problems 1 through 10 in this lesson. These problems contain numbers from 101 through 250.

1	2	3	4	5	6	7	8	9	10
1.38	2.06	2.23	1.19	1.77	1.90	1.17	1.56	2.34	1.25
2.45	1.43	1.85	2.29	1.11	1.08	1.68	1.96	2.13	1.87
1.60	1.99	2.39	1.02	1.66	2.22	1.45	1.12	1.30	1.59
2.32	1.46	1.93	1.75	2.21	2.20	1.39	1.22	1.15	1.62
1.55	2.03	2.42	1.23	1.89	1.80	2.41	1.37	1.05	2.14
2.19	2.26	1.21	1.88	2.36	1.57	1.31	1.76	2.10	1.49
1.50	2.15	1.65	2.25	1.06	2.27	1.01	1.44	2.12	1.97
1.95	2.50	1.16	1.81	1.79	2.38	1.26	1.72	2.07	1.47
2.35	1.32	2.11	2.31	1.27	1.14	2.18	1.28	1.69	1.20
1.52	1.10	1.73	2.09	2.44	2.04	2.33	1.84	1.33	1.07
1.29	1.34	2.00	1.70	2.05	1.54	2.02	1.78	2.49	1.64
2.37	1.13	1.48	1.91	1.63	1.03	1.51	1.94	1.35	1.82
2.28	1.53	2.01	1.74	1.98	1.71	2.24	2.08	1.09	1.41
2.40	1.36	1.83	1.40	1.92	2.46	1.42	1.24	2.48	1.67
1.58	2.17	2.30	1.04	1.71	2.43	1.18	1.86	2.47	2.16
—	—	—	—	—	—	—	—	—	—
....

Debit and Credit Balances in Subtraction

Amounts added and subtracted in the same column result in either a positive or a negative answer. If the amounts *added* are greater, the answer is a positive, or *debit*, balance; but if the amounts *subtracted* are greater, the answer is a negative, or *credit*, balance. An overdrawn checking account is an illustration of an actual credit

balance. The depositor has withdrawn a greater amount of money from his account than the total amount of his deposits; therefore, his account has a negative, or credit, balance.

In the illustrations of debit and credit balances, and in the problems that follow, the amounts to be subtracted are followed by a minus (−) sign.

Name.....Date.....

Period.....Errors.....Scoring.....

LESSON 17. FOUR-COLUMN TOUCH ADDITION; CIPHER DIVISION

Most of the amounts added in this lesson contain four figures. These amounts, like all the amounts in the preceding lessons, are added with two fingers—the index and middle fingers. The figures in the last column (the units column) are depressed with the middle finger. All other figures—whether they are in the second (tens), third (hundreds), or fourth (thousands) column—are depressed with the index finger.

Use the first and second fingers *only* to add the following problems:

1	2	3	4	5	6	7	8	9	10
3.36	6.06	7.34	8.48	4.73	63.66	84.04	95.25	16.23	19.50
36.63	7.34	73.37	4.08	4.87	33.36	47.37	58.49	28.80	15.94
3.03	67.37	70.68	88.48	84.07	3.03	.84	4.50	14.40	14.51
6.36	3.83	4.47	4.83	7.46	34.67	3.71	89.94	21.03	16.32
30.63	7.37	8.74	48.80	8.84	3.34	7.03	3.85	62.31	1.24
6.63	7.46	4.37	4.84	4.04	3.28	44.82	.35	17.40	10.16
3.66	4.83	8.63	88.04	84.48	63.36	4.24	5.20	1.35	21.81
33.36	44.84	80.48	8.40	8.44	.62	.84	.95	18.32	30.07
6.06	8.08	4.88	84.88	80.88	36.60	80.74	90.05	71.37	10.09
63.60	40.84	8.68	4.48	4.08	3.06	4.08	9.95	7.74	11.45
.....

Cipher Division

Division problems are solved on the key-driven calculator in much the same manner as subtraction problems are solved, because cipher division is actually repeated subtraction. There are three major steps in cipher division:

Step 1. Large figures are used to record the dividend, starting one column from the extreme left of the keyboard.

Step 2. Small figures, preceded by a small cipher, are held to represent the divisor. The small figures are always one figure less than the actual divisor.

Step 3. The divisor is depressed until the figures in the answer dials below are reduced to an amount that is less than the divisor; then the divisor is

moved one place to the right and the figure reduced again.

Example:

$$\begin{array}{r} 10,488 \div 23 = 456 \\ \text{(the dividend)} \quad \text{(the divisor)} \quad \text{(the quotient)} \end{array}$$

Solution:

Pencil-and-Paper Method

$$\begin{array}{r} 456. \\ 23 \overline{) 10488} \\ \underline{92} \\ 128 \\ \underline{115} \\ 138 \\ \underline{138} \\ 0000 \end{array}$$

Detailed Steps in Cipher Division

*Answer Dial
Reading, Starting
from the Left*

- | | |
|---|----------------|
| 1. Beginning in the second column at the left side of the keyboard, use <i>large</i> figures to record the dividend, 10,488. | 0 0 1 0 4 8 8. |
| 2. Set a decimal pointer after the dividend, 10,488; then move it three places to the left to allow for the preceding cipher plus the two whole numbers in the divisor. | 0 0 1 0.4 8 8 |
| 3. For the divisor, 23, hold small 022 (23 less 1, preceded by a 0) in the columns directly above the 104 in. | 0 0 1 0.4 8 8 |
| 4. Reduce the 104 to a number less than 23. After four depressions, the dials read. | 0 4 0 1.2 8 8 |
| 5. Since the amount in the answer dials directly below the divisor 012 is less than the divisor 022, move the divisor one place to the right directly above 128 in. | 0 4 0 1.2 8 8 |
| 6. Reduce the 128. After five depressions, the dials read. | 0 4 5 0.1 3 8 |
| 7. Move one place to the right and reduce 138. After six depressions the final answer is. | 0 4 5 6.0 0 0 |

Place the decimal pointer after the dividend and move one place to the left for the preceding cipher and one additional place to the left for each whole number in the divisor before attempting each of the following cipher-division problems:

- | | |
|------------------------------|------------------------------|
| 11. 2,376 ÷ 33 = | 21. 53,454 ÷ 59 = |
| 12. 11,767 ÷ 41 = | 22. 4,427 ÷ 19 = |
| 13. 25,305 ÷ 105 = | 23. 7,872 ÷ 24 = |
| 14. 10,824 ÷ 44 = | 24. 32,058 ÷ 78 = |
| 15. 26,112 ÷ 102 = | 25. 41,472 ÷ 144 = |
| 16. 87.75 ÷ 2.7 = | 26. 49.01 ÷ 2.9 = |
| 17. 101.25 ÷ 4.5 = | 27. 48.125 ÷ 5.5 = |
| 18. 168.75 ÷ 25. = | 28. 525.25 ÷ 5.5 = |
| 19. 260.71 ÷ 31. = | 29. 159.60 ÷ 35. = |
| 20. 285.12 ÷ 7.2 = | 30. 402.16 ÷ 88. = |

Name.....Date.....

Period.....Errors.....Scoring.....

LESSON 18. FOUR-COLUMN TOUCH ADDITION WITH A HORIZONTAL REACH; DIVISION BY REDUCTION

All the addition problems in this lesson contain a horizontal reach from the second to the fourth column. The keys in both columns are depressed with the index finger. The middle finger is used to depress the keys in the last column only.

When adding the following columns, read the amounts as whole numbers and not as separate figures, just as you read words and not separate letters.

1	2	3	4	5
30.24	50.54	70.11	40.21	20.54
60.42	20.43	40.33	30.51	30.78
20.43	60.23	20.99	20.90	10.26
40.62	30.22	80.32	70.80	20.02
50.71	50.27	40.56	50.66	60.73
20.43	20.74	70.88	10.95	10.92
10.21	20.52	90.27	50.01	20.78
30.32	40.44	20.54	30.14	30.74
60.22	30.36	30.45	40.61	10.56
30.64	90.23	60.36	20.93	20.62
50.43	30.54	70.23	30.18	40.28
20.67	50.51	20.65	50.59	10.92
_____	_____	_____	_____	_____
.....
6	7	8	9	10
70.25	20.78	30.97	10.92	30.72
90.18	30.74	10.68	30.58	10.53
40.23	50.41	40.62	10.83	40.14
10.57	20.55	10.87	50.62	10.66
60.20	50.15	10.20	80.08	10.12
80.29	20.98	10.89	60.10	20.87
10.46	50.29	40.12	10.75	90.31
70.28	10.91	70.50	10.50	20.78
40.25	10.95	10.81	50.29	40.81
90.82	20.38	30.52	30.46	60.27
20.62	70.71	60.14	50.75	60.92
70.29	20.61	20.99	10.39	80.02
_____	_____	_____	_____	_____
.....

Division by Reduction

Cipher division is the simplest method of dividing on the key-driven calculator, but reduction and trial-divisor division are faster. The reduction method is presented in this lesson.

Large figures are depressed to record the dividend; and *small* figures, less one, are held to reduce the dividend in all methods of dividing. The small cipher is not held in either reduction or trial-

divisor division. All division problems, except cipher-division problems, are started in the columns at the extreme left of the keyboard.

When dividing by the reduction method, the divisor is depressed (*reduced*) until the figures in the answer dials are reduced to an amount that is less than the divisor held on the keyboard of the calculator.

The four steps in division by reduction follow:

Example: $144 \div 12 = 12$.

Solution:

<i>Steps in Division by Reduction</i>	<i>Answer Dial Reading, Starting from the Left</i>
1. Add <i>large</i> 144 in the columns at the extreme left of the keyboard	0 1 4 4.
2. Move the decimal pointer two places to the <i>left</i> for the two-digit divisor, 12	0 1.4 4
3. Hold <i>small</i> 11 (12 less 1) in the columns directly above the 1.4 and depress <i>once</i> to reduce	1 0.2 4
4. Since 02 is less than 12, move one place to the right—directly above 24—and reduce <i>twice</i>	1 2.0 0

When solving the following problems, reduce the divisor until the numbers in the answer dials directly below are less than the divisor:

- | | |
|------------------------------|------------------------------|
| 11. $72 \div 12 =$ | 16. $96 \div 12 =$ |
| 12. $78 \div 13 =$ | 17. $91 \div 13 =$ |
| 13. $96 \div 24 =$ | 18. $88 \div 22 =$ |
| 14. $75 \div 15 =$ | 19. $96 \div 16 =$ |
| 15. $92 \div 23 =$ | 20. $90 \div 18 =$ |

After the numbers in the answer dials are reduced to an amount less than the divisor, move one place to the right and reduce again.

- | | |
|---------------------------------|---------------------------------|
| 21. $169 \div 13 =$ | 26. $196 \div 14 =$ |
| 22. $225 \div 15 =$ | 27. $288 \div 16 =$ |
| 23. $272 \div 17 =$ | 28. $1,728 \div 12 =$ |
| 24. $1,725 \div 15 =$ | 29. $3,276 \div 14 =$ |
| 25. $525 \div 21 =$ | 30. $4,646 \div 23 =$ |

Name.....Date.....

Period.....Errors.....Scoring.....

LESSON 19. FOUR-COLUMN TOUCH ADDITION WITH A TWO-COLUMN REACH; TRIAL-DIVISOR DIVISION

All the addition problems in Lesson 19 contain a horizontal reach from the units to the thousands column. The keys in the thousands column are depressed with the index finger and the keys in the units (last) column are depressed with the second finger.

1	2	3	4	5
40.08	80.05	20.01	40.03	20.05
40.07	30.08	60.09	10.02	30.04
30.06	20.07	20.03	10.04	10.05
40.05	20.02	40.04	40.02	20.06
40.02	40.05	50.08	50.04	10.08
20.03	30.06	30.03	10.05	50.03
60.06	20.08	20.04	30.04	40.07
40.03	30.07	10.03	20.08	10.03
20.05	30.03	50.04	20.02	30.05
30.08	40.04	10.02	40.04	10.04
10.05	20.05	30.06	50.01	20.03
80.04	30.06	10.05	50.02	10.01
20.02	20.07	30.06	20.03	20.08
40.06	10.03	40.04	60.05	10.06
10.01	50.04	10.02	20.02	30.05
.....
6	7	8	9	10
10.01	30.03	40.02	40.03	30.04
30.02	10.04	30.05	10.06	10.08
20.08	80.01	10.03	40.05	20.02
60.04	20.04	20.04	80.01	30.05
50.02	20.02	40.04	30.05	80.08
50.02	40.01	80.06	40.05	20.05
10.03	30.03	60.08	20.03	40.08
20.04	20.05	10.05	20.08	50.02
40.05	10.04	50.05	20.04	30.03
20.04	80.06	20.06	10.05	40.07
50.03	30.06	50.03	50.04	40.05
20.04	20.08	10.06	30.08	20.06
40.06	50.09	50.09	80.02	40.07
90.04	20.03	20.05	40.01	90.05
50.01	30.02	30.06	70.07	70.06
.....

Trial-Divisor Divison

Trial-divisor division is a faster method of dividing than cipher division because the small cipher is not held with the divisor. Another step, however, is taken—depressing the divisor until the number of depressions agrees with the number in the answer dials just to the left of the columns in which the divisor is held.

There are three major steps in trial-divisor division:

Step 1. The divisor must be depressed until the number of depressions *agrees* with the number in the answer dials just to the left.

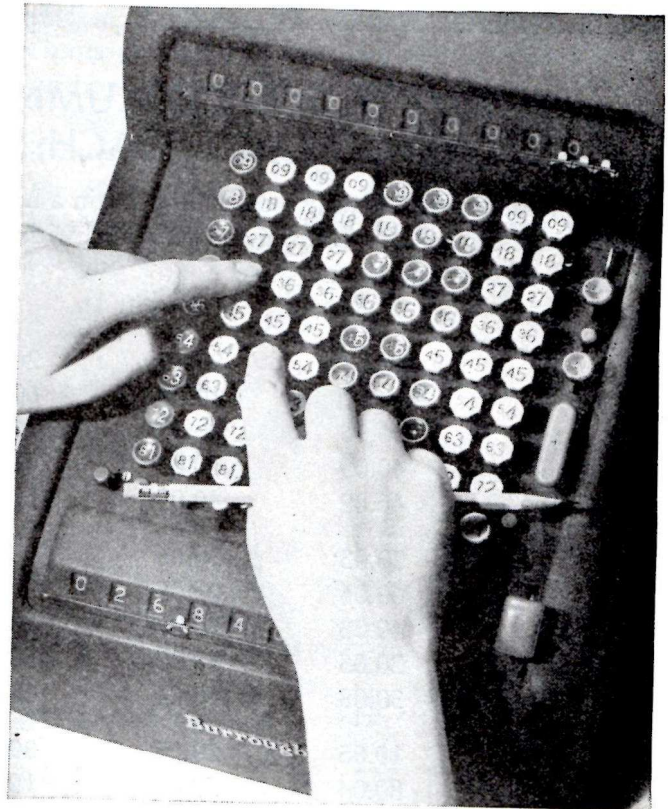
Step 2. The remainder in the answer dials directly below the divisor must be *reduced* to an amount less than the divisor. (Disregard the number to the left of the divisor after it has been equaled).

Step 3. The divisor must be moved to the right and Steps 1 and 2 repeated to agree with the number in the answer dials just to the left of the new position; then the remainder must be reduced to an amount less than the divisor.

The eight operations in trial-divisor division follow:

Example: $1,404 \div 36 = 39$.

Solution:



Step 1: Equal the trial divisor.

Operations in Trial-Divisor Division

*Answer Dial Readings,
Starting from the Left*

- | | |
|--|------------|
| 1. Add large 1404 at the extreme left of the keyboard | 0 1 4 0 4. |
| 2. Move the decimal pointer two places to the left to allow for the two whole numbers in the divisor, 36 | 0 1 4.0 4 |
| 3. Hold <i>small</i> 35 (36 less 1). Since 35 is not contained in 14, the first two numbers of 1404, move the divisor one place to the <i>right</i> so that small 35 is held in the columns directly above the 40 in | 0 1 4.0 4 |
| 4. Depress small 35 once to agree with the 1 in 1404. The dial reading is | 0 2 0.4 4 |
| Depress small 35 a <i>second time</i> to agree with the 2 in 2044. The dial reading is | 0 2 6.8 4 |
| The trial divisor has been agreed with. It has been depressed twice and the figure to the left is 2— | 0 2 6.8 4 |
| 5. In the columns directly above the dials reading 68, depress the divisor once to reduce the remainder, 68, to an amount less than the divisor | 0 3 3.2 4 |
| The remainder, 32, is less than the divisor, 36. | |
| 6. Move one place to the right so that small 35 is held in the columns directly above 24 in. | 0 3 3.2 4 |
| a. Depress small 35 three times to agree with the second 3 in 3324. The dial reading is . . | 0 3 5.1 6 |
| b. Depress small 35 a fourth and a fifth time to agree with the 5 in 3516 | 0 3 6.4 4 |
| c. Depress small 35 a sixth time to agree with the 6 in 3644 | 0 3 7.0 8 |
| d. Depress small 35 a seventh time to agree with the 7 in 3708 | 0 3 7.7 2 |
- Step one has been completed for a second time because the figure 7 in 3772 agrees with the seven depressions of the divisor.

Name..... Date.....



Step 2: Reduce the remainder.



Step 3: Move 1 column to right and equal the new trial divisor.

*Answer Dial Readings,
Starting from the Left*

- 7. Reduce the remainder 72 to an amount less than 36..... 0 3 7.7 2
- a. Depress small 35 once..... 0 3 8.3 6
- b. Depress small 35 again..... 0 3 9.0 0
- 8. Check the accuracy of the answer by multiplying 36×39 (1,404).

The three major steps in trial-divisor division are repeated until the problem is solved:

1. Depress the divisor until the *number* of depressions *agrees* with the *number* in the answer dials just to the left of the divisor.

2. *Reduce the remainder* to an amount that is less than the divisor.

3. Move the divisor one column to the right—agree and reduce again.

Point off before dividing each of the following problems by the trial-divisor method.

- 11. $1,224 \div 36 =$
- 12. $1,152 \div 48 =$
- 13. $1,080 \div 72 =$
- 14. $18,648 \div 84 =$
- 15. $12,496 \div 176 =$
- 16. $14,272 \div 64 =$
- 17. $11,736 \div 72 =$
- 18. $11,424 \div 84 =$
- 19. $11,016 \div 108 =$
- 20. $32,250 \div 125 =$

If the amount in the answer dials is greater than the divisor, reduce it to an amount less than the divisor *immediately*; then move to the right and *agree* with the number to the left.

- | | |
|-------------------------------|-------------------------------|
| 21. $25,544 \div 206 =$ | 26. $72,504 \div 212 =$ |
| 22. $70,112 \div 224 =$ | 27. $31,920 \div 240 =$ |
| 23. $43,560 \div 360 =$ | 28. $84,240 \div 360 =$ |
| 24. $76,464 \div 144 =$ | 29. $18,432 \div 144 =$ |
| 25. $87,192 \div 504 =$ | 30. $96,336 \div 432 =$ |

Check the accuracy of Problems 11 through 30 by multiplying the answer by the divisor. The result should be the divisor.

For example, in Problem 30, $223 \times 432 = 96,336$.

Name.....Date.....

Period.....Errors.....Scoring.....

LESSON 20. FOUR-COLUMN TOUCH ADDITION; DECIMAL DIVISION

Check your posture, the position of your textbook, and the position of the calculator before adding the following four-column touch addition problems. All ten problems contain 550 key strokes. Each problem should be added accurately in 52 seconds or less.

1	2	3	4	5
4.48	84.25	2.10	42.23	20.05
83.27	32.74	6.55	23.42	31.44
3.07	26.17	23.03	24.53	23.25
43.26	2.20	45.24	4.03	2.35
24.72	4.05	52.44	15.52	13.24
2.13	34.86	3.00	14.25	5.03
67.26	25.24	24.42	32.34	4.07
4.03	43.07	14.03	25.04	14.23
23.45	3.03	53.24	2.42	32.35
35.24	4.14	14.42	4.34	15.54
2.05	25.25	3.60	50.41	2.30
3.04	37.36	1.35	34.42	1.72
2.82	27.24	32.45	24.13	25.14
41.25	13.03	41.24	5.05	14.86
25.41	5.35	13.32	2.32	23.53
-----	-----	-----	-----	-----
.....

6	7	8	9	10
2.02	3.23	41.52	4.03	8.03
35.20	2.04	35.50	42.13	24.04
2.64	20.24	25.42	82.35	13.42
14.54	44.34	25.53	64.14	32.45
31.15	25.14	4.04	72.35	82.14
5.73	8.01	24.30	8.15	4.45
13.05	35.06	60.34	2.52	8.24
1.33	2.45	39.45	62.34	14.13
42.25	12.34	25.50	21.08	53.42
23.54	41.34	3.15	1.25	42.34
51.60	6.26	52.53	5.05	4.03
2.41	2.58	23.60	3.14	2.60
41.56	51.35	5.75	41.42	40.67
4.53	24.53	24.82	42.20	81.35
52.71	32.52	2.53	73.50	42.32
.....

Decimal Division

Use trial-divisor division in solving the following decimal division problems.

Example: $31.875 \div 7.5 = 4.25$.

Solution:

Steps in Decimal Division

Answer Dial Readings from the Left

1. Add the dividend, 31.875, in the columns at the extreme left side of the keyboard. 0 3 1 8 7 5
2. Move the decimal pointer to the proper position in the dividend. 0 3 1.8 7 5
3. Move the decimal pointer one place to the left for each whole number in the divisor, 7.5. 0 3.1 8 7 5

- | | |
|--------------------------------|--------------------------------|
| 11. $8.0385 \div 2.33 =$ | 16. $6.912 \div 2.4 =$ |
| 12. $15.984 \div 3.33 =$ | 17. $76.125 \div 5.25 =$ |
| 13. $32.490 \div 2.25 =$ | 18. $24.805 \div 5.5 =$ |
| 14. $12.528 \div 3.48 =$ | 19. $18.125 \div 7.25 =$ |
| 15. $534.65 \div 3.7 =$ | 20. $183.00 \div 1.22 =$ |

The following problems contain uneven answers. Do not carry an uneven answer more than four places beyond the decimal point.

- | | |
|-------------------------------|-------------------------------|
| 21. $1,731 \div 12 =$ | 26. $1,772 \div 12 =$ |
| 22. $80.52 \div 24 =$ | 27. $28.96 \div 2.4 =$ |
| 23. $11.754 \div 3.6 =$ | 28. $39.60 \div 4.8 =$ |
| 24. $20.424 \div 4.8 =$ | 29. $66.67 \div 1.3 =$ |
| 25. $350.70 \div 56 =$ | 30. $11.500 \div 6.6 =$ |

Name..... Date.....

Period..... Errors..... Scoring.....

TEST 2 (COVERING LESSONS 11 THROUGH 20)

Add these 10 columns by the touch method.

Add:

1	2	3	4	5	6	7	8	9	10
4.44	6.19	5.48	7.55	9.16	1.38	3.36	30.24	80.05	4.48
3.15	6.14	5.83	8.76	9.66	2.45	36.63	60.42	40.08	83.27
3.84	6.07	4.55	8.31	9.87	1.60	3.03	20.67	30.06	3.07
4.01	7.05	5.02	7.89	9.51	2.32	6.36	60.22	40.03	43.26
4.31	6.52	5.52	8.59	2.98	1.55	30.63	30.64	20.05	24.72
4.28	7.39	4.83	7.69	2.86	2.26	7.46	70.25	10.01	2.13
3.22	6.53	5.15	8.71	9.52	2.15	4.83	90.18	30.02	67.26
3.68	6.84	4.61	8.05	9.61	2.50	44.84	40.23	60.04	4.03
4.42	6.86	5.49	7.93	9.24	1.32	8.08	10.57	50.02	23.45
3.69	6.90	5.48	8.23	2.96	1.10	40.84	60.20	20.04	35.24
3.94	6.41	5.84	7.54	2.89	1.17	7.34	30.97	20.01	3.23
3.40	6.49	4.55	8.99	9.92	1.68	73.37	10.68	20.03	2.04
3.52	7.01	5.70	8.01	9.46	1.46	70.68	40.62	50.08	20.24
4.12	6.75	4.80	8.38	9.68	2.07	4.47	10.87	40.04	44.34
3.06	6.84	5.26	8.07	9.93	2.47	8.74	70.50	70.06	8.01
—	—	—	—	—	—	—	—	—	—
.....

Multiply:

- 11. $72 \times 48 \times .75 = \dots\dots\dots$
- 12. $39 \times 33 \times .80 = \dots\dots\dots$
- 15. 7 yds. @ \$3.25 =
 17 yds. @ 4.50 =
 24 yds. @ 3.35 =
 36 yds. @ 1.75 =
 108 yds. @ 2.79 =

Total

- 13. 24 bolts of 76 yards @ \$.80 a yd. =
- 14. 30 boxes of 48 pieces @ \$.49 a piece =
- 16. 8 yds. @ \$1.25 =
 6 yds. @ .79 =
 7 yds. @ 1.625 =
 18 yds. @ .375 =
 202 yds. @ 1.10 =

Total

Subtract:

17	18	19	20	21
4.75	35.00	15.75	105.50	841.01
2.24 —	28.96 —	3.01 —	102.94 —	70.79 —
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
.....

22	23	24	25	26
2.81	.70 —	3.31 —	4.28	1.54
6.21 —	3.74	.63	.89 —	1.05 —
3.16	8.62 —	5.71	4.84	1.98 —
1.28 —	5.50	3.35 —	3.40 —	2.21 —
3.09	1.18 —	7.01	7.20 —	9.92
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
.....

Divide:

- | | | | |
|--------------------------|-------|--------------------------|-------|
| 27. $18,648 \div 42 =$ | ..... | 34. $12,496 \div 88 =$ | ..... |
| 28. $87,192 \div 252 =$ | ..... | 35. $96,336 \div 216 =$ | ..... |
| 29. $64,500 \div 125 =$ | ..... | 36. $22,848 \div 84 =$ | ..... |
| 30. $15,984 \div 3.33 =$ | ..... | 37. $18.125 \div 7.25 =$ | ..... |
| 31. $32.490 \div 2.25 =$ | ..... | 38. $24.805 \div 5.5 =$ | ..... |
| 32. $1,732 \div 12 =$ | ..... | 39. $1,772 \div 24 =$ | ..... |
| 33. $701.40 \div 56 =$ | ..... | 40. $39.65 \div 7.5 =$ | ..... |

Name.....Date.....

Period.....Errors.....Scoring.....

LESSON 21. FOUR-COLUMN TOUCH ADDITION; DISCOUNT AND NET AMOUNTS

The following four-column touch addition problems contain 600 key depressions. Each problem should be added by touch with the first and second fingers in approximately 50 seconds.

1	2	3	4	5
31.14	25.31	4.75	35.25	2.75
52.13	34.41	13.34	13.24	35.02
43.24	24.34	60.80	1.94	24.24
12.39	2.75	32.34	42.35	25.33
2.45	45.60	35.42	63.04	12.08
35.32	41.24	52.34	12.53	8.35
23.46	23.35	24.53	13.34	31.45
15.45	8.24	31.43	32.80	14.35
30.54	53.70	5.85	7.21	25.53
6.07	12.52	15.35	62.02	33.70
14.35	31.53	61.44	14.42	1.47
52.26	60.43	26.05	34.53	25.53
42.07	13.28	41.42	17.03	13.42
80.23	2.51	42.25	9.13	24.35
1.44	34.15	6.52	12.44	28.04
_____	_____	_____	_____	_____
.....
6	7	8	9	10
51.43	24.41	32.23	52.21	82.06
43.23	52.32	7.45	8.35	27.80
42.13	23.43	21.43	32.24	24.53
4.28	51.14	25.54	22.43	3.85
80.06	63.03	32.09	42.07	49.03
35.24	41.43	42.45	24.42	23.34
14.35	25.34	23.33	25.33	8.31
24.52	35.08	32.25	13.52	35.42
3.84	3.85	28.04	4.74	42.25
14.80	9.24	8.25	23.06	38.04
42.35	32.34	34.21	24.14	32.35
31.42	23.09	45.35	53.52	31.08
80.33	45.32	24.23	14.43	2.73
1.94	13.44	8.33	9.07	43.06
13.55	6.08	20.71	54.09	22.35
_____	_____	_____	_____	_____
.....

Discounts and Net Amounts

Business firms grant trade and cash discounts. A *trade discount* is a reduction from the list price granted to the retailer by the wholesaler to meet varying business conditions. A *cash discount* is granted to a buyer by the seller as an inducement to pay the amount due within a specified time. If the terms of an invoice dated March 13 are 2/10,N/30, the seller will grant the buyer a reduction, or discount, of 2 per cent if the invoice is paid in ten

days, or by March 23; and if the discount is not taken, the full amount is due in 30 days.

The term *per cent* or the symbol % means "by the hundred"; therefore, decimal multiplication is used to figure discounts. If the gross amount of the invoice dated March 13 is \$240.50, the discount to be granted if paid by March 23 would be figured by multiplying $240.50 \times .02$. The discount would be \$4.81.

Figure the *cash* discounts on the following invoices:

- 11. Gross amount of invoice \$255.00, cash discount 2%
- 12. Gross amount of invoice \$972.00, cash discount 3%
- 13. Gross amount of invoice \$445.50, cash discount 2%
- 14. Gross amount of invoice \$28.50, cash discount 6%
- 15. Gross amount of invoice \$244.40, cash discount 5%

Figure the *trade* discounts on the following invoices:

- 16. Gross amount of invoice \$336.00, trade discount 12%
- 17. Gross amount of invoice \$24.40, trade discount 15%
- 18. Gross amount of invoice \$210.20, trade discount 25%
- 19. Gross amount of invoice \$320.40, trade discount 45%
- 20. Gross amount of invoice \$81.20, trade discount 55%

The *net amount* is the amount to be paid after the discount has been taken. The shortest and easiest way to find the net amount is to multiply the gross amount of the invoice by the discount, using *small figures* and left-to-right multiplication.

Example: To find the net amount of an invoice for \$240.50 less 2%.

Solution:

1. Add 2 4 0 5 0 at the right of the keyboard.

2. Move the decimal pointer 4 places from the right (2 decimal places for the .50 and 2 for the .02), so that the dial reading becomes 2.4 0 5 0.

3. Hold *small* 02 (not less 1) with the 0 held in the sixth column from the right and the small 2 held in the fifth column directly above the 2 in 2.4 0 5 0.

4. Multiply from left to right, 2-4-0-5-0.

5. The net amount is 2 3 5.6 9 0 0, or \$235.69.

Use *left-to-right* multiplication to find the *net amount* of these invoices. Point off before multiplying.

- | | <i>Net Amount</i> |
|--|-------------------|
| 21. Gross amount of invoice \$255.00, cash discount 2% | |
| 22. Gross amount of invoice \$972.00, cash discount 3% | |
| 23. Gross amount of invoice \$445.50, cash discount 2% | |
| 24. Gross amount of invoice \$28.50, cash discount 6% | |
| 25. Gross amount of invoice \$244.40, cash discount 5% | |
| 26. Gross amount of invoice \$336.00, trade discount 12% | |
| 27. Gross amount of invoice \$24.40, trade discount 15% | |
| 28. Gross amount of invoice \$210.20, trade discount 25% | |
| 29. Gross amount of invoice \$320.40, trade discount 45% | |
| 30. Gross amount of invoice \$81.20, trade discount 55% | |

Name.....Date.....

Period.....Errors.....Scoring.....

LESSON 22. FOUR-COLUMN TOUCH ADDITION; CHAIN DISCOUNTS

There are 750 key depressions in the ten addition problems in this lesson. Each problem should be added accurately by the touch method in 50 seconds or less.

1	2	3	4	5
26.24	31.57	22.57	41.27	53.81
37.35	62.54	68.43	25.83	28.14
29.42	18.14	82.07	41.61	14.27
40.88	16.53	34.27	16.51	26.52
23.28	61.90	35.65	28.07	37.07
12.75	70.74	25.28	17.08	46.52
9.38	42.94	38.13	46.51	93.34
43.92	34.65	6.82	53.27	62.41
18.23	6.75	47.25	6.83	4.65
60.65	55.95	60.62	25.18	47.08
42.75	56.23	42.75	82.35	46.15
6.93	31.85	52.18	41.75	8.29
21.38	52.82	38.41	35.83	31.93
41.71	26.07	6.64	8.63	28.07
60.36	6.74	70.85	36.07	39.08
.....
6	7	8	9	10
96.24	52.81	16.24	35.62	71.25
46.51	13.49	25.37	61.25	53.54
2.97	8.36	3.78	5.98	6.85
37.06	92.42	88.25	91.06	92.43
4.87	6.28	8.61	5.76	8.16
53.27	93.13	19.26	52.37	14.62
45.67	32.94	92.13	61.54	62.51
3.98	7.85	6.65	9.16	4.69
82.21	53.16	45.25	38.24	83.15
8.85	9.28	8.27	4.98	5.79
91.23	82.15	12.75	82.25	29.24
34.48	93.25	56.14	35.82	83.35
4.99	5.78	8.65	2.97	3.68
29.24	38.31	53.74	15.75	83.52
6.57	6.59	4.88	8.19	9.85
.....

Chain Discounts

The net amount to be paid after a chain of discounts has been granted to the buyer is found by using right-to-left multiplication to deduct each of the discounts.

Example: 23 articles @ .75¢ each, less 10% and 5%.

Solution:

Dial Readings

1. Set a decimal pointer 6 places from the right in the answer dials. 0 0 0 0.0 0 0 0 0 0
(Two for .75 plus two for 10% (.10) plus two for 5% (.05)

2. Use right to left multiplication to multiply .75 × 23. 0 0 0 0.0 0 1 7 2 5

3. Hold *small* 10 in columns five and four and multiply from left to right by the amount in the answer dials 1-7-2-5. 0 0 0 0.1 5 5 2 5 0

4. Hold *small* 05 in columns seven and six and multiply from left to right by the amount in the answer dials 1-5-5-2-5-0. 0 0 1 4.7 4 8 7 5 0

5. The answer to be recorded \$14.75.

Point off before finding the *net amount* of each of the following chain discount problems:

- | | | | |
|--|-------|---|-------|
| 11. 37 articles @ \$1.25 less 15% and 10% = | ..... | 21. 64 articles @ \$3.55 each less 30% and 5% = | ..... |
| 12. 56 articles @ \$1.45 less 25% and 10% = | ..... | 22. 25 articles @ \$5.75 each less 25% and 10% = | ..... |
| 13. 24 articles @ \$1.79 less 20% and 15% = | ..... | 23. 433 articles @ \$.95 each less 20% and 2% = | ..... |
| 14. 72 articles @ \$2.29 less 10% and 10% = | ..... | 24. 32 articles @ \$2.72 each less 30% and 3% = | ..... |
| 15. 18 articles @ \$4.45 less 50% and 6% = | ..... | 25. 380 articles @ \$2.45 each less 40% and 5% = | ..... |
| 16. 124 articles @ \$3.79 less 40% and 5% = | ..... | 26. 404 articles @ \$2.20 each less 50% and 6% = | ..... |
| 17. 136 articles @ \$2.50 less 20% and 20% = | ..... | 27. 240 articles @ \$2.80 each less 10% and 2% = | ..... |
| 18. 144 articles @ \$1.75 less 15% and 5% = | ..... | 28. 30 articles @ \$.75 each less 10% and 2½% = | ..... |
| 19. 75 articles @ \$.79 less 10% and 10% = | ..... | 29. 108 articles @ \$1.59 each less 20% and 2½% = | ..... |
| 20. 531 articles @ \$.55 less 40% and 2% = | ..... | 30. 396 articles @ \$.25 each less 25% and 2½% = | ..... |

Name..... Date.....
 Period..... Errors..... Scoring.....

LESSON 23. FOUR-COLUMN TOUCH ADDITION; DECIMAL EQUIVALENTS OF CHAIN DISCOUNTS

The touch addition problems in this lesson contain 800 strokes. Each column is to be added accurately in 55 seconds or less.

1	2	3	4	5
86.07	93.27	67.45	62.37	51.26
27.92	37.45	61.30	25.18	25.37
25.37	21.04	35.42	93.58	51.08
72.65	78.20	57.82	72.62	93.62
18.27	26.75	96.27	25.15	37.45
22.75	43.47	56.25	34.59	27.26
41.66	72.35	22.82	23.67	38.74
90.78	83.96	57.92	53.37	92.37
82.39	57.56	12.05	36.51	75.75
42.35	32.75	62.45	27.65	43.22
22.91	48.59	95.25	45.04	33.75
32.75	22.62	26.75	23.14	36.38
43.22	56.45	53.35	58.49	72.45
55.52	31.29	78.26	27.65	90.80
73.27	56.27	77.75	81.28	67.75
.....
6	7	8	9	10
87.25	26.41	88.92	21.98	79.62
46.35	59.58	72.47	34.54	65.57
23.76	26.73	21.82	12.73	84.33
57.85	93.65	65.52	56.43	45.88
70.44	20.82	17.92	28.06	36.45
23.75	65.92	80.84	72.45	23.85
49.15	29.43	22.35	98.23	22.65
22.45	66.45	27.79	39.98	48.75
27.37	28.42	70.45	62.35	36.07
35.49	23.25	72.35	12.67	22.65
93.45	72.75	23.75	53.45	22.94
72.37	78.32	73.36	27.73	25.55
69.27	74.52	93.34	75.29	63.58
57.85	79.45	21.95	61.38	27.08
28.04	14.23	47.25	30.72	66.25
.....

Decimal Equivalents of Chain Discounts

All office machine operators use a table of chain discount equivalents to save time when chain discounts are deducted regularly.

Example: \$122.50 less discounts of 20%, 10% and 5% = \$83.79.

Solution: In the following table, refer to the column headed by the figure 20; then move down the column to the figure on the same line with 10-5 at the left of the table. The figure is .684, the decimal equivalent of 20%, 10% and 5%.

Multiply $122.50 \times .684 = 83.79000$, or \$83.79.

Table of NET DECIMAL EQUIVALENTS OF CHAIN DISCOUNTS

Rate %	5	7½	10	12½	15	16⅔	20	25	30	33⅓	35	37½
Net	.95	.925	.90	.875	.85	.83333	.80	.75	.70	.66667	.65	.625
2½	.92625	.90188	.8775	.85313	.82875	.8125	.78	.73125	.6825	.65	.63375	.60938
5	.9025	.87875	.855	.83125	.8075	.79166	.76	.7125	.665	.63333	.6175	.59375
5 2½	.87994	.85678	.83363	.81047	.78731	.77187	.741	.69469	.64838	.6175	.60206	.57891
5 5	.85738	.83481	.81225	.78969	.76713	.75208	.722	.67688	.63175	.60167	.58663	.56406
5 5 2½	.83594	.81394	.79194	.76995	.74795	.73328	.70395	.65995	.61596	.58663	.57196	.54996
7½	.87875	.85563	.8325	.80938	.78625	.77083	.74	.69375	.6475	.61667	.60125	.57813
7½ 2½	.85678	.83423	.81169	.78914	.76659	.75156	.7215	.67641	.63131	.60125	.58622	.56367
7½ 5	.83481	.81284	.79088	.76891	.74694	.73229	.703	.65906	.61513	.58583	.57119	.54922
10	.855	.8325	.81	.7875	.765	.75	.72	.675	.63	.6	.585	.5625
10 2½	.83363	.81169	.78975	.76781	.74588	.73125	.702	.65813	.61425	.585	.57038	.54844
10 5	.81225	.79088	.7695	.74813	.72675	.7125	.684	.64125	.5985	.57	.55575	.53438
10 5 2½	.79194	.7711	.75026	.72942	.70858	.69469	.6669	.62522	.58354	.55575	.54186	.52102
10 7½	.79088	.77006	.74925	.72844	.70763	.69375	.666	.62438	.58275	.555	.54113	.52031
10 10	.7695	.74925	.729	.70875	.6885	.675	.648	.6075	.567	.54	.5265	.50625
10 10 5	.73103	.71179	.69255	.67331	.65408	.64125	.6156	.57713	.53865	.513	.50018	.48094
10 10 5 2½	.71275	.69399	.67524	.65648	.63772	.62522	.60021	.5627	.52518	.50018	.48767	.46891
Rate %	40	50	60	62½	65	66⅔	70	75	80	85	87½	90
Net	.60	.50	.40	.375	.35	.33333	.30	.25	.20	.15	.125	.10
2½	.585	.4875	.39	.36563	.34125	.325	.2925	.24375	.195	.14625	.12188	.0975
5	.57	.475	.38	.35625	.3325	.31667	.285	.2375	.19	.1425	.11875	.095
5 2½	.55575	.46313	.3705	.34734	.32419	.30875	.27788	.23156	.18525	.13894	.11578	.09263
5 5	.5415	.45125	.361	.33844	.31588	.30083	.27075	.22563	.1805	.13538	.11281	.09025
5 5 2½	.52796	.43997	.35198	.32998	.30798	.29331	.26398	.21998	.17599	.13199	.10999	.08799
7½	.555	.4625	.37	.34688	.32375	.30833	.2775	.23125	.185	.13875	.11563	.0925
7½ 2½	.54113	.45094	.36075	.3382	.31566	.30063	.27056	.22547	.18038	.13528	.11273	.09019
7½ 5	.52725	.43938	.3515	.32953	.30756	.29292	.26363	.21969	.17575	.13181	.10984	.08788
10	.54	.45	.36	.3375	.315	.3	.27	.225	.18	.135	.1125	.09
10 2½	.5265	.43875	.351	.32906	.30713	.2925	.26325	.21938	.1755	.13163	.10969	.08775
10 5	.513	.4275	.342	.32063	.29925	.285	.2565	.21375	.171	.12825	.10688	.0855
10 5 2½	.50018	.41681	.33345	.31261	.29177	.27788	.25009	.20841	.16673	.12504	.1042	.08336
10 7½	.4995	.41625	.333	.31219	.29138	.2775	.24975	.20813	.1665	.12488	.10406	.08325
10 10	.486	.405	.324	.30375	.2835	.27	.243	.2025	.162	.1215	.10125	.081
10 10 5	.4617	.38475	.3078	.28856	.26933	.2565	.23085	.19238	.1539	.11543	.09619	.07695
10 10 5 2½	.45016	.37513	.30011	.28135	.26259	.25009	.22508	.18757	.15005	.11254	.09378	.07503

Name..... Date.....

Refer to the table of decimal equivalents of chain discounts and then multiply by the decimal equivalents in solving Problems 11 through 24.

- | | |
|------------------------------------|-------------------------------------|
| 11. \$129.80 less 10-5% = | 18. \$224.00 less 15-10-10% = |
| 12. \$235.00 less 20-10-5% = | 19. \$85.50 less 20-10-7½% = |
| 13. \$36.65 less 25-10% = | 20. \$475.50 less 30-10-10% = |
| 14. \$530.30 less 40-10-5% = | 21. \$245.00 less 40-10-2½% = |
| 15. \$56.75 less 50-10-10% = | 22. \$92.50 less 60-7½% = |
| 16. \$35.25 less 65-5% = | 23. \$74.67 less 70-10% = |
| 17. \$34.68 less 75-10-10% = | 24. \$25.65 less 80-5% = |

Problems 25 through 30 contain discounts not shown in the table.
To find the decimal equivalent of a discount not shown in the table:

- Place the figure 1 in the units column at the right
- Using small figures, multiply from left to right by each of the discounts.

To find the decimal equivalent of 45-10-2%:

Dial Readings

- | | |
|--|---------------------|
| 1. Place the figure 1 in the units column..... | 0 0 0 0 0 0 0 0 0 1 |
| 2. Multiply from left to right by <i>small</i> 45..... | 0 0 0 0 0 0 0 0 5 5 |
| 3. Multiply from left to right by <i>small</i> 10..... | 0 0 0 0 0 0 4 9 5 0 |
| 4. Multiply from left to right by <i>small</i> 02..... | 0 0 0 0 4 8 5 1 0 0 |
- Decimal equivalent of 45-10-2% = .4851.

- | | |
|------------------------------------|------------------------------------|
| 25. \$79.00 less 45-10-2% = | 28. \$25.00 less 35-15% = |
| 26. \$24.40 less 30-12½% = | 29. \$31.05 less 50-6% = |
| 27. \$310.15 less 20-20-2% = | 30. \$416.25 less 45-20-5% = |

Name.....Date.....

Period.....Errors.....Scoring.....

LESSON 24. FOUR-COLUMN TOUCH ADDITION; PERCENTAGE WITH THE RATE GIVEN

The ten touch-addition problems in this lesson contain 850 key depressions. Each problem should be added accurately in 60 seconds.

1	2	3	4	5
41.76	56.27	19.75	56.49	17.75
32.55	71.68	76.59	72.67	53.26
75.28	43.89	8.01	11.80	42.38
73.54	21.79	28.43	43.59	92.57
68.75	54.06	38.64	36.08	28.08
54.37	40.64	53.49	19.37	41.75
29.96	65.43	85.46	63.46	11.99
57.75	93.72	59.09	56.21	29.63
4.59	42.08	74.56	28.80	87.35
65.38	12.45	93.65	31.08	39.36
15.39	61.39	24.39	18.36	18.57
56.32	32.46	35.90	74.53	28.35
28.80	72.34	41.82	59.16	12.38
20.06	29.21	72.25	73.78	86.69
77.55	98.05	32.49	14.39	42.64
_____	_____	_____	_____	_____
.....
6	7	8	9	10
56.64	27.78	71.78	92.18	72.69
82.37	54.76	29.49	35.89	72.88
92.16	25.67	93.48	61.17	45.92
52.67	71.85	55.26	28.36	87.35
90.95	39.29	32.97	43.98	45.96
92.27	62.92	47.75	42.78	62.27
86.49	72.78	83.46	35.97	57.37
82.85	56.65	32.89	69.92	92.88
37.95	97.28	89.22	47.50	80.29
41.08	26.85	42.59	89.93	17.84
73.49	72.69	71.92	71.56	63.85
77.82	71.19	53.89	39.82	18.28
3.26	85.39	82.47	14.53	88.56
17.23	72.48	53.56	58.26	31.98
39.50	26.96	71.99	38.47	25.79
_____	_____	_____	_____	_____
.....

Percentage with the Rate Given

Percentage is used to figure many everyday business transactions, such as the amount to be added to a sale for city, state, or Federal taxes, the amount to be deducted from a sale for a salesman's commission, or the amount to be charged for interest. Percentage is computed by multiplying the total, or base, by the per cent, or fixed rate.

Example: Find the amount to be added to a purchase of \$59.50 for a 2% city sales tax.

Solution:

1. Mark off 4 decimal places from the right (2 for the 50 cents in the purchase price, \$59.50, plus 2 for .02).
2. Multiply $59.50 \times .02 = 1.1900$, or \$1.19.

Find the following percentages:

- | | |
|------------------------------|------------------------------|
| 11. 2% of \$22.50 = | 16. 2% of \$69.50 = |
| 12. 2% of \$78.00 = | 17. 2% of \$125.50 = |
| 13. 5% of \$525.00 = | 18. 5% of \$702.40 = |
| 14. 5% of \$4,500.00 = | 19. 5% of \$8,900.00 = |
| 15. 6% of \$660.50 = | 20. 15% of \$75.20 = |

To add the percentage to the purchase price in a single operation, multiply by 100% plus the added per cent. For example, to add 2% to a purchase of \$24.50, multiply $24.50 \times 1.02 = 24.99$.

Add the percentage by multiplying:

21. Purchase price, \$78.50 plus 2% ($\times 1.02$) =
22. Purchase price, \$55.10 plus 2% ($\times 1.02$) =
23. Purchase price, \$95.40 plus 15% Federal excise tax ($\times 1.15$) =
24. Purchase price, \$88.80 plus 15% Federal excise tax ($\times 1.15$) =
25. Insurance loan, \$550.00 plus 5% interest ($\times 1.05$) =
26. Insurance loan \$301.00 plus 6% interest =
27. Mortgage, \$6,300.00 plus 4% interest =
28. Mortgage, \$7,800.00 plus 5% interest =
29. Mortgage, \$3,200.00 plus $4\frac{1}{2}\%$ interest =
30. Mortgage, \$4,500.00 plus $5\frac{1}{2}\%$ interest =

Name.....Date.....

Period.....Errors.....Scoring.....

LESSON 25. FOUR-COLUMN TOUCH ADDITION; PERCENTAGE—DETERMINING THE RATE

Each of the addition problems in this lesson requires 900 key depressions.
Each problem should be added accurately in 66 seconds.

1	2	3	4	5
72.84	85.82	67.05	29.08	53.87
78.69	25.86	55.85	87.84	27.24
9.19	61.44	27.76	60.85	57.71
83.69	75.13	23.84	94.54	82.93
96.06	14.76	78.06	59.49	98.08
67.02	89.64	45.87	73.95	81.95
88.50	76.58	52.98	57.41	7.89
25.68	18.95	69.46	28.55	76.53
64.21	76.75	98.78	96.49	37.05
57.13	37.51	72.48	47.89	80.09
67.65	85.90	71.64	82.27	89.96
84.48	59.76	53.37	75.73	77.88
96.65	31.87	95.04	36.39	60.79
66.09	3.79	75.76	86.73	7.68
46.84	26.98	82.86	68.27	86.26
.....
6	7	8	9	10
7.08	60.76	9.48	9.07	9.65
48.32	80.69	87.02	72.35	28.37
3.96	34.78	68.79	86.75	56.76
97.57	26.25	26.84	16.97	27.94
86.69	75.06	75.36	78.56	8.75
90.97	42.83	4.93	98.07	35.68
8.07	84.29	88.09	7.87	10.79
86.98	69.18	96.45	32.75	2.96
75.64	79.87	8.78	79.68	26.79
98.34	25.76	35.67	90.75	68.98
6.37	73.08	73.52	73.90	96.68
79.68	89.15	89.07	52.78	72.36
67.84	86.49	79.69	8.87	35.87
8.59	30.78	36.78	96.59	82.69
37.65	68.65	7.96	84.19	8.05
.....

Percentage—Determining the Rate

The rate of percentage is a constant guide to modern business firms. If a given expense exceeds a certain percentage of the total income, the firm may fail to make a profit. In such highly competitive lines as retailing, for example, the management must know at all times what happens to every part of the "retail dollar bill." To maintain a profitable operation, the management must know the percentage of the sales dollar returned to the manufacturers, the percentage spent for overhead, the percentage cost of selling and other expenses, and finally the percentage of the sales dollar distributed to the owners in the form of profits.

To determine what percentage one amount is of another, always divide the first amount by the "of" amount. In other words, to find what per cent \$2.25 is of \$56.25, divide 2.25 by 56.25.

Example: 2.25 divided by 56.25 = .04, or 4%

Solution:

1. Add 2.25 at the extreme left, with a decimal pointer between the dollars and cents. . . . 0 2.2 5 0 0 0 0 0 0

2. Move the decimal pointer 2 places to the left to allow for the 2 whole numbers in the divisor, 56.25 0 2 2 5 0 0 0 0 0 0

3. Hold *small* 5624 in the second, third, fourth and fifth columns from the left; and depress the divisor *twice* to equal the 2 at the left. The dial reading is 0 3 1 2 5 0 0 0 0 0

4. Depress small 5624 a *third* time to equal the 3. The dial reading becomes 0 3 5 6 2 5 0 0 0 0

5. *Reduce* the remainder, 5625. The answer is 0 4 0 0 0 0 0 0 0 0

Dial Reading

Divide the first amount of the "of" amount to determine the rate of percentage in each of the following problems:

- | | |
|---|---|
| 11. \$3.25 is what per cent of \$65.00 = | 24. A commission of \$225 is what per cent of a sale of \$4,500 = |
| 12. \$4.25 is what per cent of \$85.00 = | 25. A commission of \$273 is what per cent of a sale of \$6,600 = |
| 13. \$3.75 is what per cent of \$25.00 = | 26. A commission of \$72 is what per cent of a sale of \$4,800 = |
| 14. \$4.75 is what per cent of \$19.00 = | 27. \$400 is what per cent of a salary of \$5,000 = |
| 15. \$3.20 is what per cent of \$40.00 = | 28. \$396 is what per cent of a salary of \$9,900 = |
| 16. \$4.31 is what per cent of \$21.55 = | 29. 3455 is what per cent of 20,730 = |
| 17. \$6.67 is what per cent of \$20.01 = | 30. 324 is what per cent of 2,592 = |
| 18. \$3.75 is what per cent of \$22.50 = | |
| 19. \$2.24 is what per cent of \$17.92 = | |
| 20. \$18.00 is what per cent of \$14.40 = | |
| 21. 150 days is what per cent of 360 days = | |
| 22. 72 days is what per cent of 360 days = | |
| 23. 81 days is what per cent of 360 days = | |

Name..... Date.....

Period..... Errors..... Scoring.....

LESSON 26. CROSSFOOTING TO FIND A GRAND TOTAL; PERCENTAGE OF INCREASE OR DECREASE

In this lesson, the amounts are added both vertically and horizontally to find a single grand total. Adding across the columns, or horizontally, is called "crossfooting" by all office machine operators.

Steps in crossfooting to find a grand total:

1. Add the amounts in each section vertically and record the total at the bottom of each section.

2. Add across the columns to find the total purchases of each customer. Record the total purchases in the space provided at the extreme right.

3. Add the last column vertically to find the grand total. Check the accuracy of the grand total by adding the totals of each section. If the addition is correct, the section totals and the customer sales totals should agree in a single grand total.

Customer	1 <i>Section 1 (Meat)</i>	2 <i>Section 2 (Produce)</i>	3 <i>Section 3 (Groceries)</i>	4 <i>Section 4 (Groceries)</i>	5 <i>Section 5 (Groceries)</i>	<i>Total Sales for Each Customer</i>
A	.44	.19	.35	.23	.23	\$.
B	7.00	.27	.33	.25	.65	. . . . .
C	.51	.08	.28	.10	.20	. . . . .
D	.59	.47	.16	.27	.29	. . . . .
E	4.58	.35	.47	.23	.36	. . . . .
F	1.87	.44	.15	.35	.49	. . . . .
G	3.02	.64	1.30	.13	.98	. . . . .
H	.63	.33	.29	.50	.47	. . . . .
I	.95	.39	.36	.44	.15	. . . . .
J	.88	.23	.25	.25	.33	. . . . .
K	3.65	.58	.26	.19	.95	. . . . .
L	2.85	.39	.27	.35	.23	. . . . .
M	.94	.35	.39	.49	.29	. . . . .
N	1.89	.45	.09	.47	.28	. . . . .
O	2.36	.46	.35	.27	.65	. . . . .
	Total Sec. 1	Total Sec. 2	Total Sec. 3	Total Sec. 4	Total Sec. 5	\$.
						Grand Total

Percentage of Increase or Decrease

The percentage of increase or decrease is found by dividing the actual amount of the increase or decrease by the cost price.

Example: 3.70 divided by 14.80 = 25% increase.

Solution:

1. *Subtract* to find the actual amount of the increase or decrease

\$18.50 the selling price
14.80 — the cost price

\$ 3.70 the increase

2. *Divide* the increase by the cost, to find the *percentage* of increase.

Check the accuracy of Problems 6 through 10 and solve Problems 11 through 20.

<i>Problem</i>	<i>Cost Price</i>	<i>Selling Price</i>	<i>Amount of Increase, or Gross Profit</i>	<i>Percentage of Increase, or Markup</i>
6.	\$14.80	\$18.50	\$3.70	25%
7.	24.00	28.80	4.80	20
8.	15.00	22.50	7.50	50
9.	22.50	30.00	7.50	33.33
10.	17.80	24.00	6.20	34.83
11.	8.20	12.30	....	....
12.	16.80	21.00	....	....
13.	8.80	11.00	....	....
14.	13.40	16.75	....	....
15.	5.60	6.44	....	....
16.	5.50	6.82	....	....
17.	50.80	58.42	....	....
18.	24.60	28.70	....	....
19.	7.71	10.28	....	....
20.	14.40	18.00	....	....

The percentage of decrease is found in the same manner as the percentage of increase. Subtract to find the amount of the decrease, and divide the decrease by the first amount given.

Check the accuracy of Problem 21 and solve Problems 22 through 36.

TELEVISION CLEARANCE SALE

<i>Problem</i>	<i>Original Selling Price</i>	<i>Sale Price</i>	<i>Amount of Reduction</i>	<i>Percentage of Markdown</i>
21.	\$299.00	\$179.40	\$119.60	40%
22.	229.00	160.30	....	....
23.	199.50	79.80	....	....
24.	325.00	243.75	....	....
25.	795.00	437.25	....	....
26.	495.00	396.00	....	....
27.	375.00	250.00	....	....
28.	325.00	211.25	....	....
29.	169.00	113.23	....	....
30.	259.00	168.35	....	....
31.	535.00	428.00	....	....
32.	330.00	247.50	....	....
33.	435.00	339.30	....	....
34.	695.00	535.15	....	....
35.	270.00	175.50	....	....
36.	398.00	298.50	....	....

Name..... Date.....

Period..... Errors..... Scoring.....

LESSON 27. CROSSFOOTING THREE-DIGIT AMOUNTS; MULTIPLICATION BY C, M, and Cwt.

Use both vertical and horizontal addition to find the grand total of the sales problem given in this lesson. To find the total sales in each section, add vertically; then crossfoot, or add horizontally, to find the total sales to each customer. The grand total can be checked by comparing the total sales in all five sections with the total sales to all customers, A through O.

Customer	1 <i>Section 1 (Meat)</i>	2 <i>Section 2 (Produce)</i>	3 <i>Section 3 (Groceries)</i>	4 <i>Section 4 (Household)</i>	5 <i>Section 5 (Beverages)</i>	<i>Total Sales Per Customer</i>
A	3.69	2.03	4.45	1.35	2.20	\$.....
B	6.20	3.15	6.35	2.10	2.40	.....
C	5.45	1.67	5.05	3.31	.37	.....
D	1.65	2.84	7.60	.95	1.08	.....
E	2.25	2.27	3.29	2.92	2.60	.....
F	2.91	1.09	5.22	2.29	.75	.....
G	7.21	3.25	7.09	.85	1.63	.....
H	5.46	2.25	6.27	2.50	.85	.....
I	9.50	.65	7.38	2.75	2.80	.....
J	8.22	3.95	8.24	.60	1.05	.....
K	4.43	1.20	8.53	2.46	2.30	.....
L	7.02	1.60	7.76	1.40	1.90	.....
M	5.24	.97	5.93	1.45	2.50	.....
N	9.46	3.28	8.06	2.80	1.35	.....
O	8.38	2.04	7.82	3.00	2.75	.....
Section Totals	.....	.....	.....	.....	.....	\$..... <hr/><hr/>Grand Total

Multiplication by C, M, and Cwt.

Roman numerals are used to indicate articles priced by the hundred and by the thousand.

C, the roman numeral for 100, means the price per hundred.

M, the roman numeral for 1000, means the price per thousand.

Cwt. is a combination of the roman numeral for 100 plus "wt" the abbreviation for weight and means the price per hundredweight, or 100 pounds.

Example: 476 articles @ \$3.25 per C = \$15.47.

Solution:

1. There are actually 4.76 hundred articles at a

price of \$3.25 per hundred articles. If a 5 column calculator is used, hold the price at the extreme right, mark off 4 decimal places, and multiply $3.25 \times 4.76 = 15.4700$.

2. If the calculator has more than 5 columns, hold the price over the fixed decimal point—between the fifth and sixth columns from the right of the keyboard.

3. Hold the 3 in the price in the sixth column. Hold the 2 in the price in the fifth column. Hold the 5 in the price in the fourth column.

4. Multiply from left to right by 4-7-6. Answer 15.47.

Problems 6 through 15 consist of articles priced by the hundred.

- | | |
|--|--|
| 6. 235 articles @ \$4.67 per C = | 11. 450 articles @ \$9.35 per C = |
| 7. 898 articles @ \$2.25 per C = | 12. 1,255 articles @ \$4.24 per C = |
| 8. 750 articles @ \$.98 per C = | 13. 810 articles @ \$6.25 per C = |
| 9. 405 articles @ \$2.15 per C = | 14. 1,808 articles @ \$5.75 per C = |
| 10. 95 articles @ \$1.05 per C = | 15. 2,450 articles @ \$12.00 per C = |

Problems 16 through 23 consist of articles priced by the thousand. If a 5-column calculator is used, hold the price at the extreme right, mark off 3 decimal places, and multiply.

- | | |
|---|---|
| 16. 7,500 brick @ \$21.50 per M = | 20. 10,500 brick @ \$20.00 per M = |
| 17. 22,000 brick @ \$25.00 per M = | 21. 75,000 brick @ \$19.00 per M = |
| 18. 24,000 brick @ \$23.00 per M = | 22. 95,000 brick @ \$21.00 per M = |
| 19. 275,000 brick @ \$24.00 per M = | 23. 450,000 brick @ \$18.50 per M = |

Livestock are sold in the wholesale markets by the cwt., or price per hundred pounds. The selling price of hogs, cattle, and sheep is computed in the same way as articles priced by the C, or the hundred. For example, a 180 pound hog @ \$20.25 per cwt. = \$36.45 (1.80 hundred pounds @ \$20.25 per hundred pounds).

- | |
|--|
| 24. 230 pound hog @ \$20.60 per cwt. = |
| 25. 160 pound hog @ \$18.75 per cwt. = |
| 26. 1,150 pound steer @ \$29.50 per cwt. = |
| 27. 550 pound yearling @ \$26.00 per cwt. = |
| 28. 850 pound light feeding steer @ \$30.50 per cwt. = |
| 29. 125 pound ewe @ \$11.50 per cwt. = |
| 30. 130 pound buck @ \$7.50 per cwt. = |

Name..... Date.....
 Period..... Errors..... Scoring.....

LESSON 28. CROSSFOOTING FOUR-DIGIT AMOUNTS; MULTIPLYING BY THE DOZEN AND GROSS

Crossfooting and vertical addition are used to find the total sales for the week in the illustration and the weekly sales reports that follow. Crossfoot to find the total sales for each day; add vertically to find the weekly sales total for each department. Check the accuracy of the total sales for each week by comparing the total of sales for all six days with the weekly total for all five departments.

WEEKLY SALES REPORTS

Week Ending June 17

Departments	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>Total Daily Sales</i>
June 12	\$ 24.44	\$ 18.53	\$ 36.88	\$10.43	\$12.96	\$103.24
13	16.78	20.85	32.29	14.30	14.25	98.47
14	24.07	19.56	28.87	13.28	7.28	93.06
15	15.52	22.18	31.46	16.06	13.64	98.86
16	17.79	19.35	33.17	15.75	9.86	95.92
17	18.80	23.04	36.27	17.35	4.97	100.43
<hr/>						
Departmental Totals	\$117.40	\$123.51	\$198.94	\$87.17	\$62.96	\$589.98 Total Weekly Sales

Week Ending June 24

Departments	1	2	3	4	5	<i>Total Daily Sales</i>
June 19	\$ 23.36	\$ 19.72	\$ 33.44	\$ 9.85	\$11.08	\$
20	17.38	21.45	31.81	13.65	10.06	.....
21	23.49	20.32	27.74	16.75	6.31	.....
22	8.94	10.17	14.42	8.58	7.50	.....
23	9.56	10.37	20.30	16.42	8.90	.....
24	25.15	20.84	33.53	19.48	15.28	.....
<hr/>						
Departmental Totals	.....	.....	.....	.....	.....	\$===== Total Weekly Sales

Week Ending July 1

Departments	6	7	8	9	10	Total Daily Sales
June 26	\$ 22.07	\$ 20.13	\$ 32.64	\$10.65	\$12.50	\$
27	16.82	41.92	37.30	9.50	24.25	.....
28	19.56	21.84	28.80	13.43	7.05	.....
29	9.73	10.45	15.55	8.21	3.60	.....
30	27.06	31.87	15.76	18.83	13.86	.....
July 1	24.72	15.77	30.83	8.81	8.48	.....
Departmental Totals	.....	.....	.....	.....	.....	===== Total Weekly Sales

Multiplying by the Dozen

When a price is quoted by the dozen and the quantity is expressed in single units, both multiplication and division are used. Multiply the quantity by the price per dozen and then divide by 12, the number of single units in a dozen.

Example: 58 articles @ \$.72 per dozen = \$3.48.

$$\frac{58 \times .72}{12} = \frac{41.76}{12} = 3.48$$

Solution:

Dial Readings

1. Hold the price, 72, over the fixed decimal point and multiply by the quantity, 58. 0 0 0 4 1.7 6 0 0 0
2. Move the decimal pointer 2 places to the left to allow for the 2 whole numbers in the divisor, 12. 0 0 0.4 1 7 6 0 0 0
3. Hold small 11, for the divisor, 12, and divide. 0 0 3.4 8 0 0 0 0 0

- | | |
|--|---|
| 11. 44 articles @ \$1.50 per dozen = | 14. 180 articles @ \$1.35 per dozen = |
| 12. 42 articles @ \$.78 per dozen = | 15. 238 articles @ \$2.25 per dozen = |
| 13. 104 articles @ \$.75 per dozen = | |

Multiplying by the Gross

When the price is quoted by the gross and the quantity is expressed in single units, multiply the quantity by the price and then divide by 144, the number of single units in a gross.

Example: 66 articles @ \$4.80 = \$2.20.

$$\frac{66 \times 4.80}{144} = \frac{316.80}{144} = 2.20$$

- | | |
|---|---|
| 16. 75 articles @ \$2.40 per gross = | 19. 216 articles @ \$3.75 per gross = |
| 17. 106 articles @ \$1.98 per gross = | 20. 348 articles @ \$7.50 per gross = |
| 18. 126 articles @ \$2.72 per gross = | |

Name..... Date.....

The accompanying table of *Decimal Equivalents for Fractional Parts of a Gross* is used to eliminate the need for dividing by 144 when the price is quoted by the gross and the quantity is given in single items, dozens, or dozens and fractional parts of a dozen.

Consult the chart to find the decimal equivalent of the quantity, and multiply it by the price per gross.

Examples:

35 items @ \$4.80 per gross = \$1.17 (.2431, decimal equivalent of 35, multiplied by 4.80 = 1.16688).

5 doz. @ \$6.70 per gross = \$2.79 (.4167, decimal equivalent of 5 dozen, or 60 items, $\times 6.70 = 2.79$).

$3\frac{7}{12}$ doz. @ \$10.50 per gross = 3.14 (.2986, decimal equivalent of $3\frac{7}{12}$ dozen, or 43 items, multiplied by 10.50 = 3.1353).

- 21. 15 items @ \$14.40 per gross =
- 22. 49 items @ \$24.50 per gross =
- 23. 9 doz. @ \$21.48 per gross =
- 24. 128 items @ \$4.50 per gross =
- 25. 90 items @ \$7.72 per gross =
- 26. 18 items @ \$13.90 per gross =
- 27. 7 doz. @ \$16.50 per gross =
- 28. $9\frac{4}{12}$ doz. @ \$18.00 per gross =
- 29. $11\frac{7}{12}$ doz. @ \$24.00 per gross =
- 30. $8\frac{1}{2}$ doz. @ \$5.50 per gross =

DECIMAL EQUIVALENTS FOR FRACTIONAL PARTS OF A GROSS

Pieces	Dozens and 12ths of Doz.	Decimal Part of Gross	Pieces	Dozens and 12ths of Doz.	Decimal Part of Gross	Pieces	Dozens and 12ths of Doz.	Decimal Part of Gross	Pieces	Dozens and 12ths of Doz.	Decimal Part of Gross	Pieces	Dozens and 12ths of Doz.	Decimal Part of Gross	Pieces	Dozens and 12ths of Doz.	Decimal Part of Gross
1		.0069	24	2-	.1667	48	4-	.3333	72	6-	.5000	96	8-	.6667	120	10-	.8333
2		.0139	25	2- ₁	.1736	49	4- ₁	.3403	73	6- ₁	.5069	97	8- ₁	.6736	121	10- ₁	.8403
			26	2- ₂	.1806	50	4- ₂	.3472	74	6- ₂	.5139	98	8- ₂	.6806	122	10- ₂	.8472
3		.0208	27	2- ₃	.1875	51	4- ₃	.3542	75	6- ₃	.5208	99	8- ₃	.6875	123	10- ₃	.8542
4		.0278	28	2- ₄	.1944	52	4- ₄	.3611	76	6- ₄	.5278	100	8- ₄	.6944	124	10- ₄	.8611
5		.0347	29	2- ₅	.2014	53	4- ₅	.3681	77	6- ₅	.5347	101	8- ₅	.7014	125	10- ₅	.8681
6		.0417	30	2- ₆	.2083	54	4- ₆	.3750	78	6- ₆	.5417	102	8- ₆	.7083	126	10- ₆	.8750
7		.0486	31	2- ₇	.2153	55	4- ₇	.3819	79	6- ₇	.5486	103	8- ₇	.7153	127	10- ₇	.8819
8		.0556	32	2- ₈	.2222	56	4- ₈	.3889	80	6- ₈	.5556	104	8- ₈	.7222	128	10- ₈	.8889
9		.0625	33	2- ₉	.2292	57	4- ₉	.3958	81	6- ₉	.5625	105	8- ₉	.7292	129	10- ₉	.8958
10		.0694	34	2- ₁₀	.2361	58	4- ₁₀	.4028	82	6- ₁₀	.5694	106	8- ₁₀	.7361	130	10- ₁₀	.9028
11		.0764	35	2- ₁₁	.2431	59	4- ₁₁	.4097	83	6- ₁₁	.5764	107	8- ₁₁	.7431	131	10- ₁₁	.9097
12	1-	.0833	36	3-	.2500	60	5-	.4167	84	7-	.5833	108	9-	.7500	132	11-	.9167
13	1- ₁	.0903	37	3- ₁	.2569	61	5- ₁	.4236	85	7- ₁	.5903	109	9- ₁	.7569	133	11- ₁	.9236
14	1- ₂	.0972	38	3- ₂	.2639	62	5- ₂	.4306	86	7- ₂	.5972	110	9- ₂	.7639	134	11- ₂	.9306
15	1- ₃	.1042	39	3- ₃	.2708	63	5- ₃	.4375	87	7- ₃	.6042	111	9- ₃	.7708	135	11- ₃	.9375
16	1- ₄	.1111	40	3- ₄	.2778	64	5- ₄	.4444	88	7- ₄	.6111	112	9- ₄	.7778	136	11- ₄	.9444
17	1- ₅	.1181	41	3- ₅	.2847	65	5- ₅	.4514	89	7- ₅	.6181	113	9- ₅	.7847	137	11- ₅	.9514
18	1- ₆	.1250	42	3- ₆	.2917	66	5- ₆	.4583	90	7- ₆	.6250	114	9- ₆	.7917	138	11- ₆	.9583
19	1- ₇	.1319	43	3- ₇	.2986	67	5- ₇	.4653	91	7- ₇	.6319	115	9- ₇	.7986	139	11- ₇	.9653
20	1- ₈	.1389	44	3- ₈	.3056	68	5- ₈	.4722	92	7- ₈	.6389	116	9- ₈	.8056	140	11- ₈	.9722
21	1- ₉	.1458	45	3- ₉	.3125	69	5- ₉	.4792	93	7- ₉	.6458	117	9- ₉	.8125	141	11- ₉	.9792
22	1- ₁₀	.1528	46	3- ₁₀	.3194	70	5- ₁₀	.4861	94	7- ₁₀	.6528	118	9- ₁₀	.8194	142	11- ₁₀	.9861
23	1- ₁₁	.1597	47	3- ₁₁	.3264	71	5- ₁₁	.4931	95	7- ₁₁	.6597	119	9- ₁₁	.8264	143	11- ₁₁	.9931

Name..... Date.....
 Period..... Errors..... Scoring.....

LESSON 29. SPLIT ADDITION; SPLIT MULTIPLICATION

The amounts in the 10 addition problems in this lesson are split between the dollars and cents columns. The cents are added first in the last 2 columns at the right, but the dials are not cleared until the dollars have been added in the fifth, fourth, and third columns from the right with the index and second fingers of the right hand.

In the first column of figures, for example, the answer dial reading is 6.87 after the cents have been added. Do not clear the dials until the dollars have been added and the complete answer appearing in the dials (2994.87) has been recorded.

1	2	3	4	5
\$368.48	\$289.76	\$375.66	\$246.57	\$489.53
72.60	4.03	46.78	98.71	70.96
26.02	47.02	83.96	57.96	78.29
487.38	54.28	93.40	69.47	86.03
70.43	2.95	4.35	4.25	87.69
2.87	31.35	3.46	13.00	3.25
226.46	442.50	25.56	1.56	35.60
50.03	22.59	21.65	41.38	7.99
6.75	85.83	3.88	661.90	514.23
80.23	338.61	900.21	84.80	56.13
645.76	779.55	435.68	385.83	554.10
76.95	93.86	95.40	35.67	36.29
837.69	3.95	66.07	3.27	1.67
35.19	9.90	2.59	4.97	4.10
8.03	212.30	260.55	371.46	121.47
.....

6	7	8	9	10
\$378.44	\$287.33	\$165.45	\$215.30	\$297.56
23.75	84.50	77.54	48.36	66.25
2.77	55.88	3.62	8.80	5.73
34.70	7.38	93.20	34.95	31.60
62.89	5.68	84.05	67.25	3.69
980.31	579.62	278.58	276.58	295.04
47.83	93.20	5.68	39.16	8.31
9.42	1.37	20.97	40.28	82.37
89.34	56.30	5.27	43.67	48.38
262.85	384.84	227.90	278.54	582.37
346.65	265.24	72.70	486.83	106.89
27.09	29.34	854.50	24.02	45.40
3.45	35.46	46.45	44.13	42.09
39.33	843.08	749.23	724.04	524.55
35.63	8.75	42.05	3.24	5.09
.....

Split Multiplication

Split multiplication is used when both factors of a multiplication problem exceed four digits. Left-to-right multiplication is used in solving split multiplication, so that if a number is to be dropped at the right it will be an insignificant decimal.

Example: $367.82 \times 12.465 = 4,584.876$.

Solution:

Dial Readings

1. Move the decimal pointer 5 places from the extreme left to allow for the 5 whole numbers in both factors—3 in 367.82 plus 2 in 12.465, the second factor 0 0 0 0 0.0 0 0 0 0

2. Split the first factor, 367.82 by holding 367 on the keyboard in the last three columns at the

left. Then multiply from *left* to right by 1 - 2 - 4 - 6 - 5 . . . 0 4 5 7 4.6 5 5 0 0

Do not clear the answer dials.

Leave the partial answer in the dials.

3. Hold the remaining numbers in the first factor, xxx82, on the keyboard in the fourth and fifth columns from the left and again multiply from left to right by 1 - 2 - 4 - 6 - 5 0 4 5 8 4.8 7 6 3 0

4. Record the answer to the nearest third decimal. If the fourth decimal were 5 or more instead of 3, 1 would be added to the third decimal. The answer is 4 5 8 4.8 7 6

Use left-to-right multiplication in solving the following split multiplication problems. Record answers to the nearest third decimal. If the fourth decimal is less than 5, disregard it; if 5 or more, however, add 1 to the third decimal of the answer.

- | | |
|------------------------------------|------------------------------------|
| 11. $475.91 \times 13.582 =$ | 21. $479.18 \times 72.839 =$ |
| 12. $32.889 \times 56.174 =$ | 22. $65.156 \times 51.683 =$ |
| 13. $7.6738 \times 4.2359 =$ | 23. $5.3471 \times 82.927 =$ |
| 14. $75.375 \times 6.0833 =$ | 24. $76.625 \times 18.667 =$ |
| 15. $43.875 \times 38.125 =$ | 25. $98.167 \times 8.1625 =$ |
| 16. $54.528 \times 6.7128 =$ | 26. $426.92 \times .21893 =$ |
| 17. $65.667 \times 8.3333 =$ | 27. $75.125 \times .58333 =$ |
| 18. $978.48 \times .41667 =$ | 28. $32.625 \times .91667 =$ |
| 19. $75.875 \times 5.3333 =$ | 29. $9.0875 \times .16667 =$ |
| 20. $65.375 \times 3.4167 =$ | 30. $6.9862 \times 83.035 =$ |

Name.....Date.....

Period.....Errors.....Scoring.....

LESSON 30. SPLIT ADDITION; MULTIPLYING BY RECIPROCAL

Split addition is used to add the amounts listed in the first 10 columns in this lesson. The figures in the last 2 columns, the cents columns, are added first. The answer dials are not cleared until the amounts in the dollar columns have been added also.

1	2	3	4	5
\$502.49	\$259.79	\$486.25	\$257.05	\$361.03
34.05	652.20	723.95	902.37	24.96
318.46	268.49	90.61	63.54	29.83
97.56	30.62	78.04	86.05	169.74
749.08	402.85	329.40	129.70	97.16
602.37	77.95	264.30	409.26	803.65
27.34	385.30	29.75	98.04	47.75
473.25	67.02	76.43	83.39	454.14
88.35	39.42	784.12	325.45	90.36
545.74	668.49	59.23	88.53	804.72
823.40	556.64	87.70	65.73	44.20
265.77	258.93	490.43	338.57	273.63
85.35	79.80	27.89	99.38	75.05
76.20	72.81	685.62	453.94	801.02
357.74	485.35	62.30	105.18	611.15
.....
6	7	8	9	10
\$638.27	\$703.36	\$404.04	\$802.54	\$544.09
45.90	59.64	24.05	24.40	52.34
409.32	502.68	227.30	639.08	778.69
37.70	86.40	55.62	62.85	36.35
826.45	316.75	287.84	469.64	424.60
289.65	226.05	626.70	376.40	486.03
66.35	28.08	44.78	42.49	261.49
396.09	745.18	392.20	383.45	45.38
25.41	64.80	20.37	62.55	88.24
506.98	340.74	254.06	475.87	478.39
844.83	389.34	408.54	300.52	860.15
91.36	41.85	77.58	95.78	69.28
280.84	349.70	807.64	280.01	360.45
79.77	33.07	87.50	28.36	94.38
487.72	609.41	497.04	374.91	473.90
.....

Multiplying by Reciprocals

When the same divisor is used repeatedly, division problems may be solved by multiplying by the reciprocal of the divisor. The reciprocal of the divisor is the decimal equivalent obtained when the divisor is divided into the figure 1. For example, the reciprocal of 25 is found by dividing 1.00 by 25. The reciprocal is .04, which means that if 1,375 is divided by the whole number 25, or multiplied by .04, the answer is the same—55.

Dial Readings

To find the reciprocal of 16: *Dial Readings*

1. Add the figure 1 over the fixed decimal place—column 6 on most calculators—and place a decimal pointer after it. 0 0 0 0 1.0 0 0 0 0

2. The decimal pointer is moved 1 place to the left for each whole number in the divisor. Since there are 2 whole numbers in the divisor, 16, move the decimal pointer 2 places to the left. 0 0 0.0 1 0 0 0 0 0

3. Hold *small* 15, one less than 16, in the fifth and fourth columns from the right and divide. 0 0 0.0 6 2 5 0 0 0

The reciprocal of 16 is .0625.

The reciprocals found in Problems 11 through 16 are to be recorded 5 places beyond the decimal point.

- 11. The reciprocal of 12 is
- 12. The reciprocal of 24 is
- 13. The reciprocal of 32 is
- 14. The reciprocal of 144 is
- 15. The reciprocal of 250 is
- 16. The reciprocal of 360 is

Multiplying by Reciprocals to Determine Percentages

In the following example, the expenses of each department are given and each item of expense is multiplied by the reciprocal of the total to find the per cent of the total incurred by each department.

3. Use split addition to add and check the accuracy of the per cents of total expense.

To find the per cent of the total of each of the items in the example:

1. Divide the total, 2,500, into 1 to find the reciprocal of the total, which is .0004.

2. Use split multiplication to multiply the expenses of each department by the reciprocal of the total, .0004.

<i>Department</i>	<i>Expense</i>	<i>Per Cent of Total Expense</i>
A	\$531.21	21.2484
B	446.36	17.8544
C	382.71	15.3084
D	687.27	27.4908
E	452.45	18.0980
Total Expenses \$2,500.00		100%

Name..... Date.....

Follow the same steps in finding the per cent of the total in Problems 17 through 23; also Problems 24 through 30.

	<i>Department</i>	<i>Expenses</i>	<i>Per Cent of Total Expense</i>
17.	A	\$ 382.65	.....
18.	B	352.62	.....
19.	C	759.71	.....
20.	D	623.92	.....
21.	E	905.15	.....
22.	F	309.87	.....
23.	G	666.08	.....
	Totals	<hr/> \$4,000.00	<hr/> 100%

SALES REPORT

	<i>Department</i>	<i>Sales for the Week</i>	<i>Per Cent of Total</i>
24.	A	\$ 1,250.57	.....
25.	B	1,275.31	.....
26.	C	1,682.64	.....
27.	D	2,755.82	.....
28.	E	1,501.62	.....
29.	F	1,408.73	.....
30.	G	2,625.31	.....
	Totals	<hr/> \$12,500.00	<hr/> 100%

Name.....Date.....

Period.....Errors.....Scoring.....

TEST 3 (COVERING LESSONS 21 THROUGH 30)

Problems 1 through 10 are touch addition problems:

1	2	3	4	5
51.43	25.21	24.26	16.25	26.41
43.23	8.53	37.35	35.45	59.85
24.31	32.24	29.42	6.85	26.73
8.24	22.43	40.88	92.43	93.65
60.08	24.04	32.82	8.16	20.82
35.24	24.42	12.75	14.62	65.92
14.35	25.33	9.38	62.51	29.43
24.52	13.52	43.92	4.69	66.45
3.84	4.74	18.23	83.15	28.42
14.80	23.06	60.65	5.79	23.25
42.35	24.14	42.75	29.24	93.45
31.42	53.52	6.93	83.35	72.37
80.33	14.34	21.38	5.68	69.27
1.94	9.07	41.71	83.52	57.85
13.55	45.09	60.36	9.35	28.04
.....
6	7	8	9	10
41.76	27.96	85.92	9.07	24.44
23.55	72.88	52.68	72.35	16.78
75.28	45.92	61.44	68.75	24.07
37.54	87.35	75.13	61.79	15.52
68.57	45.96	14.76	78.56	17.79
54.37	62.27	89.64	98.07	18.80
29.96	57.37	76.58	7.87	18.53
57.75	92.77	18.95	32.75	20.85
4.59	80.29	76.75	79.68	19.56
65.38	17.84	37.51	90.75	22.18
15.39	63.85	85.90	73.90	19.35
56.32	18.28	59.76	52.78	23.04
28.80	88.56	31.87	8.87	36.88
20.06	31.98	3.79	96.59	32.29
77.55	25.79	26.98	84.18	28.87
.....

Find the *cash discounts* on the gross amounts of the invoices given in Problems 11 through 14.

- | | |
|--------------------------------------|--------------------------------------|
| 11. \$225.40, cash discount 5% | 13. \$202.50, cash discount 6% |
| 12. \$338.50, cash discount 2% | 14. \$538.00, cash discount 3% |

Find the *net amount* of each of the chain discount problems, 15 through 18.

- | | |
|--|---|
| 15. 248 articles @ \$.75 less 15%
and 10% = | 17. 380 articles @ \$2.45 less 40%
and 10% = |
| 16. 136 articles @ \$2.25 less 10%
and 5% = | 18. 396 articles @ \$1.25 less 20%
and 2½% = |

Use trial-divisor division to solve Problems 19 through 24.

- | | |
|------------------------------|--------------------------------|
| 19. $12,716 \div 44 =$ | 22. $43,380 \div 36 =$ |
| 20. $12,985 \div 53 =$ | 23. $267.75 \div 3.5 =$ |
| 21. $11,232 \div 48 =$ | 24. $468.35 \div 14.5 =$ |

Divide by the "of" amount to find the rate of percentage in solving Problems 25 through 30.

- | | |
|--|--|
| 25. \$2.24 is what per cent of \$8.96 | 29. \$265.00, the commission, is what
per cent of a sale of \$5,300 |
| 26. \$2.75 is what per cent of \$68.75 | 30. \$225.00, the commission, is what
per cent of a sale of \$1,500. |
| 27. \$4.40 is what per cent of \$88.00 | |
| 28. \$3.78 is what per cent of \$30.24 | |

Multiply by the C, M, and Cwt. to solve Problems 31 through 40.

- | | |
|---|---|
| 31. 245 articles @ \$4.66 per C = | 36. 820 articles @ \$7.75 per C = |
| 32. 55,000 bricks @ \$25.00 per M = | 37. 75,500 bricks @ \$24.00 per M = |
| 33. 1,264 lbs. steer @ \$31. per cwt. = | 38. 880 lbs. steer @ \$31.50 per cwt. = |
| 34. 1,284 articles @ \$8.25 per C = | 39. 1,300 articles @ \$12. per M = |
| 35. 1,350 lbs. steer @ \$29.40 per cwt. = | 40. 2,440 articles @ \$18. per M = |

Name.....Date.....
 Period.....Errors.....Scoring.....

LESSON 31. FIVE-COLUMN ADDITION WITH A FOUR-COLUMN REACH; INTEREST COMPUTED BY THE 360-DAY METHOD

The addition problems in this lesson contain a four-column reach from the fifth column to the last column at the right. After the first number of the amount has been recorded in the fifth column with the index finger, raise the fingers slightly above the keyboard before making the reach to the last column to record the last number of the amount with the middle finger.

1	2	3	4	5
300.03	600.03	700.04	800.04	900.05
600.03	700.08	800.06	700.06	500.04
300.06	400.04	300.05	900.05	400.08
600.04	300.06	400.08	500.02	600.03
300.02	200.03	500.06	800.01	200.02
700.03	600.02	900.04	700.02	100.02
400.02	700.04	500.08	800.03	200.04
800.08	800.06	700.07	300.05	600.07
600.04	300.08	800.05	600.06	800.03
300.07	200.02	500.02	700.04	400.04
600.02	400.04	600.07	800.08	500.02
400.03	800.07	800.03	500.05	900.04
700.06	700.03	900.02	900.04	800.03
800.07	200.04	500.04	400.08	100.02
300.06	700.02	700.06	200.02	500.06
.....

6	7	8	9	10
200.03	800.04	100.04	300.03	100.05
400.02	500.06	300.06	100.01	900.01
300.01	900.07	500.07	200.02	500.02
100.02	400.03	400.03	400.04	200.08
300.04	200.08	200.01	500.05	300.04
400.03	100.07	900.05	800.08	900.02
500.02	300.06	700.08	900.09	700.01
300.01	400.08	500.06	400.04	800.02
100.03	800.04	800.07	200.02	400.03
200.04	500.05	600.02	100.01	500.01
500.02	700.07	200.03	600.06	900.02
300.04	900.06	100.04	800.08	200.09
100.03	800.02	300.05	500.05	800.04
400.05	200.01	500.08	300.03	700.03
200.01	100.03	400.04	100.01	300.05
.....

Interest Computed by the 360-Day Method

Annual interest is computed simply by multiplying the principal by the rate. For example, to find the annual interest on a mortgage of \$1,350 at 6%, multiply the principal, \$1,350, by the rate, 6%, and the result, or annual interest, is \$81.

To compute the interest for a given number of days by the 360-day, or ordinary, method of computing interest, multiply the principal by the rate to find the annual interest; multiply the annual interest by the exact number of days; and, finally, divide the result by 360.

Example: Find the interest on \$1,350 at 6% for 72 days.

$$\text{Interest formula: } \frac{\text{Principal} \times \text{Rate} \times \text{Days}}{360}$$

Solution:

Dial Readings

1. Multiply 1,350. × .06 to find the annual interest. 0 0 0 0 0 8 1.0 0
2. Hold *large* 71 (72 less 1) in the fifth and fourth columns from the right, and multiply from left to right by 8-1-0-0. 0 0 0 0 5 8 3 2.0 0
3. Move the decimal pointer 3 places to the left to allow for the 3 whole numbers in the divisor, 360. 0 0 0 0 5.8 3 2 0 0
4. Divide by the trial-divisor method, holding *small* 35x (360 less 1) for the divisor. 0 0 0 1 6.2 0 0 0 0
5. The answer is \$16.20.

Compute the following interest problems by the 360-day method.

- | | |
|--|--|
| 11. \$7,500 at 6% for 72 days = | 21. \$650 at 4% for 45 days = |
| 12. \$4,500 at 6% for 36 days = | 22. \$6,660 at 4½% for 48 days = |
| 13. \$6,200 at 6% for 45 days = | 23. \$12,000 at 3% for 72 days = |
| 14. \$8,500 at 6% for 90 days = | 24. \$356 at 5% for 42 days = |
| 15. \$4,250 at 6% for 30 days = | 25. \$244.25 at 4% for 36 days = |
| 16. \$6,200 at 5% for 30 days = | 26. \$445 at 6% for 45 days = |
| 17. \$4,220 at 5% for 28 days = | 27. \$350.95 at 6% for 90 days = |
| 18. \$5,240 at 5% for 45 days = | 28. \$476 at 5% for 35 days = |
| 19. \$3,600 at 5% for 120 days = | 29. \$528.50 at 4% for 65 days = |
| 20. \$274 at 5% for 180 days = | 30. \$423.20 at 5% for 75 days = |

Name.....Date.....

Period.....Errors.....Scoring.....

LESSON 32. FIVE-COLUMN ADDITION WITH A THREE-COLUMN REACH; INVENTORIES COMPUTED AT THE COST PRICE

The addition problems in this lesson contain a reach from the fourth column to the last column at the right. After the first two figures of an amount have been added with the index finger, reach to the last column and add the remaining figure of the amount with the middle finger.

1	2	3	4	5
360.03	630.03	480.03	740.08	480.06
630.06	840.04	770.07	830.06	360.04
660.03	730.07	630.04	570.02	570.03
360.06	240.02	880.02	360.04	830.05
630.03	270.06	570.08	950.03	940.08
730.04	460.02	950.05	130.02	230.02
470.03	370.04	840.08	280.08	480.03
340.07	740.03	770.03	430.07	670.07
670.06	870.08	360.02	820.04	120.02
730.04	380.02	220.08	780.05	570.05
480.08	260.07	470.03	150.08	730.04
840.04	370.03	950.04	380.03	870.07
730.06	480.02	580.05	570.04	960.08
370.03	730.08	260.02	240.02	320.02
480.07	420.02	540.07	710.01	130.01
_____	_____	_____	_____	_____
.....

6	7	8	9	10
150.03	360.03	390.06	540.02	340.05
260.07	230.05	450.07	280.04	130.02
410.02	180.08	230.04	120.01	910.04
590.01	430.02	240.08	180.03	230.01
270.03	630.03	540.04	240.07	460.06
360.05	860.04	120.05	670.08	480.09
570.09	320.04	290.04	210.07	940.05
250.04	640.08	170.09	440.03	620.03
530.03	150.07	560.07	150.04	520.08
170.09	530.06	330.03	170.02	780.03
250.05	580.03	110.03	340.05	890.05
510.08	840.05	130.06	150.06	560.07
320.03	280.01	880.07	250.08	250.08
640.08	210.02	320.02	380.07	820.03
230.04	820.05	130.04	560.01	760.05
.....

Inventories Computed at the Cost Price

The inventories to be completed in this lesson are to be figured at the cost price. Multiply the *cost price* by the quantity to find the extension for each line of the inventory. To extend the first line, for example, multiply the cost price by the quantity—.75 × 23 = \$17.25.

STATIONERY INVENTORY

Sheet No. 104
 Called by A. E. H.
 Entered by L. L. D.

Date January 2, 195-
 Priced by H. H.
 Calculated by

	Quantity	Stock Number	Description	Selling Price	Cost Price	Extension
11.	23	7082	Fountain Pens	\$1.25	\$.75	.....
12.	44	7083	Fountain Pens	1.00	.60	.....
13.	34	6002	Eversharp Pencils	.50	.295	.....
14.	24	6003	Slim Jim Pencils	.49	.295	.....
15.	18	1032	Automatic Pencils	.20	.175	.....
16.	482	2081	Fillers	.10	.058	.....
17.	697	2081 Q	Fillers	.10	.058	.....
18.	203	2081 P	Fillers	.10	.058	.....
19.	231	2080	Fillers	.10	.058	.....
20.	360	2153	Fillers	.05	.033	.....
21.	244	6104	Bank Blanks	.05	.04	.....
22.	172	2010	Bank Blanks	.05	.025	.....
23.	51	2176	Fillers	.10	.067	.....
24.	26	2066	Looseleaf Covers	.25	.1675	.....
25.	17	2061	Graham Binders	.15	.105	.....
26.			Total Sheet No. 104	.....	.....	.....

Name.....Date.....

STATIONERY INVENTORY

Sheet No. 105
 Called by A. E. H.
 Entered by J. G.

Date July 1, 195-
 Priced by H. H.
 Calculated by

	Quantity	Number	Description	Selling Price	Cost Price	Extension
27.	72	4166	Vernon Binders	\$.25	\$.1875	.....
28.	332	2001	Index Cards 3 x 5	.10	.047	.....
29.	340	2002	Index Cards 4 x 6	.15	.076	.....
30.	505	2003	Index Cards 5 x 8	.20	.13	.....
31.	2220	1389	Graham 8½ x 11	.06	.04	.....
32.	456	1390	Graham 8 x 10½	.06	.03	.....
33.	338	1391	Graham 6 x 9½	.06	.03	.....
34.	12	1043	Pen & Pencil Sets	1.00	.60	.....
35.	33	1044	Pen & Pencil Sets	.95	.58	.....
36.	37	1045	Pencils	.50	.30	.....
37.	77	2810	Zipper Binders	1.10	.95	.....
38.	34	2811	Leatherette Binders	.50	.33	.....
39.	291	4281	Binders	.50	.333	.....
40.			Total Sheet No. 105	.....	.....	.....

Name.....Date.....

Period.....Errors.....Scoring.....

LESSON 33. FIVE-COLUMN ADDITION WITH A TWO-COLUMN REACH; INVENTORIES COMPUTED AT THE SELLING PRICE

The addition problems in this lesson contain a reach from the third column to the last column at the right. After the first three figures of an amount have been added with the index finger, reach to the last column and add the remaining figure of the amount with the middle finger.

1	2	3	4	5
363.03	484.07	484.04	736.04	621.02
636.06	376.03	545.05	378.02	897.04
363.03	268.04	973.09	135.06	542.03
336.06	737.06	853.07	284.01	985.03
633.03	823.02	767.03	461.03	232.01
433.04	632.04	283.02	954.05	349.02
746.03	426.02	826.05	273.02	598.04
374.07	748.03	537.04	612.04	737.03
637.06	827.07	729.09	737.01	645.05
474.04	243.02	447.07	459.05	372.06
846.08	628.08	938.05	147.02	112.02
473.07	437.04	845.04	421.06	876.06
384.04	243.02	753.06	532.01	596.07
737.03	824.03	274.02	871.04	211.02
484.06	738.07	382.03	924.02	862.04
_____	_____	_____	_____	_____
.....

6	7	8	9	10
734.05	436.03	325.01	971.05	312.03
498.07	484.05	291.03	865.04	816.04
126.04	644.02	343.07	255.03	453.05
321.02	123.01	215.06	621.02	916.06
832.03	524.09	482.07	462.07	781.02
623.04	147.07	466.01	239.02	618.01
472.02	655.05	751.02	665.04	232.02
386.03	714.01	383.09	313.01	121.03
897.08	521.02	612.06	824.03	865.05
595.04	225.03	124.07	723.05	413.07
496.03	242.02	375.04	123.09	393.02
712.03	438.03	227.02	724.01	217.06
529.08	913.05	251.01	119.02	421.01
252.02	145.04	424.07	848.04	323.03
929.05	969.07	152.05	764.03	932.04
.....

Inventories Computed at the Selling Price

The inventories in this lesson are computed at the selling price. Multiply the *selling price* by the quantity to find the extension for each line of the inventory. To extend the first line, for example, multiply the selling price by the quantity—.05 × 133 = \$6.65.

STATIONERY INVENTORY

Sheet No. 106

Date January 3, 195-

Called by G. J. G.

Priced by L. B. H.

Entered by A. E. H.

Calculated by

	Quantity	Stock Number	Description	Selling Price	Cost Price	Extension
11.	133	7801	Notebooks	\$.05	\$.023	.....
12.	167	7841	Notebooks	.05	.023	.....
13.	235	6672	Notebooks	.10	.075	.....
14.	411	7606	Notebooks	.19	.125	.....
15.	718	8322	Music notebooks	.20	.15	.....
16.	655	7466	Music notebooks	.10	.06	.....
17.	111	6277	Workbooks	.55	.45	.....
18.	134	1235	Pencils	.50	.35	.....
19.	203	1236	Pencils	.75	.50	.....
20.	135	1237	Pencils	1.25	.90	.....
21.	73	1238	Pencils	2.95	1.80	.....
22.	84	1239	Pencils	3.75	2.25	.....
23.	95	2165	India ink	.25	.167	.....
24.	78	2166	Blue black ink	.15	.095	.....
25.	114	2167	Black ink	.15	.095	.....
26.			Total sheet No. 106	.....	.....	.....

Name..... Date.....

ART SUPPLIES INVENTORY

Sheet No. 107
 Called by J. J. G.
 Entered by M. F. P.

Date June 30, 195-
 Priced by M. E. M.
 Calculated by

	Quantity	Stock Number	Description	Selling Price	Cost Price	Extension
27.	119	2401	Water Color Sets	\$ 3.50 ea.	\$ 2.55 ea.	.....
28.	23	1301	Liners	.85 ea.	.65 ea.	.....
29.	27	2308	Brush Cases	1.65 ea.	1.25 ea.	.....
30.	144 sheets	1010	Parchment Paper	.25 ea.	.175 ea.	.....
31.	218 sheets	1012	C. P. Paper	.70 ea.	.55 ea.	.....
32.	400 sheets	1013	Log Paper	1.35 per C	.90 C	.....
33.	500 sheets	1014	Constr. Paper	8.50 per C	6.00 C	.....
34.	42	5250	Brushes	.85 ea.	.65 ea.	.....
35.	3 dozen	5540	Brushes	17.40 per dz.	13.80 dz.	.....
36.	75 jars	5640	Rubber Cement	.35 ea.	.23 ea.	.....
37.	9 dozen	5641	Rubber Cement	6.50 per dz.	4.55 dz.	.....
38.	8 dozen	5642	Rubber Cement	7.20 per dz.	5.20 dz.	.....
39.	14 dozen	5644	Thinner	8.40 per dz.	6.60 dz.	.....
40.			Total Sheet No. 107	.....	.....	.....

Name..... Date.....
 Period..... Errors..... Scoring.....

LESSON 34. FIVE-COLUMN ADDITION PROBLEMS WITH SINGLE VERTICAL REACHES; INVENTORIES COMPUTED AT BOTH THE COST AND SELLING PRICES

The five-column addition problems presented in this lesson are limited to the figures 2, 3, 4, 6, 7, and 8. The vertical reaches, therefore, are for single keys only—up one key from 3 to add 4, 7 (3 and 4), and 8 (4 and 4) and down one key from 3 to add 2.

1	2	3	4	5
623.73	84.22	328.40	262.43	386.26
77.24	224.84	6.74	40.27	703.63
264.32	32.36	86.07	244.82	2.04
67.48	87.20	62.73	436.37	802.43
468.72	70.63	4.02	86.24	44.80
308.46	228.70	248.82	684.02	304.64
27.68	38.06	407.68	260.47	23.04
84.30	47.23	38.63	367.28	24.20
472.24	68.47	80.78	27.64	402.34
44.60	87.04	73.60	64.02	2.77
87.34	278.06	273.40	37.60	678.03
283.38	43.70	84.72	338.73	27.60
234.47	274.02	27.02	608.27	278.68
302.23	84.63	67.30	284.84	802.32
28.42	3.27	248.27	208.72	86.40
.....

6	7	8	9	10
624.42	84.68	287.34	86.02	338.64
464.60	287.43	308.78	208.83	2.36
20.28	208.38	47.02	32.04	68.27
243.67	30.47	240.78	24.28	208.60
28.63	60.48	78.83	408.64	408.78
460.88	708.32	487.04	204.68	286.40
8.24	434.60	48.37	278.40	64.28
34.08	80.82	472.83	6.34	73.20
242.40	43.23	83.80	26.43	237.04
2.74	208.02	26.08	4.73	82.60
274.06	306.20	667.70	37.30	207.42
86.27	207.68	26.04	28.42	8.34
40.87	47.24	38.07	223.46	203.64
2.74	3.08	443.87	72.47	26.03
207.06	232.04	6.43	302.87	80.37
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
.....

Name.....Date.....

**Inventories Computed at Selling and Cost Prices
to Determine the Markup**

The inventories presented in this lesson are computed at both the selling and cost prices to determine the markup on the merchandise inventory. Multiply the quantity by both the selling and cost prices to complete the extensions for each line.

Subtract the total of the cost extensions (line 25) from the total of the sales extensions (line 24) to find the total markup on the merchandise inventory (line 26).

FURNITURE INVENTORY

Sheet No. 108
Called by B. C. M.
Entered by M. M. C.

Date July 2, 195-
Priced by E. V. W.
Calculated by

	Quantity	Description	Selling Price	Selling Extension	Cost Price	Cost Extension
11.	6	Gray Sofas	\$ 93.50	.....	\$ 69.00	.....
12.	7	Lounge Sofas	129.00	.....	98.00	.....
13.	5	Fringed Sofas	249.00	.....	159.00	.....
14.	11	Coral-Back Sofas	429.00	.....	298.00	.....
15.	3	Sectionals 6-piece	775.00	.....	498.00	.....
16.	12	Sectionals	352.00	.....	169.00	.....
17.	5	Left Sections	179.00	.....	119.00	.....
18.	7	Right Sections	179.00	.....	119.00	.....
19.	15	Gray Club Chairs	54.95	.....	38.75	.....
20.	14	Lounge Chairs	159.00	.....	98.50	.....
21.	23	Open-Arm Chairs	219.00	.....	109.00	.....
22.	17	Barrel Chairs	189.00	.....	119.00	.....
23.	31	Wood Armchairs	89.95	.....	42.50	.....
24.		Total Selling Extensions		=====		.....
25.		Total Cost Extensions		=====		.....
26.		Total Markup (Total Selling Less Total Cost)		.....		=====

STEELWARES INVENTORY

Sheet No. 109
 Called by D. S.
 Entered by C. C.

Date July 2, 195-
 Priced by S. T.
 Calculated by

	Quantity	Description	Selling Price	Selling Extension	Cost Price	Cost Extension
27.	34	All Steel Wardrobes	\$14.98	.....	\$ 9.50	.....
28.	27	Kitchen Cabinets	18.50	.....	13.25	.....
29.	13	Kitchen Cabinets	29.98	.....	17.00	.....
30.	51	Wall Cabinet Sets	19.98	.....	14.50	.....
31.	8	Combination Wardrobes	29.95	.....	19.50	.....
32.	14	Cabinet Sets 6-piece	32.50	.....	16.50	.....
33.	8	Base Cabinets	12.98	.....	9.25	.....
34.	33	Credenzas	3.69	.....	2.75	.....
35.	11	Single-Door Cabinets	10.98	.....	6.85	.....
36.	15	Double-Door Cabinets	12.98	.....	8.75	.....
37.	22	Window Fans	9.95	.....	6.50	.....
38.		Total Selling Extensions		=====		=====
39.		Total Cost Extensions		=====		=====
40.		Total Markup (Line 39 Subtracted from Line 38).....				=====

Name.....Date.....

Period.....Errors.....Scoring.....

LESSON 35. FIVE-COLUMN ADDITION WITH EMPHASIS ON TWO-KEY VERTICAL REACHES; INVOICES WITHOUT DISCOUNTS

The five-column addition problems presented in this lesson include all the numbers, but the greatest emphasis is placed on two-key vertical reaches—up two keys from 3 to 5, the reach for 9 (5 and 4), and down two keys from 3 to 1.

1	2	3	4	5
363.03	505.09	901.26	987.05	501.57
135.56	139.31	845.50	13.75	9.65
89.35	5.05	194.05	53.07	57.75
57.13	98.06	19.80	179.05	159.05
201.25	981.50	29.35	90.19	305.50
91.50	59.15	65.08	103.85	9.58
98.45	109.55	167.59	5.71	19.70
547.90	531.91	9.54	198.50	309.29
9.35	301.52	12.79	93.25	19.35
178.14	90.37	129.50	1.75	83.05
56.35	495.70	90.75	17.53	709.29
312.71	5.95	114.29	107.91	18.95
57.80	518.48	51.04	96.04	208.25
137.03	5.25	5.46	260.55	70.99
9.10	90.60	66.15	54.76	1.56
.....
6	7	8	9	10
105.05	94.75	389.04	309.65	390.65
79.09	109.29	54.89	94.85	94.95
308.59	75.95	1.59	5.35	5.05
9.19	15.90	39.07	50.29	25.50
139.90	185.50	205.50	390.51	139.91
56.15	10.75	510.79	9.54	25.70
5.85	105.25	30.98	13.35	190.09
90.05	309.05	9.85	50.59	531.15
15.51	22.10	69.58	309.05	138.09
304.95	190.07	305.04	7.50	35.51
587.05	162.90	375.09	54.80	590.75
98.45	9.09	59.29	250.13	15.30
309.85	70.39	7.19	13.35	1.25
75.16	289.95	25.25	5.50	70.35
19.50	5.15	559.13	265.79	209.95
.....

Invoices without Discounts

Multiply the quantity by the unit price to complete the extensions in each of the invoices presented in this lesson. Add the extensions to find the total amounts required for lines 25 and 40.

INVOICE

REED ROBERTS, INC.
 465 Washington St., Buffalo 5, N. Y.

Order Date:	Customer's Order No.:	Req. No.:	Contract No.:	Invoice No.:
5-22-5--	2071			200-18538
<i>Sold to</i>		A. E. Hirsch Stationery Co. 695 Lexington Avenue New York 21, New York		<i>Invoice Date</i> 6-12-5--
<i>Shipped to</i>		Same--A. E. Hirsch		
Date Shipped:	How Shipped:	Shipped From:	Prepaid or Collect:	Salesman:
6-4-5--	Express	N. Tonawanda	Ppd.	McCaw
TERMS: NET 30 DAYS				

	Quantity	Catalog Number	Description	Unit Price	Extension	
11.	18	1810	Gold Leaf Transfer Paper	\$3.55 rl.	.....	.....
12.	14	1809	White Transfer Paper	1.10 rl.	.....	.....
13.	13	1808	Black Transfer Paper	1.20 rl.	.....	.....
14.	15	1807	Long Run Paper	.85 rm.	.....	.....
15.	18	1806	Master Paper	1.55 rm.	.....	.....
16.	23	1805	Master Paper	1.85 rm.	.....	.....
17.	36	1804	Long Run Paper	.95 rm.	.....	.....
18.	27	1803	Mimeo Bond 20 Pound	1.75 rm.	.....	.....
19.	32	1802	Mimeo 16 Pound	1.25 rm.	.....	.....
20.	48	1801	Long Run Paper	.75 rm.	.....	.....
21.	24	1800	Standard Master	1.75 rm.	.....	.....
22.	96	1799	Standard Long Run	1.15 rm.	.....	.....
23.	6	1798	Ditto Master White	1.85 rm.	.....	.....
24.	9	1797	Ditto Master Corn	1.65 rm.	.....	.....
25.	Total Amount of Invoice				-----	.....

Name.....Date.....

INVOICE

Original

STANDARD INK COMPANY
 2740 Washington Boulevard
 Bellwood, Illinois

Inv. No. 44266

Sold to

A. E. Hirsch Stationery Co.
 695 Lexington Avenue
 New York 21, New York
 2%--10 Days--30 Days Net

Ship to

F. O. B. Chicago

Terms

Date		Order No.	Your Order	Shipped Via	Salesman
8/24/5--		1495	7/9/5--	Acme prepaid	GNS
Gross	Dozen	Number	Description	Price	Amount
26.	3	276	Blue Black	\$24.00 gr.	.....
27.	5	256	W. Blue	24.00 gr.	.....
28.	4	266	Washable Black	24.00 gr.	.....
29.	6	236	Black	24.00 gr.	.....
30.		665	India Ink	1.35 dz.	.....
31.		494	India Ink	3.60 dz.	.....
32.	2	396	Red Ink	27.00 gr.	.....
33.	4	276-M	Green Ink	16.00 gr.	.....
34.		216-M	White Ink	3.50 dz.	.....
35.		206-M	Yellow Ink	4.45 dz.	.....
36.	2	296-M	Black Ink	18.00 gr.	.....
37.		99	White Ink	1.35 dz.	.....
38.	4	256-M	Blue Ink	17.50 gr.	.....
39.		246-M	Black Ink	1.20 dz.	.....
40.			Total Amount of Invoice		.....

Name..... Date.....
 Period..... Errors..... Scoring.....

LESSON 36. REVIEW OF THREE-COLUMN ADDITION; INVOICES WITH SINGLE DISCOUNTS

The addition problems in this lesson consist of three-digit amounts. Each problem should be added accurately in slightly less than 45 seconds.

1	2	3	4	5
6.37	8.72	2.05	7.03	8.25
7.15	6.31	6.79	2.48	9.02
5.41	5.32	6.02	8.31	4.91
4.27	2.81	9.06	7.26	1.69
4.48	7.43	3.50	2.97	6.02
8.89	6.14	3.52	7.04	5.33
9.24	2.05	6.60	5.92	3.56
5.29	5.25	9.76	4.25	2.07
7.45	3.78	7.30	9.57	9.08
3.08	6.92	9.60	4.05	4.57
2.16	7.30	8.84	3.45	3.17
5.97	4.32	8.54	7.24	7.01
7.24	6.19	6.28	6.50	1.95
9.07	9.01	8.72	7.65	6.87
6.05	1.30	1.07	3.21	1.25
—	—	—	—	—
.....
6	7	8	9	10
2.17	9.84	8.36	1.46	9.26
1.68	1.12	3.69	5.13	4.98
7.20	1.89	3.04	2.79	6.08
6.37	8.36	9.53	6.28	7.69
8.05	9.10	8.67	3.56	4.16
2.75	2.98	2.56	5.08	6.54
7.08	9.75	8.02	7.98	4.10
9.73	1.56	7.69	1.56	7.88
6.90	4.62	3.10	2.28	7.05
3.86	3.45	4.12	8.70	5.46
2.90	7.80	2.97	4.52	7.25
8.46	4.08	3.07	5.02	5.50
2.94	7.94	5.31	8.50	7.20
3.06	3.86	9.28	7.06	3.49
1.67	4.05	3.09	8.56	1.47
—	—	—	—	—
.....

Invoices with Single Discounts

Single trade discounts are deducted from the invoices presented in this lesson. Multiply the total amount of the invoice by the rate of discount to find the amount of the trade discount. Subtract the trade discount from the total amount of the invoice to find the net amount of the invoice.

INVOICE

HARRY C. WILLIAMS & CO.
 10 Warren Street
 New York 7, New York

Order No. 17574

Date 2/14/5-

Sold to Wilson's Sport Shop
 11 West 42 Street
 New York 17, New York
 Shipped to Above Route Delivery

Invoice No. 20187

Terms Less 15%

Date Shipped 2/19/5-
 Salesman Drilling

	Quantity Ordered	Description	Cost Price	Extension	Total Amount
11.	16	Good Shot Tennis Rackets	\$3.50	.....
12.	22	Lee Hi " "	4.50	.....
13.	18	Driver " "	3.75	.....
14.	23	International " "	4.75	.....
15.	44	Spartan " "	3.25	.....
16.	31	P 3 Triangle Presses	.45	.....
17.	18	P 5 Square Presses	.65	.....
18.	24	Oil Silk Head Covers	.85	.....
19.	12	Monarch Badminton Rackets	3.00	.....
20.	15	Stadium " "	3.45	.....
21.	36	Spartan " "	3.15	.....
22.	6	Wonder " "	2.25	.....
23.	9	Square Presses	.75	.....
24.		Total Amount of Invoice			.....
25.		Less Trade Discount of 15%			.....
26.		Net Amount of Invoice			.....

Name.....Date.....

GORHAM DISTRIBUTORS, INC.
 53 GRAHAM AVENUE
 BROOKLYN 6, N. Y.

<i>Sold to</i>	Hovis & Shopp 1000 South Elmora Ave. Elizabeth, New Jersey	<i>Order No.</i> 496 <i>Invoice No.</i> 3960 <i>Date</i> September 8, 195-
<i>Shipped to</i>	Above <i>Route Delivery</i>	<i>Terms</i> Less 25%

	Unit	Quantity Dozen	Gross	Description	Price	Amount
27.		6		Ink #672	\$.80 dz.	.....
28.		9		Ink #172	.96 dz.	.....
29.			2	Carbon Paper #10	9.20 gr.	.....
30.			8	Scotch Tape #10	19.60 gr.	.....
31.			4	Scotch Tape #15	14.40 gr.	.....
32.		5		Scotch Tape #25	12.00 dz.	.....
33.		8		Envelopes #6 $\frac{3}{4}$	14.80 dz.	.....
34.		9		Envelopes #10	24.00 dz.	.....
35.		6		Envelopes #10	18.00 dz.	.....
36.	4			Boxes Paper Clips	5.25 bx.	.....
37.	7			Boxes Rulers 6 inch	9.60 bx.	.....
38.				Total Amount of Invoice.....		=====
39.				Less Trade Discount of 25%.....		=====
40.				Net Amount of Invoice.....		=====

Name..... Date.....
 Period..... Errors..... Scoring.....

LESSON 37. REVIEW OF THREE- AND FOUR-COLUMN ADDITION; INVOICES WITH CHAIN DISCOUNTS

The addition problems presented in this lesson contain three- and four-digit amounts. Each problem should be added accurately in slightly less than 50 seconds.

1	2	3	4	5
89.40	40.59	28.84	24.74	85.03
5.04	4.75	3.04	7.38	10.20
50.49	97.04	60.75	96.08	34.76
4.75	6.72	27.84	3.49	8.58
90.58	15.69	35.50	18.75	10.68
6.19	83.26	67.34	70.41	47.56
85.64	6.05	2.69	9.34	56.24
9.57	58.07	40.95	8.19	80.27
36.10	5.87	8.64	68.90	4.03
2.78	62.05	86.75	6.59	27.17
60.93	31.87	67.03	90.83	87.37
8.19	10.83	6.95	3.82	9.74
14.35	8.15	4.40	27.85	39.07
8.76	70.35	12.50	1.05	2.61
45.13	9.50	1.04	40.35	16.42
.....
6	7	8	9	10
9.67	79.64	2.70	17.20	47.81
80.60	5.27	50.28	45.16	5.98
73.33	20.78	3.47	14.84	8.08
8.52	4.60	82.62	5.28	24.70
16.65	90.73	69.45	40.78	10.54
5.75	78.68	11.35	6.79	3.42
82.78	20.35	72.64	67.09	80.67
15.36	8.46	2.81	8.53	4.15
5.68	2.13	83.58	24.77	48.27
80.25	98.25	1.70	2.45	86.72
50.74	72.84	83.55	76.04	8.12
8.04	8.41	5.64	3.86	40.36
7.16	42.57	80.82	10.28	30.54
29.01	8.24	7.35	70.35	7.98
8.52	30.28	26.90	8.14	68.01
.....

Invoices with Chain Discounts

Multiply the gross amount of each invoice by the net decimal equivalent of the chain discounts to find the amount to be subtracted from each invoice as trade discounts. Refer to the Table of Net Decimal Equivalents of Chain Discounts in Lesson 23, page 62.

INVOICE

BROWN SALES CO., INC.
 260 Fifth Avenue
 New York 1, N. Y.

Sold to Roberts Electrical Supply Co.
 2921 Main Street
 Hartford, Conn.

Invoice No. 403064

Date December 10, 195-

Your order No. 6480 Dept. Shipped via NYNH&H Terms Net 10 Days

	Quantity	Unit	Description	Price	Extension	Net 10 Days
11.	8	only	Pop-up Electric Toasters	\$16.95 ea.		
12.	4	only	Mixers #3200	29.95 ea.	.....	...
13.	6	only	Electric Blankets	37.95 ea.	.....	...
14.	2	dozen	Electric Pants Pressers	29.88 dz.	.....	...
15.	18	only	Electric Razors	17.80 ea.	.....	...
16.	9	only	Fluorescent Lamps #282	4.45 ea.	.....	...
17.	4	dozen	Electric Clocks #741	93.00 dz.	.....	...
18.	12	only	Cream King Whippers	9.00 ea.	.....	...
19.	6	only	Portable Radios #401	15.50 ea.	.....	...
20.	10	only	Portable Radios #506	19.95 ea.	.....	...
21.	8	only	Portable Radios #598	23.95 ea.	.....	...
22.	3	gross	Flashlights #227	158.40 gr.	.....	...
23.	9	only	Electric Drills	19.95 ea.	.....	...
24.			Gross Amount of Invoice		.....	.....
25.			Less Trade Discounts of 20%-10%-10%		.....	.....
26.			Net Amount of Invoice.....		.....	.....

Name.....

Date.....

THE STANDARD PUBLISHING CO.

Stationery Division
500 Park Avenue
New York 21, New York

Invoice No. S 76411

Date: February 9, 195-

Your Order No. 3960

Terms: 2%, 10 days.

Net 30 days.

Sold to: A. E. Hirsch Stationery Co.
695 Lexington Avenue
New York 19, New York

	Quantity	Unit	Items	Unit Price	Extension
27.	4	gross	No. 481	\$ 7.20 gr.	.....
28.	6	dozen	No. 1218R	4.25 dz.	.....
29.	1034	only	No. 672C	83.00 M.	.....
30.	1723	only	No. 2057 Fillers	80.00 M.	.....
31.	960	only	No. 2081P Fillers	80.00 M.	.....
32.	5	gross	No. HG627	11.52 gr.	.....
33.	480	only	No. 2081Q Fillers	85.00 M.	.....
34.	3½	gross	No. 580C	10.08 gr.	.....
35.	50	M	3 x 5 Ruled White Cards	.73 M.	.....
36.	25	M	5 x 8 Ruled White Cards	1.95 M.	.....
37.	6½	gross	No. 850C	20.16 gr.	.....
38.			Gross Amount of Invoice		.....
39.			Less Trade Discounts of 16⅔%, 10%, 10%		.....
40.			Net Amount of Invoice		.....

Name.....Date.....
 Period.....Errors.....Scoring.....

LESSON 38. REVIEW OF FOUR-COLUMN ADDITION; MONTHLY PAYROLLS

Each of these four-digit addition problems should be added accurately in less than 55 seconds.

1	2	3	4	5
36.36	48.84	53.95	22.23	11.02
84.48	68.34	94.28	12.28	26.16
23.38	45.54	76.32	38.64	13.23
74.73	93.98	32.61	54.72	27.41
62.26	75.04	24.72	77.05	82.27
48.83	42.25	13.30	32.21	24.26
34.76	90.73	27.65	16.27	12.32
26.62	42.25	84.62	62.31	31.01
33.06	82.58	99.43	74.73	22.16
32.24	94.53	45.72	85.58	13.30
42.84	32.98	32.31	94.47	28.08
66.76	38.59	14.05	73.38	13.21
27.43	43.27	61.25	52.20	32.62
78.22	20.36	34.78	31.03	31.02
42.66	42.80	79.85	16.64	62.13
.....
6	7	8	9	10
51.22	88.17	92.34	14.62	52.16
68.23	52.39	42.24	25.53	31.23
82.12	14.13	84.25	36.54	41.65
14.32	23.42	53.06	81.14	23.56
52.32	12.01	32.59	86.32	84.04
50.09	26.56	51.32	53.05	61.26
14.65	42.22	52.47	35.26	25.51
91.23	13.54	32.78	62.35	91.86
28.48	42.33	42.52	14.24	52.24
39.86	33.07	41.05	82.71	93.45
11.24	12.10	51.12	23.75	25.02
23.28	42.28	32.47	62.27	34.36
28.08	53.21	82.55	31.83	83.72
38.81	81.16	91.22	13.74	42.55
91.23	96.32	66.04	41.08	33.52
.....

Name.....Date.....

Period.....Errors.....Scoring.....

LESSON 39. REVIEW OF FOUR- AND FIVE-COLUMN ADDITION; WEEKLY PAYROLL SHEETS

Each of these four- and five-digit addition problems should be added accurately in less than 1 minute.

1	2	3	4	5
326.42	402.25	93.47	808.39	126.18
40.37	17.85	112.81	47.82	82.36
408.96	33.83	12.60	609.75	48.35
21.07	701.04	21.38	147.93	585.02
661.95	18.89	837.65	124.83	756.43
69.54	755.48	545.80	11.95	55.08
700.09	64.30	116.75	253.36	800.58
64.29	75.46	90.84	52.33	136.25
33.11	404.06	175.50	607.21	273.65
707.48	99.84	700.03	23.67	305.10
90.54	108.18	16.58	348.02	52.11
18.79	83.62	388.68	427.06	176.89
441.73	63.98	186.40	33.04	76.75
69.28	168.20	21.57	202.15	231.12
860.26	13.24	36.75	212.35	99.18
.....
6	7	8	9	10
115.06	155.06	632.44	445.63	212.25
77.35	21.37	28.70	16.37	33.26
625.64	250.62	307.89	808.09	117.58
447.62	19.34	250.35	73.26	90.27
523.36	20.55	15.40	59.45	500.50
70.73	64.37	114.81	220.15	66.57
102.92	902.46	702.36	12.96	18.35
50.46	47.26	552.20	90.83	775.46
57.00	325.36	302.46	111.01	80.69
678.32	29.85	70.05	68.58	222.14
606.62	907.68	48.52	371.26	405.80
89.07	76.83	752.20	27.26	92.42
98.70	480.75	88.62	509.86	33.72
840.79	16.85	10.33	22.79	885.40
701.80	201.33	313.41	806.57	66.57
.....

Weekly Payroll Sheets

Horizontal addition and subtraction are also used to complete each line of the weekly payroll sheets. Add horizontally the four deductions—for Federal Withholding Tax, for Social Security benefits, for United States Savings Bonds, and for Health Insurance; and record the sum of the deductions under that heading in Column 8. The net amount paid to each employee at the end of the week is found by subtracting the Total Deductions from the Taxable Wages Paid, and the remainder is recorded in the Net Pay column.

Add all columns except the first and second to find the totals required at the bottom of each weekly payroll sheet.

SHEET 1

	NAME	Social Security Number	Taxable Wages Paid	Federal Withholding Tax	FICA 1½%	U. S. Gov. Bonds	Health Ins. Plan	Total Deductions	Net Pay
11.	W. C. Kane	312-44-1891	\$55.00	\$6.40	\$.83	\$3.00	\$.50	\$.....	\$.....
12.	J. Metzler	313-33-2809	55.00	4.50	.83	3.00	1.05	.....	.....
13.	F. A. Born	313-13-2388	55.00	8.30	.83	2.00	...	.....	.....
14.	F. E. Erwin	313-44-2345	50.00	5.60	.75	2.00	.50	.....	.....
15.	D. O. Small	313-33-2355	50.00	3.70	.75	2.00	1.15	.....	.....
16.	B. E. Hall	414-22-2378	50.00	1.80	.75	1.00	1.55	.....	.....
17.	J. J. Smith	455-11-4055	45.00	4.90	.68	2.00	.50	.....	.....
18.	J. M. Lamont	655-35-8934	45.00	4.90	.68	1.00	.50	.....	.....
19.	L. J. Berg	555-36-8903	45.00	3.00	.68	2.00	1.05	.....	.....
20.	A. E. Herz	655-35-8213	40.00	6.10	.60	1.00	1.05	.....	.....
21.	M. E. Edward	475-33-8211	40.00	4.10	.60	1.00	.50	.....	.....
22.	C. Graves	485-48-1083	35.00	3.40	.53	1.00	1.05	.....	.....
23.	E. Davis	485-01-3436	35.00	1.50	.53	1.00	.50	.....	.....
24.	R. R. Young	485-03-4583	30.00	4.60	.45	1.00	.50	.....	.....
25.	TOTALS	.....	.....	...	..	...	...	.....	.....

Name..... Date.....
 Period..... Errors..... Scoring.....

LESSON 40. REVIEW OF FIVE-COLUMN ADDITION; HOURLY PAYROLLS

Each of these five-digit addition problems should be added accurately in less than 1 minute.

1	2	3	4	5
366.33	264.46	297.22	307.36	323.62
484.08	208.82	707.77	617.94	926.23
547.73	845.40	466.36	585.92	350.74
623.32	606.41	186.45	313.33	858.13
135.50	942.87	684.42	129.95	651.66
989.07	110.12	302.06	574.75	365.56
313.84	611.23	121.13	240.02	594.50
116.58	364.38	297.18	777.37	610.63
464.37	303.07	306.88	306.42	901.72
808.28	229.19	478.63	592.11	486.88
676.31	579.86	902.32	313.15	190.25
122.02	885.02	324.65	699.71	824.63
775.54	332.76	891.60	288.22	122.99
846.13	164.98	421.08	805.88	147.13
396.03	688.46	476.85	350.03	346.83
.....
6	7	8	9	10
307.66	330.76	949.96	913.70	942.99
623.25	362.32	318.60	353.87	298.85
658.62	834.28	348.18	912.36	667.72
366.07	649.25	916.17	826.48	838.19
395.31	151.13	298.99	892.72	834.84
342.88	644.38	826.09	952.56	661.63
655.44	651.33	366.11	330.07	930.87
605.77	942.50	667.19	911.46	936.47
722.43	949.74	338.37	376.97	904.80
514.23	339.08	903.27	947.04	653.04
763.38	619.48	352.13	911.05	378.03
225.82	370.78	313.68	823.52	370.06
312.08	443.27	912.36	353.84	782.09
677.49	959.77	823.52	657.62	278.20
260.77	331.26	664.82	316.06	661.50
.....

Hourly Payrolls

When employees are paid at the hourly rate, the weekly time cards are used as a basis for figuring the gross earnings for the week. The regular and overtime hours have been taken from the time cards and recorded in the Daily Clock Record column by the timekeepers. The regular hours have been recorded in the lower right-hand section of the daily blocks, and the overtime hours have been recorded in the upper left-hand section of each daily block.

All work on Saturdays and all work over eight hours a day is figured at the overtime rate. The calculating machine operator must remember that overtime is one and one-half times the regular hourly rate.

Steps in figuring the gross earnings for an employee:

Regular Earnings:

1. Add the regular hours.
2. Multiply the regular hours by the regular hourly rate.
3. Record the result in the Regular Earnings column.

Overtime Earnings:

1. Add the overtime hours.
2. Multiply the regular rate by 1.5 to find the overtime rate (Stalcup, Clock #410, $\$1.90 \times 1.5 = \2.85).
3. Multiply the overtime hours by the overtime rate (Stalcup, Clock #410, $6 \times \$2.85 = \17.10).

Add the regular earnings and the overtime earnings to find the Gross earnings for the week (Stalcup, Clock #410, $\$76.00$ plus $\$17.10 = \93.10).

Name	Classification	Daily Clock Record						Total Regular Hours	Regular Rate	Regular Weekly Earnings	Over-time Hours	Over-time Earnings	Gross Weekly Earnings	Clock No.
		M.	T.	W.	T.	F.	S.							
H. Stalcup	Chief Oper.	0/8	0/8	1/8	1/8	0/8	4/	40	\$1.90	\$76.00	6	\$17.10	\$93.10	410
C. Trippe	Spec. Oper.	1/8	0/8	1/8	0/8	1/8	0/	.....	1.84	.....	.....	.....	.....	411
T. B. Brown	Operator	1/8	1/8	1/8	1/8	0/8	4/	.....	1.80	.....	.....	.....	.....	412
J. J. Dale	Operator	0/8	0/8	0/8	0/8	0/8	0/	.....	1.80	.....	.....	.....	.....	413
G. Daniels	Operator	1/8	0/8	0/8	1/8	0/8	4/	.....	1.80	.....	.....	.....	.....	414
M. De Carlo	Asst. Oper.	0/8	0/8	0/8	0/8	0/4	0/	.....	1.74	.....	.....	.....	.....	415
P. De Luca	Asst. Oper.	1/8	0/8	2/8	1/8	2/8	2/	.....	1.74	.....	.....	.....	.....	416
H. Freeman	Helper	1/8	0/8	2/8	1/8	2/8	2/	.....	1.68	.....	.....	.....	.....	417
J. W. Holme	Helper	1/8	0/8	2/8	1/8	1/8	4/	.....	1.68	.....	.....	.....	.....	418
D. H. Hunt	Helper	1/8	1/8	1/8	1/8	1/8	4/	.....	1.68	.....	.....	.....	.....	419
J. D. Keane	Helper	1/8	1/8	0/8	0/8	0/8	2/	.....	1.68	.....	.....	.....	.....	420
E. W. Kelly	Laborer	1/8	1/8	0/8	0/8	0/8	2/	.....	1.60	.....	.....	.....	.....	421
A. Kramer	Painter	1/8	0/8	0/0	1/8	1/8	4/	.....	1.90	.....	.....	.....	.....	422
C. Larsen	Carpenter	0/8	0/6	0/8	0/8	0/8	0/	.....	1.90	.....	.....	.....	.....	423
T. McCann	Electrician	0/8	0/8	0/8	0/8	0/8	4/	.....	1.90	.....	.....	.....	.....	424
S. North	Elec. 2d C.	1/8	1/8	1/8	1/8	1/8	0/	.....	1.82	.....	.....	.....	.....	425
H. O. Noyes	Elec. 3d C.	0/8	0/8	0/0	0/8	0/8	4/	.....	1.74	.....	.....	.....	.....	426
J. M. Owens	Apprentice	6/8	0/8	0/8	0/8	0/8	0/	.....	1.66	.....	.....	.....	.....	427

Name..... Date.....

Name	Classification	Daily Clock Record						Total Regular Hours	Regular Rate	Regular Weekly Earnings	Over-time Hours	Over-time Earnings	Gross Weekly Earnings		Clock No.
		M.	T.	W.	T.	F.	S.								
M. F. Palmer	Painter	1/8	0/8	1/8	0/8	2/8	4/	.....	\$1.90	\$.....	.....	\$.....	\$.....	428
H. O. Perry	Appr. 2d	1/8	1/8	0/8	0/8	0/8	2/	.....	1.58	.....	.....	.....	.....	429
C. M. Rogers	Appr. 5th	0/8	0/8	0/6	0/8	0/4	0/	.....	1.34	.....	.....	.....	.....	430
J. E. Rowe	Pipefitter	2/8	2/8	0/0	2/8	2/8	4/	.....	1.90	.....	.....	.....	.....	431
J. Russell	Appr. 3d	2/8	1/8	0/6	0/8	0/4	0/	.....	1.50	.....	.....	.....	.....	432
T. L. Ryan	Appr. 4th	1/8	1/8	1/8	0/8	0/8	4/	.....	1.42	.....	.....	.....	.....	433
W. S. Sakson	Elec. 2d	1/8	1/8	0/8	1/7	1/7	4/	.....	1.82	.....	.....	.....	.....	434
H. W. Sweet	Mach. 3d	2/8	2/8	2/8	0/8	0/8	4/	.....	1.74	.....	.....	.....	.....	435
M. E. Taylor	Pipefitter	0/8	0/8	0/8	0/8	0/8	0/	.....	1.90	.....	.....	.....	.....	436
J. E. Walsh	Apprentice	0/0	1/8	1/8	1/8	0/8	4/	.....	1.66	.....	.....	.....	.....	437
S. W. White	Appr. 2d	1/8	0/0	1/8	0/0	1/8	0/	.....	1.50	.....	.....	.....	.....	438
J. M. Young	Carpenter	1/8	2/8	0/8	0/8	0/6	2/	.....	1.90	.....	.....	.....	.....	439
F. W. Zeller	Painter	1/8	1/8	0/8	0/8	0/8	2/	.....	1.90	.....	.....	.....	.....	440

Name.....Date.....

Period.....Errors.....Scoring.....

TEST 4

Add:

1	2	3	4	5
.68	.73	3.80	6.37	8.42
.58	.08	3.08	6.22	7.61
.60	.21	3.96	7.21	8.91
.27	.87	4.06	7.24	8.02
.05	.15	3.11	6.62	8.25
.32	.91	4.18	6.72	7.54
.76	.68	3.40	6.91	8.99
.98	.72	3.36	7.31	8.01
.04	.29			
.10	.27	3.85	6.94	8.38
.41	.51	4.32	7.23	8.07
.22	.95	3.88	7.44	7.98
.57	.57	4.17	7.38	7.78
.46	.90	3.07	6.55	8.32
.64	.67	3.71	6.97	8.52
.85	.94	4.05	7.47	8.97
.20	.63	3.16	6.59	7.84
—	—	—	—	—
..
6	7	8	9	10
30.24	35.62	53.87	802.54	323.62
60.42	61.25	27.24	24.40	926.23
20.43	5.98	57.71	639.08	350.74
40.62	91.06	82.93	62.85	858.13
50.27	5.76	98.08	469.64	651.66
20.74	14.62	81.95	367.40	365.56
40.44	62.51	7.89	42.49	594.50
30.36	4.69	67.35	383.45	610.63
90.23	83.15	37.05	62.55	701.72
50.51	5.79	80.09	475.87	486.88
70.25	29.24	89.96	300.52	309.52
90.18	83.35	77.88	95.78	248.36
40.23	3.68	60.79	280.01	122.99
10.57	83.52	7.68	28.36	147.13
60.20	9.85	86.26	374.91	346.83
—	—	—	—	—
.....

Multiply:

- | | |
|---|---|
| 11. $735 \times 623 = \dots\dots\dots$ | 13. $2475 \times 57 = \dots\dots\dots$ |
| 12. $6.625 \times 3.5 = \dots\dots\dots$ | 14. $8\frac{7}{8} \times 77\frac{3}{4} = \dots\dots\dots$ |
| 15. 48 cases of 96 articles each @ \$.75 each = $\dots\dots\dots$ | |
| 16. 36 boxes of 24 pieces @ \$.85 a piece = $\dots\dots\dots$ | |

Subtract:

- | | | |
|---|---|---|
| <p>17. 745.30
 $609.10 -$
 <hr style="width: 50%; margin-left: 0;"/> <p>$\dots\dots\dots$</p> </p> | <p>18. 250.95
 $202.00 -$
 <hr style="width: 50%; margin-left: 0;"/> <p>$\dots\dots\dots$</p> </p> | <p>19. 950.73
 $879.01 -$
 <hr style="width: 50%; margin-left: 0;"/> <p>$\dots\dots\dots$</p> </p> |
| <p>20. 291.74
 $61.91 -$
 <hr style="width: 50%; margin-left: 0;"/> <p>$\dots\dots\dots$</p> </p> | <p>21. 382.74
 $92.03 -$
 <hr style="width: 50%; margin-left: 0;"/> <p>$\dots\dots\dots$</p> </p> | <p>22. 845.43
 $88.09 -$
 <hr style="width: 50%; margin-left: 0;"/> <p>$\dots\dots\dots$</p> </p> |

Divide by trial-divisor method:

- | | |
|--|---|
| 23. $11,424 \div 42 = \dots\dots\dots$ | 26. $11,736 \div 36 = \dots\dots\dots$ |
| 24. $25,544 \div 103 = \dots\dots\dots$ | 27. $36,864 \div 144 = \dots\dots\dots$ |
| 25. $245.28 \div 16.8 = \dots\dots\dots$ | 28. $40.512 \div 6.4 = \dots\dots\dots$ |

Problems 29 through 40 are miscellaneous problems:

- | | |
|---|-------------------|
| 29. 56 articles @ \$1.95, less 25% and 10% = | $\dots\dots\dots$ |
| 30. \$88.80 purchase, plus 15% Federal excise tax = | $\dots\dots\dots$ |
| 31. 1808 articles @ \$5.75 per C = | $\dots\dots\dots$ |
| 32. 13,500 feet of lumber @ \$48.00 per M = | $\dots\dots\dots$ |
| 33. Interest (360-day method) on \$7,500 at 6% for 72 days = | $\dots\dots\dots$ |
| 34. Interest (360-day method) on \$9,600 at 5% for 36 days = | $\dots\dots\dots$ |
| 35. $3\frac{5}{12}$ dozen jars black ink @ \$1.20 per dozen = | $\dots\dots\dots$ |
| 36. 25 M ruled white cards @ \$1.95 per M = | $\dots\dots\dots$ |
| 37. $1\frac{1}{2}\%$ of a taxable weekly wage of \$65.80 = | $\dots\dots\dots$ |
| 38. $1\frac{1}{2}\%$ of a taxable weekly wage of \$86.14 = | $\dots\dots\dots$ |
| 39. One and one-half times an hourly rate of \$1.88 = | $\dots\dots\dots$ |
| 40. One and one-half times an hourly rate of \$1.72 = | $\dots\dots\dots$ |

