

Instructions

for Operating the

Burroughs Calculator



Burroughs Adding Machine Company
DETROIT, MICHIGAN

ADDING • CALCULATING • BILLING AND ACCOUNTING MACHINES
TYPEWRITERS • CASH REGISTERS • CORRECT POSTURE CHAIRS

Table of Contents

	Page
THE MACHINE.....	4
ADDITION.....	5
Full Keyboard Method.....	5
Touch Method.....	5
Adding Sales Checks or Similar Media.....	6
MULTIPLICATION.....	7
Simple Multiplication from the Right to the Left.....	7
Holding Key Combinations.....	8
Multiplication of Decimals.....	11
Multiplying from the left to the right.....	11
Pointing off from the left of the machine.....	12
Multiplication of Common Fractions.....	12
Decimal Equivalentents of Common Fractions.....	13
Multiplication of Large Amounts.....	13
Stroke Wheel Multiplication.....	13
Fixed Decimal Point.....	15
Fixed Decimal Point Accumulation.....	16
Articles priced by the 100, 1,000, and Hundredweight.....	16
SUBTRACTION.....	17
Credit Balances.....	18
Direct Subtraction.....	19
DIVISION.....	19
Cipher Division.....	20
Adding and Converting Mixed Denominations.....	20
Trial Divisor Method.....	21
Division Short Cut.....	22
Division by Use of Reciprocals.....	24
Decimal Equivalentents of Common Fractions.....	25
TRADE DISCOUNT.....	26
Finding Net Decimal Equivalentents of Chain Discounts.....	27
COMPUTING INTEREST.....	28
Interest on Savings Accounts.....	28
INSURANCE.....	29
PRORATING.....	30
FIGURING LUMBER.....	30
LUMBER TABLE.....	31
DECIMAL EQUIVALENTS OF FRACTIONAL PARTS OF A GROSS.....	32
TABLE OF NET DECIMAL EQUIVALENTS OF CHAIN DISCOUNTS.....	33
TABLE OF RECIPROCALs.....	34
TABLE OF CONSTANTS FOR COMPUTING INTEREST.....	35
LIST OF CALCULATION TABLES.....	35

¶ The purpose of this book is to present simple, fundamental methods for operating the Burroughs Calculator.

¶ These methods may be learned in a few minutes and with a little practice sufficient skill may be obtained to enable the operator to handle commercial calculations accurately and with a fair degree of speed.

¶ This book is not intended for school use as it does not contain sufficient problems for practice.

¶ An instruction book containing practice problems, written for use in schools and colleges may be obtained at a nominal charge from any Burroughs office or by writing to

Burroughs Adding Machine Company
Detroit, Michigan

The Hand-operated Burroughs Calculator

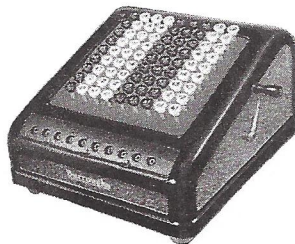
The Burroughs Calculator is a key-actuated, non-listing computing machine that adds, subtracts, multiplies and divides.

It is made in six sizes with six-, seven-, eight-, ten-, twelve- and fourteen-column totaling capacity.

The number of columns of keys is one less than the totaling capacity in each case.

Any of these sizes may be constructed with keyboards containing whole figures and fractions for the adding and sub-

tracting of amounts, such as feet, inches and eighths of inches, hours and minutes, etc.



10-column size

The instructions and examples in this book are illustrated with the 10-column machine (9 columns of keys) but many of the problems may be handled with a smaller size. Also it may be found that for certain work, some problems can be handled more efficiently with the 12- or 14-column size.



6-column size

Burroughs Electric Calculators

Electrically Enforced Accuracy

Accuracy of registration is assured by the motor-driven computing mechanism. The depression of a key causes the motor to register the full value of the key on the dials. Partial registration is impossible.

Electric Key Touch—Light and Uniform

The key touch is light and easy, and is exactly the same for all keys. The key depression merely actuates the motor. The motor furnishes the power to operate the computing mechanism.

The short key depression and light touch make possible a greater span of the keyboard. For example, \$10.90 may be easily held with the thumb and middle finger of the right hand when multiplying.

Increased rhythm and ease of operation—made possible by the light, uniform key touch—result in reduction in operator fatigue and increase in speed of calculating.



The Burroughs Electric Calculator with Single Accumulator

Electric "Simplified Subtraction" Keys

The simplest and fastest complementary method of subtraction ever known on a key-actuated machine is made possible by the Electric Subtraction Control Keys. Any subtraction can be performed with only one hand; or both hands can be used to depress—simultaneously—all keys in the amount being subtracted. There is only one simple rule to follow in subtraction—no need for the operator to determine mentally which one of several operations to follow.

Intermittent Motor

The motor *starts* automatically when a key depression is made—and *stops* automatically when the key restores. It does *not* run when the machine is not being operated, thereby eliminating the nervous strain of having to listen—constantly—to the sound of a running motor.



The Burroughs Electric Duplex Calculator
with Direct Subtraction

The Electric Duplex Calculator

The two accumulating registers of the Duplex make it possible to perform calculations and obtain separate answers—then, without any extra effort, to obtain the grand total. The result of each calculation appears in the front dials just as on all other Burroughs Calculators. When the front dials are cleared, the result automatically transfers to the rear accumulator. If desired, the front accumulator may be cleared without transferring the result. A touch of the clear key clears both accumulators simultaneously. A key is provided that, when latched down, prevents the transfer of fractions to the rear accumulator, thus only full cent amounts are accumulated. This assures the total exactly balancing with the full cent results of individual calculations.

Direct Subtraction

Subtraction on the Burroughs Electric Duplex Calculator is just as easy as addition. By entering an amount on the keyboard and operating the subtract key, the subtraction is performed directly, without the use of complements.

Capacities

The Burroughs Electric Calculators are made in five sizes with accumulating capacities of 7, 8, 10, 12 and 14 columns respectively.

The Machine

The dials register the results of the calculations.

The pointers are used to indicate the decimal point in the result.

The handle, or the electric clearing bar, at the right of the machine is used for clearing the dials.

In the case of the Burroughs Electric Duplex Calculator, the electric clearing bar transfers the result, which first appears in the front accumulator, to the rear accumulator. The subtract key clears the front accumulator and subtracts the amount from the rear accumulator. The "Front" key clears the front accumulator only and the "Clear" key clears both accumulators at once.

The standard full keyboard consists of keys arranged in columns with alternating sections of key tops colored white and black, conforming to the punctuation for dollars and cents.



Position of the Machine

Each key top has a large and small figure on it. The large figures are used for addition and multiplication, and the small figures are used for subtraction and division.

The key tops for the even numbers are flat and those for the odd numbers are concave to facilitate touch operation.

Correct Position of the Machine

The Calculator should be placed on the desk in front and slightly to the right of the operator, and at an angle so that the forearm will be parallel with a line from the one-cent key to the nine-dollar key.

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

Holding a Pencil

A pencil should be held between the thumb and palm while operating (see illustration). This saves time in writing answers.

When multiplying, especially with an Electric Calculator, the thumb is sometimes used for depressing a key. When this is done, the pencil is held with the little finger.

Addition

Always clear the machine before beginning a new problem.

Addition is performed by merely depressing the keys which represent the figures to be added. The results appear instantly in the dials—there is no handle to pull, levers to turn or motor bar to depress. The large figures on the key tops are used.

The first column at the extreme right of the keyboard is for units, 1 to 9; the second column is for tens, 10 to 90; the third column is for hundreds, 100 to 900, etc.

To add 5, depress the 5 key in the units column.

To add 45, depress the 4 key in the tens column and the 5 key in the units column.

Numbers should be added in the order read, that is, to add 345 depress the 3 key in the hundreds column, first, then the 4 key in the tens column and the 5 key in the units column.

There are no large ciphers on the key tops because ciphers are automatically registered on the dials when adding and multiplying.

To add 50, depress the 5 key in the tens column.

To add 500, depress the 5 key in the hundreds column.

To add 105, depress the 1 key in the hundreds column and the 5 key in the units column.

Full Keyboard Method

The full keyboard method is so-called because all the keys from one to nine are used. It is the same as that employed on adding machines with the standard full keyboard. This method may be used when a limited amount of adding is to be done by an untrained operator.

Touch Method of Addition

The touch method is recommended when the operator will use the machine a great deal for adding. With this method no key above 5 is used for adding. For figures above five, combinations of lower figures are used: 3 is depressed twice for 6; 4 and 3 for 7; 4 twice for 8; and 5 and 4 for 9. For uniformity of operation, the higher key is used first in adding the combinations for 7 and 9.

Only the first two fingers of the right hand are used. To facilitate touch operation, the key tops for the even numbers are flat and those for the odd numbers are concave. With a little practice the ability to locate the proper keys becomes a habit and may be relied upon for correct operation. Likewise, combination strokes become a habit and require no conscious effort.

Accuracy

Illegible figures are the chief cause of errors, hence extreme care should be used in reading figures.

Great care should be used in the beginning to form correct habits of operation. Accuracy, with speed is the goal. Accuracy is of first importance, and speed should not be forced before key location, which is essential for accuracy, is thoroughly learned.

Sub-totals—When long columns of figures are added, sub-totals should be noted on paper after every twenty-five or fifty items to facilitate checking. Errors of transposition, operating the wrong key, and operating a key the wrong number of times, may be found more readily when the work has been handled in sections, because usually it is not necessary to re-add all sections.

Rhythmic Action—Rhythmic action is just as essential in learning to operate the Calculator as it is in learning to play a musical instrument. In performing addition the movements of the hand and forearm should be timed to insure smooth, regular action—not too fast nor too slow. Any tendency to vary the time between key strokes when there is a difference in the span between the keys, or to “gallop” through particularly easy combinations should be carefully avoided, as such uneven operations usually result in fumbling. The proper speed for beginners is from two to two and one-half key strokes per second.

A few practice problems are given to illustrate the simplicity of the touch method and rhythmic movement. Do not look at the keyboard while adding.

34	21	45	33	34						
43	11	43	34	44	55	54	21	22	45	
34	12	33	54	54	45	45	12	21	43	
54	32	43	34	55	5	54	32	23	23	
50	34	23	32	54	50	43	34	43	22	
<u>34</u>	<u>21</u>	<u>45</u>	<u>33</u>	<u>34</u>	<u>54</u>	<u>45</u>	<u>44</u>	<u>34</u>	<u>21</u>	

Complete instructions for learning touch addition may be obtained at any Burroughs Branch or Burroughs School for Operators.

Adding Sales Checks or Similar Media

Adding of sales checks differs from adding columns of figures, only in that a slip must be handled for each amount. The operation of turning the checks is performed with the left hand and requires practice to become skillful.

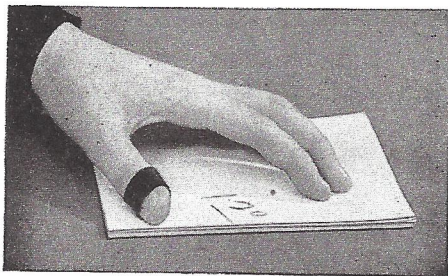


Fig. 1

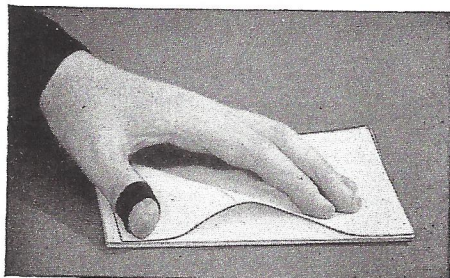


Fig. 2

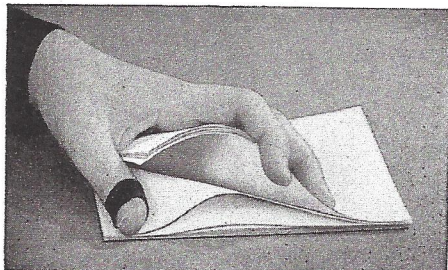


Fig. 3

Cash Sales checks are first added to balance with each cashier's total of cash received. They are then sorted so that totals may be obtained by clerks and departments. Charge Sales checks are sorted into similar groups, but they are usually handled at a separate operation.

Turning Sales Checks—The proper way to turn sales checks is to place a bundle of checks at the left of the Calculator, and hold them firmly with the fingers of the left hand as shown in Figure 1.

The fingers hold the checks, and the thumb raises them. This is accomplished by pressing the thumb against the check near the corner, and drawing it toward the palm of the hand. See Figure 2.

As the check buckles, it is caught by the first finger, and held while the amount on the next check is read as shown in Figure 3.

Sub-total—After a number of checks have been added, they should be placed face down in a separate pile. The sub-total may be written on the back of the last check in the pile. This enables the operator to prove more readily as errors can be localized to batches.

A rubber band used on the thumb as shown in the accompanying illustrations is essential to the rapid handling of the checks.

Multiplication

Simple Multiplication From the Right to the Left of the Machine

Machine multiplication is repeated addition. The large figures on the keytops are used and all keys for the amount to be multiplied are depressed at the same time. To multiply 278×3 , 278 is merely added three times.

$$\begin{array}{r}
 278 \\
 278 \\
 278 \\
 \hline
 834
 \end{array}
 \qquad
 278 \times 3 = 834$$

To multiply 278×30 , instead of adding 278 thirty times, it is merely moved one column to the left (which multiplies it by ten) and is added three times.

$$\begin{array}{r}
 2780 \\
 2780 \\
 2780 \\
 \hline
 8340
 \end{array}
 \qquad
 278 \times 30 = 8340$$

The multiplication of 278×33 is merely the combination of the above two steps.

The similarity of the above to the pencil method is apparent. In the pencil method, after multiplying by the right-hand figure, the amount is multiplied by the next figure to the left and the answer set down one place to the left.

Speed

While the experienced operator requires only about three seconds to make the average multiplication (three digits by four digits), it is not necessary to go through a long period of instruction before one can operate the machine fast enough to produce satisfactory results. By operating the Calculator slowly at the rate of six to eight seconds per calculation, multiplications are performed many times faster than by the pencil method.

A good operating speed for a beginner is about three key strokes per second. Due to the ease and speed of the Calculator, there is always an urge to operate the machine faster; therefore, speed picks up considerably after a few hours practice.

Method of Operation

The machine should be placed so that the keyboard will not be too high or too low for ease of operation.

The arm should be slightly above the keyboard with the fingers in a curved position.



Two-hand operation—267

The wrist should be flexible and allowed to move freely while operating.

The fingers should be lifted slightly above the key tops after each stroke.

Two Hands Used

In most cases, two hands are used to depress—at the same time—all the keys for the amount to be multiplied. In multiplying 267, the 2 is held with the first finger of the left hand and the 6 and 7 are held with the first and second fingers of the right hand.

Rhythmical Action

A smooth rhythmical operation is just as important in multiplying as in adding. Both hands should move in unison when performing the same operation. In shifting the amount being multiplied from column to column, there should be no pause in rhythm.

Holding Figure Combinations

The factor to be held on the keyboard is determined by:

First, the ease and accuracy with which the amount can be held, and

Second, by the number of key depressions represented.

Example: 4345×8239 . Since 4345 can be held more easily than 8239, it is usually best to hold 4345, even though 22 key depressions are required as compared with 16 if 8239 were held.

Simple Rule for Fingering—Use the longest finger on the highest figure.

Figure Combinations Analyzed

By a simple analysis of figure combinations, the holding of a factor on the keyboard may be greatly simplified. Those positions on the keyboard that are most easily held are *natural* combinations, while those that require a turn of the hand in order to place the fingers on the proper keys are *reverse* combinations.

Natural Fingering

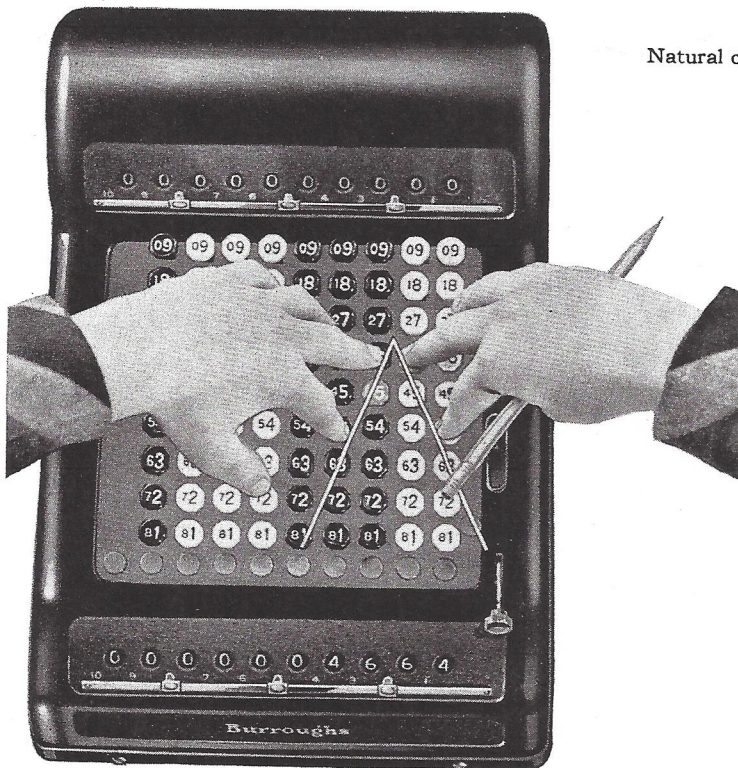
Natural fingering positions for the right hand are 35, 56, 57, 79, etc.

Natural fingering positions for the left hand are 53, 65, 75, 97, etc.

6556 is therefore a *natural* left- and right-hand combination. (See illustration at right.)



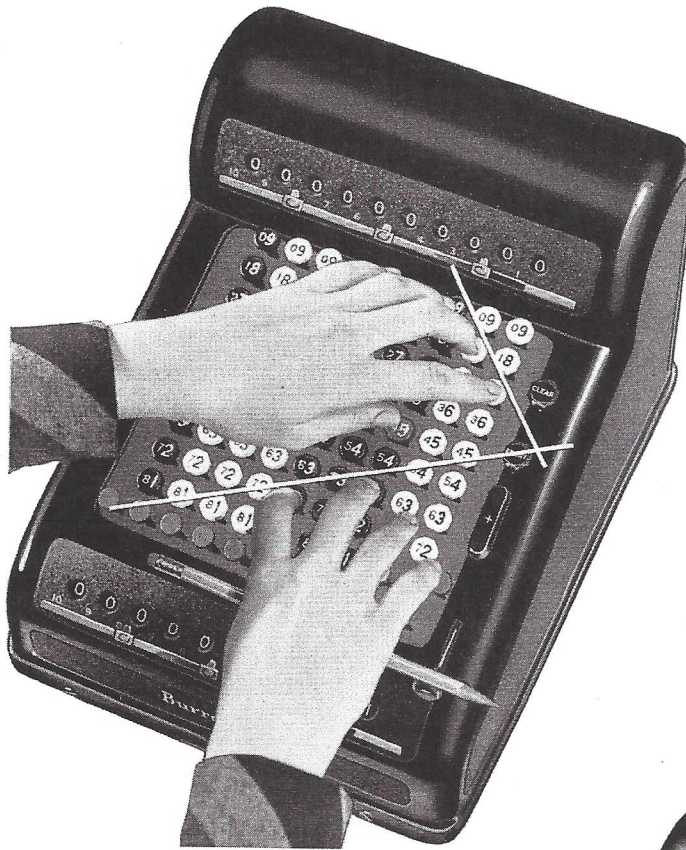
Natural combination—6556



Reverse combination—4664

Reverse Fingering

By referring to the accompanying illustration it may be seen that in holding 4664 the higher keys are held with the longer fingers. This necessitates turning the hand outward and raising the elbows slightly. Such combinations are classified as "Reverse."



Cross hand operation—20387

Cross Hand Combinations

By holding reverse combinations with the hands crossed, the fingering becomes natural as illustrated at the left for 20387. The 203 is held with the right hand and the 87 with the left.

Interposed Combinations

The holding of many combinations may be simplified by interposing the fingers. This is shown in the accompanying picture. In holding 273 the 7 is held by the left hand and the 2 and 3 are held by the right hand. In holding 391 the 9 is held by the right and the 3 and 1 are held by the left hand.



Interposed operation—273

Holding Factors Ending in Ciphers

When a factor ends in a cipher no key is held in the first right-hand column of the machine.

Example: 450×134

Operation: Hold 45 in the second and third columns and multiply to the left.

When ciphers occur at the right in both factors, hold the factor one place to the left for each such cipher.

Multiplication of Decimals

Multiplication of decimals is accomplished in the same manner as the multiplication of whole numbers.

The required number of places should be pointed off before multiplying. The pointers on the machine are used to indicate the decimal point in the result.

Rule for pointing off in multiplication of decimals:

Point off as many places from the right of the machine as there are decimal places in both factors.

Example: $6.25 \times 3.75 = 23.4375$

Proving Simple Multiplications

After obtaining the product of two factors, multiply them in reverse order, i. e., use the other factor as the keyboard factor. This will detect errors due to mental transposition of figures or mechanical mis-operation of the machine, such as operating the wrong keys or operating them the wrong number of times.

Multiplying from the Left to the Right of the Machine

When the product of two factors containing decimals will exceed the capacity of the machine, such a multiplication may usually be performed without affecting the commercial value of the answer, if the multiplication is made from the left to the right of the keyboard. In such cases it is necessary to run off the right side of the keyboard with the keyboard factor, dropping first one figure and then another.

Example: Multiply 32.465×5.1542368

Operation: Hold 32.465 with the 3 in the left-hand column on the machine and multiply by 5, 1, 5, 4 and 2. At this point 5 in the keyboard factor will have reached the right-hand column of the machine. In moving to the right to multiply by 3, the finger holding the 5 will "drop off" the keyboard.

In the next move one more figure is dropped.

In the last operation the third figure will be dropped.

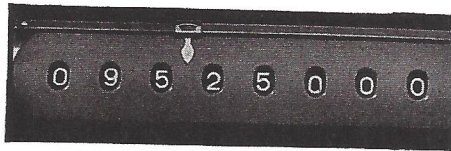
The last operation then consists of multiplying 32×8 . Answer: 167.3323.

When one or more figures in the keyboard factor are dropped in running off the keyboard, the accuracy of the product may be affected two places from the right of the machine. If the product figure in the second dial from the right is more than 5, add 1 to the figure in the third dial.

Pointing Off from the Left of the Machine

When multiplying from left to right

Rule—Beginning at the extreme left, point off one place to the right for each whole number and one place to the left for each preceding cipher in the two factors.



The dials at the left

NOTE: In pointing off, the dial at the extreme left of the machine must always be included.

Example: 37.5×2.54 . The dials will show 0952500000.

There are three whole numbers, hence the point is placed three places to the right and will fall between the 5 and 2 as shown in the illustration. Answer: 95.25.

Example: $37.5 \times .0254$. The dials will show 0952500000.

There are two whole numbers and one preceding cipher, therefore the point is placed one place to the right (two places to right and one to left). It will fall between 0 and 9. Answer: .9525.

Preceding ciphers are used only in pointing off. They are then disregarded and only the figures of value in the keyboard factor are held, starting at the extreme left of the machine.

Example: $.0375 \times .0254$. The dials will show 0952500000.

There are two preceding ciphers and the point is therefore placed two places to the left. To do this, two ciphers are prefixed to the result that appears in the dials. Answer: .0009525.

Example: $.375 \times .254$. The dials will show 0952500000.

There are neither whole numbers nor preceding ciphers, hence the point is not moved. Answer: .09525.

Multiplication of Common Fractions

When fractional amounts expressed in the form of common fractions are to be multiplied, they are changed to their decimal equivalents to conform to the decimal plan of the machine.

Example: $3\frac{1}{4} \times 6\frac{5}{8}$

$$3\frac{1}{4} = 3.25$$

$$6\frac{5}{8} = 6.625$$

$$3.25 \times 6.625 = 21.53125$$

The decimal equivalent of common fractions most frequently used are shown on the next page and should be committed to memory.

Decimal Equivalents of Common Fractions

3rds	6ths	12ths	Decimal Equivalent	4ths	8ths	16ths	Decimal Equivalent
		1	.08333*			1	.0625
	1	2	.16667*		1	2	.125
		3	.25			3	.1875
1	2	4	.33333*	1	2	4	.25
		5	.41667*			5	.3125
	3	6	.5		3	6	.375
		7	.58333*			7	.4375
2	4	8	.66667*	2	4	8	.5
		9	.75			9	.5625
	5	10	.83333*		5	10	.625
		11	.91667*			11	.6875
				3	6	12	.75
						13	.8125
					7	14	.875
						15	.9375

* All decimal equivalents in this table ending in 3 or 7 will give accurate results when multiplied by amounts less than \$100.00. All other decimal equivalents are complete and will give accurate results when multiplied by any amount.

NOTE: See page 25 for rule for finding the decimal equivalents of common fractions.

Multiplication of Large Amounts

In multiplying large amounts, the keyboard factor may be split for convenience. After multiplying through with part of the figures, those left may be multiplied in the same manner. In this way difficult combinations may be avoided. It is good practice to first multiply the first three figures at the left of an amount and finish with the remainder.

To multiply 42935×39234 , first multiply 42900 by 39234 (from left to right), then multiply 35 by 39234. This completes the operation and the answer is 1684511790. A similar procedure is followed in multiplying from right to left.

Stroke Wheel Multiplication

Stroke Wheel Multiplication is a method of multiplying an amount that is already on the dials by another amount and is usually used in such cases because it is quicker than clearing the machine and performing a simple multiplication.

When one factor is on the dials, the correct keyboard factor is always one less than the dial factor because one stroke of the multiplying operation is taken when the factor is placed on the dials. In other words, the dial factor is already multiplied by one.

This is known as the Stroke Wheel Method because the dials show the correct number of strokes to be taken in each column as the multiplying progresses. The



Over the left figure

times; move one more place to the right and operate five times. Answer: \$656.25.

operation must be performed from left to right in order that the figures on the dials may be followed.

Example: Multiply 18.75×35

The keyboard factor is 35

The dial factor is 18.75

Operation: Place 18.75 on the dials at the right. Hold 34 (one less than 35), as shown in the picture, with the right figure over the left figure on the dials.

Operate once as indicated by the left figure on the dials. Move one place to the right and operate eight times to agree with the next figure in the dial factor; move one more place and operate seven

For Compound Multiplication

This method saves the time of writing the result of the first multiplication when this result is to be multiplied by another factor.

Example: 35 bolts, 53 yards each, @ \$2.35 a yard.

Operation: Multiply 35×53 by simple multiplication as soon as the amounts are called. The amount on the dials will be 1855 yards. Leave this amount on the dials and multiply 235 by the dial factor, using the Stroke Wheel Method. Answer: \$4,359.25.

When the Keyboard Factor Ends in One

A simple rule for holding amounts which end in one as keyboard factors is to first place the fingers on the keys that represent the exact amount with the one in the same column as the left figure on the dials. Since a cipher will occur at the right, if one less is held, raise the finger from the one key and operate the other keys to agree with the left figure on the dials.

NOTE: The Stroke Wheel does not move when the keyboard factor ends in one.

Pointing Off for Decimals

Before multiplying, *point off as many places from the right of the machine as there are decimal places in the factors.*

Example: $7.23 \times .365 \times 54.7$. Six places are pointed off. Answer: 144.350565.

Fixed Decimal Point

For convenience in operating, place a decimal pointer between the fifth and sixth columns (between the white and black keys) to be used as a fixed decimal point. The columns at the left of the split are for dollars and those at the right for cents and fractions of a cent. However, bear in mind that a fixed decimal point can be established at any position on the Calculator.

Always Hold the Price

First, hold the price—*the value of one*—in the correct relation to the fixed decimal point.

1. If there are no fractions in the quantity, multiply from right to left.

Example: 25 Articles at \$3.25 each.

Operation: Hold the price, \$3.25 in the correct relation to the fixed decimal point, as explained above, and operate five times; move one place to the left and operate twice. The answer, \$81.25, is pointed off automatically.

2. When the quantity consists of whole numbers and fractions, (as $35\frac{1}{2}$) place the fingers on the price, in the units position; then move one place to the left for tens, two places for hundreds, etc. Multiply from left to right.

Example: $354\frac{1}{4}$ yards at \$3.25 per yard.

Position: Hold the price, \$3.25, in the units position. Move two places to left for the starting point.

Operation: Multiply from left to right by 3-5-4-2-5. The answer, \$1151.31, is pointed off automatically.

3. When the quantity is fractional, (as .75) move to the right for the first figure of value—one place for tenths, two places for hundredths, etc.,—then multiply from left to right.

Example: $\frac{3}{4}$ (.75) Article at \$3.25 each.

Position: Hold the price, \$3.25, in the units position. Move one place to the right for the starting point.

Operation: Multiply from left to right by 7-5. The answer, \$2.44, is pointed off automatically.

Example: .025 Article at \$3.25 each.

Position: Hold the price, \$3.25, in the units position. Move two places to the right for the starting point.

Operation: Multiply from left to right by 2-5. The answer, \$.08, is pointed off automatically.



UNIT POSITION

Fixed Decimal Point Accumulation

When several items are extended without clearing the machine, their sum is automatically accumulated. This is the quickest method of checking invoices.

Extend the following items and check by accumulation:

5	Pieces @ \$ 1.35	each \$ 6.75
25	Pieces @ .75	each
5½ (5.5)	Pieces @ .48	each
7¼ (7.25)	Pieces @ 20.00	each
24½ (24.5)	Pieces @ 2.06	each
106	Pieces @ .075	each
		\$231.56

Fixed Decimal Point Accumulation—Electric Duplex Calculator

With a single accumulator calculating machine it is necessary to re-add for the total if results of separate calculations are desired. When the results are permitted to accumulate over a fixed decimal point, as in the above, the total may not exactly balance with the total of the separate calculations because of fractions lost or gained when each result is carried to the nearest full cent.

On the Burroughs Electric Duplex Calculator, the fixed decimal point is established between the fifth and sixth columns. When it is desired to convert results of calculations involving fractions to the nearest full cent, it is only necessary to depress the 5 mills key. By having the Decimal Non-transfer Key (a red key at the right of the keyboard) latched down, only the full cent amounts will be transferred to the rear accumulator when the transfer bar is used. Fractions of a cent will be dropped. Thus the total accumulated in the rear accumulator will always exactly agree with the total of the individual extensions as written on the invoice.

Articles Priced by the 100, 1000 and Hundredweight

The multiplication, when articles are priced by 100, 1000 and hundredweight, should be made over the fixed decimal point to save time in pointing off.

Example: 275 castings at \$6.24 per 100. It will be seen that there are two whole hundreds and that 75 is a fraction of 100.

Operation: Hold the price in the unit position and multiply by 2, the number of hundreds, then move to the right and multiply by .75 the fractional portion of the quantity. Answer: \$17.16.

Hundredweight and thousands are handled in the same manner.

Problems for practice:

1741 Pcs. @ \$14.50 per C
7986 Lbs @ 9.50 per M

1355 Lbs @ \$15.50 per CWT
5625 Lbs @ 67.50 per M

Subtraction

Subtraction is performed by adding the complement of the amount to be subtracted.

The complement of a number is the difference between it and the next higher power of ten. If a number and its complement be added, the result will be one in the next order. The complement of 4 is 6; i. e., 4 plus 6 equals 10. If 6 be added to any larger number and the one, which always results when the complement of a number is added, be eliminated from the result, it will be seen that 4 has been subtracted.

Example: Subtract 4 from 7 by the complementary method. $7 + 6$ (the complement of 4) = 13. Eliminating the *one*, the difference, 3, remains.

In subtracting 3264 from 10000 it will be seen that the right-hand figure is taken from *ten* while the others are taken from *nine*.

Example: 10000
 3264

 6736

By referring to the Calculator it will be seen that the sum of the large and small figures on each key top equals nine. It is therefore not necessary to determine the complement mentally. The keys are merely depressed according to the small figures in the number to be subtracted, *less one in the right-hand figure of value*.

The extra "1" which occurs to the left when an amount is subtracted is eliminated merely by depressing the red subtraction control key in the column to the left of the amount subtracted.

Note: On machines without the simplified subtraction control keys, the "1" is eliminated by depressing a number of the small "0" keys to the left of the amount being subtracted to carry the "1" far enough to the left so that it will not be confused with the answer. To carry the "1" entirely out of the machine all of the keys in the top row to the left of the amount being subtracted are depressed.

There is only one rule for subtraction on the Burroughs Calculator, regardless of the combination of figures:

Depress the red subtract key in the column immediately to the left of the amount to be subtracted and then depress the amount, less one, in small figures.

Examples:

.75	5,000,000.45
- .56	- .56
<hr style="width: 10%; margin-left: 0;"/>	<hr style="width: 10%; margin-left: 0;"/>
.19	4,999,999.89

Nines are automatic when using the small figures in the same sense that ciphers are automatic when using the large figures.

Examples:

To Subtract— Depress—
 44 S43 (small figures)
 275 S274 (small figures)
 2705 S2704 (small figures)
 295 S2X4 (small figures)
 95 SX4 (small figures)
 200 S1XX (small figures)

S—Red subtraction control key immediately to left of amount being subtracted.

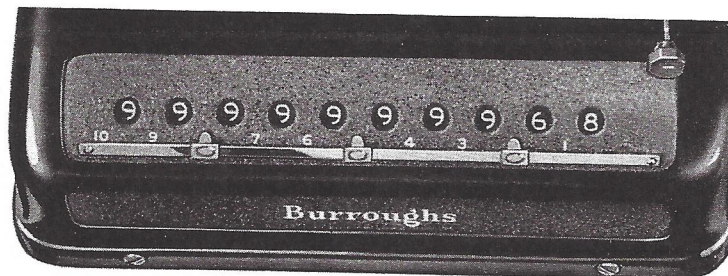
X—Nines for which no keys are operated.

Credit Balances

A credit balance, or negative total, occurs when the total of the credits (subtracted amounts) exceeds the total of the debits (added amounts). When a credit balance occurs, it is shown in the dials as a complementary amount, with nines appearing to the left.



Subtracting 44 from 290



After subtracting 77 from 45 a credit balance of 32 would be shown as a complement

To Convert a Complementary Total to a True Credit Balance

Hold the dial amount, less one, on the small figures. Depress the keys twice. If the correct keys are held, the first operation will clear the machine and the second operation will show the true credit balance.

Example: 45
 77 —

Dials show 9999999968 (Hold 67 on the small figures directly over the 68 and depress the keys twice.) Answer 32 Cr.

On a machine with direct subtraction it is only necessary to operate the subtract key and the true credit balance, 32 Cr., will appear instantly in the upper dials.

Direct Subtraction

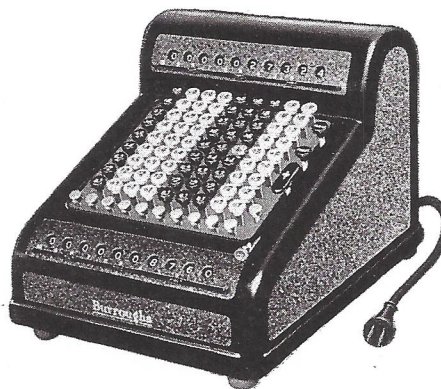
The Burroughs Electric Duplex Calculator is the only key-actuated calculating machine that provides *direct* subtraction, without the use of complementary figures. An amount in the front dials may be subtracted from an amount in the rear dials merely by depressing the subtract key.

A group of amounts may be added in the front dials and transferred to the rear dials by depressing the transfer bar. Then another group of amounts may be added in the front dials and by merely pressing the subtract key the total of the second group may be subtracted from the total of the first group.

Individual amounts may be added in the rear dials by entering them on the keyboard and depressing the transfer bar. In the same manner individual amounts may be subtracted from the amount in the rear dials by entering them on the keyboard and depressing the subtract key.

An extension of an item in an invoice may be made and the gross amount transferred to the rear dials with the transfer bar. Then the amount of the discount may be figured and, by merely pressing the subtract key, subtracted from the gross amount, leaving the net.

The use of the direct subtraction feature for converting a negative total to the true credit balance was described on the preceding page.



Division

Division is merely repeated subtraction. The answer is simply a record of the number of subtractions made. The subtractions are made from left to right, just as with the pencil-and-paper method of division.

There are two methods of dividing on the Calculator. The "cipher method" is necessary in one type of calculation (see next page). The "trial divisor" method is generally used for other calculations as it is somewhat faster, and one less key is held on the keyboard.

Cipher Method of Division

To enter the dividend (the amount to be divided) in the machine, beginning at the left of the keyboard in the column next to the last.

Just as in subtraction, the small figures on the keys, which are held in division, will represent one less than the divisor. In addition to the divisor keys, hold a small cipher in the column to the left.

Example: $1050 \div 25$.

Beginning at the left of the amount to be divided, determine the number of digits required to contain the divisor. In this instance, three digits are required (105).

Hand Method	Machine Method
42	42
25)1050	25)1050
100	25
50	80
50	25
	55
	25
	30
	25
	50
	25
	25
	25

Hold small 024 (one less than 025) over the 105 and subtract until the remainder becomes less than the divisor. In this example, four subtractions are necessary. The remainder (5) is now smaller than the divisor (25). The number of subtractions (4) is shown in the dial at the left.

Bring down the next figure (0) to the right by moving the divisor one place to the right, then subtract until the remainder again becomes less than the divisor. In this example, the remainder is reduced to zero after two subtractions.

The dials to the left now show the answer (42).

Pointing Off—To point off, place a decimal pointer in the same place as the point occurs in the dividend. Because of the small cipher that is held to the left of the divisor keys, move the decimal pointer one place to the left, then point off as follows:

When the divisor contains whole numbers with or without decimals, move the pointer one place to the left for each whole number in the divisor. In the example, 1050 divided by 25, the pointer will be moved two more places to the left—three in all.

When the divisor does not contain whole numbers, move the pointer one place to the right for each cipher between the decimal point and the first figure of value.

When the divisor contains neither whole numbers nor preceding ciphers, the pointer is not moved.

It is good practice to always point off before dividing.

Adding and Converting Mixed Denominations

The "cipher" method of division is useful for converting the lower denomination to the higher after adding such amounts as hours and minutes, bushels and pounds, feet and inches, whole numbers and common fractions, etc., on a machine without a fractional keyboard.

For example, pounds may be added on the section of white keys in the sixth to eighth columns, and ounces on the section of black keys in the third to fifth columns.

To illustrate the method, add 48 ounces on the black keys at the right. Then hold small 15 (one less than 16) with one cipher at the left, as 015.

Note that as the keys are depressed, one unit (one pound) will be recorded in the units of pounds column. The completion of the operation shows three pounds.

Place 60 on the dials as 60 ounces, divide by 16, with a cipher at the left. When the remainder shows 12, move the divisor one place to the right and continue to divide. Move over again and complete the division. Answer: 3.75 pounds. Thus, 60 ounces have been converted to pounds and the decimal of a pound.

The same process is involved in converting all mixed denominations. Example: Find the value of 35 bushels and 18 pounds of oats at 89¢ per bushel. Operation: Add the 35 in three rows of white keys, and the 18 in the three rows of black keys. Set decimal pointers as explained above. Convert the pounds to bushels, and a fraction of a bushel by dividing by 32, the number of pounds in a bushel of oats. Multiply by the price, stroke wheel method, being careful to exclude the remainder, if any, from the operation. Where the problem is too large for the capacity of the machine, note answer on dials, and extend after clearing the machine. Answer: \$31.65.

Trial Divisor Method of Division

The first operation in the lead-pencil method of division is to "try" the divisor for the number of times it can be contained in the active dividend. Machine division follows this method in principle but instead of having to mentally estimate the number of times that the divisor can be subtracted, the trial divisor dial (located directly to the left of the divisor) automatically does this for us. The procedure for dividing on the calculator is as follows:

1. Set up the dividend (large figures) at the extreme left of the keyboard.
2. *Point off before dividing.* (Begin at the dividend decimal point.)
 - (a) Move the decimal pointer one place to the left for each whole number in the divisor. Example: Three places to the left for 745.03.
 - (b) Move one place to the right for each preceding cipher contained in the divisor. Example: One place to the right for .043.

If the divisor contains neither whole numbers nor preceding ciphers, do not move the decimal pointer. Example: .423.

3. Hold the divisor (small figures less one) at the extreme left of the keyboard.
4. If the divisor is not contained in the dividend figures directly below it, move one column to the right to add another dividend figure. If it is contained, subtract until it is no longer contained, then move to the right.

5. Subtract the divisor in rapid succession as many times as indicated by the trial divisor dial located at the left of the divisor. If the trial divisor dial advances, continue to subtract until the number of subtractions equals the figure in the trial divisor dial.

6. Next, reduce the remainder (the amount appearing in the dial directly under the divisor) until it is less than the divisor.

7. Move the divisor one column to the right and repeat the process.

Example: $3465 \div 45$.

Set up 3465 (large figures) at the extreme left of the keyboard. Since there are two whole numbers in the divisor, the decimal point is moved two places to the left of the dividend decimal point position.

Hold 44 (small figures) directly over 34.

Since 45 is not contained in 34, move the divisor one column to the right to add another dividend figure.

Equal the Trial Divisor

The trial divisor dial immediately to the left of the columns in which the divisor is held now shows 3. Subtract 45 rapidly three times.

It will be observed that the trial divisor has advanced to 5.

Continue to subtract until the number of subtractions agrees with the figure in the trial divisor dial. In this case it will be after six subtractions.

The remainder in this position is 76.

Reduce the Remainder

Reduce the remainder by further subtraction (once, in this problem) until it is less than the divisor, 45.



TRIAL DIVISOR
Equal the Trial Divisor



REMAINDER
Reduce the Remainder

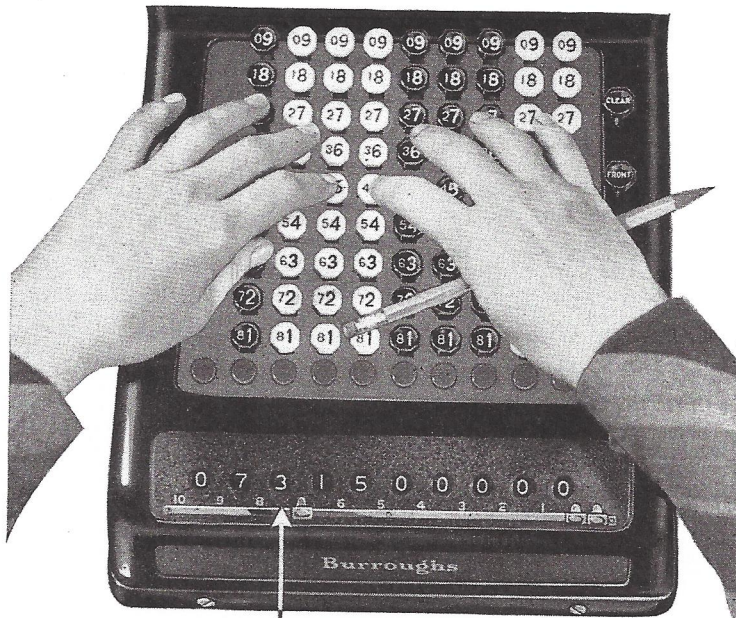
Move Over and Repeat

Move the divisor one column to the right to add another dividend figure. It will be over 15. The three at the left is the new trial divisor.

Operate rapidly three times, then twice more to equal the trial divisor. Operate two more times to reduce the remainder.

Preceding and Ending Ciphers

Preceding ciphers in a divisor, as in .0035, or ending ciphers as in 3500 are considered only in pointing off. They are disregarded while dividing. For .0035 the decimal point is moved two places to the right; for 3500 it is moved four places to the left.



NEW TRIAL DIVISOR

Move Over and Repeat

The Remainder

When a remainder occurs, move over and continue to divide as before until the quotient has been carried to the desired number of decimal places. After the last quotient figure is obtained, observe the remainder. If the remainder is more than half of the divisor, add one to the last quotient figure. The two right-hand dials should not be used for quotient figures.

Nines at Left of Divisor

When the left-hand figure in the divisor is 9, as in 95, 995, etc., the trial divisor will be one column to the left of the column in which the nine occurs.

Division Short Cut

The modern statistician is reducing the cost of compiling statistics by carrying out averages, percentages, etc., to not more than 3 or 4 decimal places. Since this serves most practical purposes, the carrying out of decimals in a division problem beyond the actual number of places required is a needless waste of time and energy.

A Safe Rule to Follow

Use *one more figure* in the *divisor* and *dividend* than the *number of figures* desired in the answer.

In pointing off, all whole numbers in the divisor must be considered although only part of the divisor is held on the keyboard.

Example: Sales \$46,872,392
 Profit 2,782,679

Find per cent of profit to Sales

Operation: 2,783,000 \div 46,870,000 = 5.94%

Division by Use of Reciprocals

Reciprocals simplify division and are especially convenient when several amounts are to be divided by the same divisor. Multiplying an amount by the reciprocal of the divisor produces the same answer as that obtained by division.

The reciprocal of a number is the quotient obtained by dividing 1 by the number. The reciprocal of 4 is .25 ($1 \div 4$). When any number is multiplied by .25 the same result is obtained as when it is divided by 4. A table of reciprocals is generally used, but when they are required infrequently they may be obtained by division.

Number of Figures to Use

When multiplying by a reciprocal, use one more digit in both the reciprocal and the dividend than the number of digits required in the answer. (The number of digits in each case is exclusive of preceding ciphers.)

When a number of amounts are to be multiplied by the same reciprocal, as in calculating percentages as shown below, the number of digits required in the largest amount is determined and all others may then be cut off at the same point. In the problem shown below amounts are used only to the nearest thousands of dollars.

Example Problem

Find the percentage of the following items to the total sales:

Material	\$2,369,897 (use 2,370)	26.7%
Labor	3,452,916 (use 3,453)	_____
Overhead	976,403 (use 976)	_____
Selling Cost	1,553,369 (use 1,553)	_____
Profit	523,724 (use 524)	_____
Sales	<u>\$8,876,309</u> (reciprocal 1127)	<u>100 %</u>

Pointing Off

Usually a fixed decimal point for the dividend is established between the fifth and sixth columns, but when the dividend is large, as in the foregoing example, the dividend decimal point is established between the second and third columns. The color division of the keyboard permits holding the dividend in its normal position as in adding.

An answer decimal point is established in the same manner as in division. In this problem it is placed at seven (seven places to the left of the dividend decimal point, for the seven whole numbers in the divisor, less two for the per cent sign used in writing the answers). Multiplication is performed from left to right.

Operation

Hold the dividend \$2,370,000 over the dividend decimal point 2. Multiply from left to right by the reciprocal 1-1-2-7. Answer 26.7%.

Using a Duplex Calculator

The above method permits accumulating the individual percentages on a duplex but the grand total will not always agree with the addition of the written answers because of fractions dropped in writing them. To obtain the correct total of the written answers, they must be recapped. The recapping of the individual percentages can be eliminated on the duplex by using the following method:

Pointing Off—The decimal point for the answer is established as *many places to the left of the third column* (which contains the red "5" key) as *there are decimal places required in the answer*. For example, for answers to tenths of a per cent (3 decimal places), the decimal pointer is set at 6. The decimal non-transfer key is latched down.

Operation—When the dividend contains the same number of whole numbers as the divisor, hold the reciprocal to the right of the fixed decimal point. When the dividend is smaller, move one place to the right for each whole number of difference. Multiply from left to right. Depress the red "5" key in column 3 to adjust the answer to the nearest digit.

Decimal Equivalents of Common Fractions

In most machine calculating it is desirable to use the decimal equivalents of common fractions, and in many cases it is necessary to use decimal equivalents.

Decimal equivalents must be used for adding and subtracting unless the machine is equipped with fraction keys. Machines with fractions are available for many uses, such as adding and subtracting feet and inches, hours and minutes, etc. The fractions, however, cannot be used for multiplying and dividing.

To multiply common fractions, as $\frac{5}{8}$ by 40 or $\frac{5}{8}$ by $\frac{7}{8}$, and express the result decimally, it is necessary to divide the product of the numerators by the product of the denominators. To divide by a common fraction, it is necessary to invert it and then proceed as in multiplication of common fractions.

Some problems in multiplication and division, involving common fractions, can be handled as explained above, but if the same fractions are to be used frequently, time can be saved by using their decimal equivalents, or in the case of division, by using the reciprocal method.

A common fraction can be changed to its decimal equivalent by dividing the numerator by the denominator. Example: To change $\frac{5}{8}$ to its decimal equivalent, divide 5 by 8. Answer: .625. $\frac{5}{8}$ of 40 = $.625 \times 40$. Answer: 25. $40 \div \frac{5}{8} = 40 \div .625$. Answer: 64.

The decimal equivalents of common fractions most frequently used are given on page 13.

Trade Discount

Trade discounts provide for fluctuations in prices and at the same time enable the manufacturer or dealer to use established list prices as the basis for quotations.

To Find the Amount of the Discount

The amount of discount is found by multiplying the gross amount of the bill by the discount per cent which is always a decimal. The operation may be performed as a simple multiplication from the right of the machine or, if the gross amount is on the dials, the Stroke Wheel Method may be used.

The keyboard factor is held according to the large figures when the amount of the discount is being calculated, since simple multiplication is performed.

Example: Find 65% (.65) discount on a gross bill of \$425.

Operation: Point off two places and multiply \$425 by .65. Answer: \$276.25.

To Find the Net Amount

Follow the Stroke Wheel Method, using the small figures for the discount, but do not deduct one from the key factor, as is usual with Stroke Wheel Multiplication. By using the small figures in this manner, the amount of the discount is subtracted from the gross amount as the calculation is made.

The *gross amount* is entered at the right of the keyboard and then *multiplied by the discount per cent, using the small figures on the key tops*. The product will be the net amount. Additional discounts may be deducted in the same manner.

Point off according to the rule for multiplication of decimals:

Successive or Chain Discounts

Problem: \$18.75 less 65-20-5%

Operation: Place \$18.75 on the dials

First—Hold small 65 and perform a Stroke Wheel Multiplication. The dials will show \$6.5625

Second—Hold small 20 and multiply as before. The dials will show \$5.25

Third—Hold small 05 and perform a Stroke Wheel Multiplication.

Answer: \$4.99

Always hold the discount in small figures as it is written decimally.

When nines occur in the discount, omit them and hold the remaining figures. **Examples:** For 90, hold small cipher only; for 95, hold small five only; for .09, hold small cipher only; for .19, hold small one.

A chain discount may be computed in any order. For example, 60-10-5% is the same as 5-10-60%.

Problem for Practice

275.00 less	40-10-10%	\$133.65
58.75 less	65-20-5%	15.63
6.30 less	33 $\frac{1}{8}$ -10-10%	3.40
	Answer	\$152.68

Net Decimal Equivalent Method of Figuring Chain Discounts

When a series or chain of discounts is used frequently, the operation may be shortened by multiplying the gross amount by the net decimal equivalent of the series of discounts. (The net decimal equivalent of a series of discounts is the product of their complements.)

Example: Find the net amount of \$425.00 less 65-20-5%.
The Net Decimal Equivalent of 65-20-5% is .266

Operation: $\$425 \times .266 = \113.05

Finding Net Decimal Equivalents

Net Decimal Equivalents may be found by Stroke Wheel Multiplication in the following manner:

Example: Find the Net Decimal Equivalent of 45-35-20-5%.

NOTE: Always hold the key factor so the first right-hand figure will be in the same column as the first left-hand figure of the dial factor.

Operation: *Use the small figures on the keys.*

Set a decimal pointer as many places from the right as there are decimal places in all the key factors. The discount 45-35-20-5% equals .45-.35-.20-.05, when expressed decimally. The pointer should, therefore, be moved to the left eight places.

First —Add 1 in the first column from the right.

Second—Hold small 45 and depress the keys once. The dials will then show 55.

Third —Hold small 35 and depress the keys the number of times indicated by the dials, as in Stroke Wheel Multiplication. The dials will then show 3575.

Fourth—Hold small 20 and depress the keys the number of times indicated by the dials. The dials will then show 286000.

Fifth —Hold small 05 and depress the keys the number of times indicated by the dials. The dials will then show 27170000.

The answer, .2717, is the Net Decimal Equivalent.

Problems for Practice

In figuring problems involving extensions and discounts, first find the Net Decimal Equivalents of the discounts that are used frequently and note them on paper. Then compute the gross amount and take off the discount by multiplying by the Net Decimal Equivalent, using the large figures on the keys.

When using a Net Decimal Equivalent by the Stroke Wheel Method use the large figures and hold one less.

Find the net amounts for the following items.

Gross Items	Discount	
\$ 73.50 less .75-.10		985 gross $\frac{3}{4}$ x 8 screws @ \$.95 gro
127.60 less .25-.10-.10		Less 70-20-10-5-2 $\frac{1}{2}$ %
27.85 less .95-.10-.05		1050 gross $\frac{3}{4}$ x 10 screws @ 1.10 gro
87.50 less .90-.90-.10		Less 67 $\frac{1}{2}$ -20-10-5-2 $\frac{1}{2}$ %

A table of net decimal equivalents of common chain discounts is given on page 33.

Computing Interest

The following is the usual method for computing interest:

Rule: Principal \times time in days \times rate \div number of days in year = interest.

Problem: \$450 for 224 days at $4\frac{1}{2}\%$ (on basis of 360 days in the year).

Operation: $\frac{\$450 \times 224 \times .045}{360} = \12.60

The Use of Constants

When the same rate is to be used in a number of problems, the work may be shortened by the use of a constant. The constant for a given rate is the interest on \$1.00 for one day. Thus it will be seen that the use of a constant eliminates one operation—dividing by the number of days—in each interest problem.

Rule: Principal \times time in days \times constant = interest.

Problem: \$450 for 224 days at $4\frac{1}{2}\%$ (on basis of 360 days in the year).

Operation: $\$450 \times 224 \times .000125 = \12.60 . (Point off before multiplying.)

NOTE: Figure interest on dollars only. Fractional amounts of fifty cents or over should be considered as one dollar and fractional amounts under fifty cents should be disregarded. Example: \$425.65 should be figured as \$426.00; \$425.25 should be figured as \$425.00.

The interest on \$1.00 for one day at a few common rates, on the basis of 360 days in the year, are given below. Tables showing the interest at other rates, or based on 365 days to the year may be obtained.

3%	.00008333	$5\frac{1}{2}\%$.00015278
$3\frac{1}{2}\%$.00009722	6%	.00016667
4%	.00011111	$6\frac{1}{2}\%$.00018056
$4\frac{1}{2}\%$.000125	7%	.00019444
5%	.00013889	8%	.00022222

Constants not given in the above table may be found by dividing the rate by the number of days in a year.

Example: $.04\frac{1}{4} \div 360 = .0001181$

Interest on Savings Accounts

Interest on savings accounts is usually computed quarterly or semi-annually. While there are a number of different methods for determining the amounts and the time on which the interest is based, the principle of the machine calculation is the same in most cases.

One common method of figuring savings interest is to compute the interest on the minimum monthly balances. Usually, under this method, deposits made on or before the fifth of the month bear interest from the first. Any withdrawals made during the month lose interest from the first. Therefore the lowest balance after the fifth of each month is used.

Date		Problem		
		Withdrawal	Deposit	Balance
Jan.	1			\$200.00
Jan.	3		\$175.30	375.30
Feb.	10		40.00	415.30
Mar.	15	\$110.00		305.30
Apr.	3		164.70	470.00
June	8		100.00	570.00

Assuming that interest at 3% is to be figured for the six-month period ending June 30, the monthly balances are added as follows: January, \$375; February, \$375; March, \$305; April, \$470; May, \$470; June, \$470.

The total of the balances, \$2465, is then multiplied by the interest on \$1 for one month (.03 divided by 12, or .0025). This may be done by stroke wheel multiplication. Another method frequently used is to hold the total of balances over itself and multiply by .0024, the interest on \$1 for one month, less one (the total of balances is already in the machine once). For example, in this problem hold 2465 and depress the keys four times; then move to the left and depress the keys twice. Answer: \$6.16.

Insurance

When an insurance policy is cancelled, the amount of premium to be returned for the unexpired policy is determined either on the so-called short rate basis or on a prorata basis, depending upon the reason for the cancellation.

When the short rate basis is used, the annual premium is multiplied by the allowance per cent for the unexpired term as determined from a short rate cancellation table.

Prorata Cancellation

A prorata cancellation gives the exact return premium for the unexpired term of a policy.

Problem: Find the prorata return premium on the following policy:

Policy issued October 12 to expire October 12 of the next year. The amount is \$25000 at \$1.35 per M—total premium \$33.75. The policy was cancelled June 15.

Operation: Find exact number of days between June 15, the date of cancellation, and October 12, the date of expiration.

Add the number of days as follows:

June	15
July	31
August	31
September	30
October	12
Total	119

Leave 119 in the dials, point off and then multiply by .00274, the reciprocal of 365 days.

$119 \times .00274 = .326$, decimal of year for unexpired period.

Leave this amount in the dials and multiply by the total premium, \$33.75.

$.326 \times \$33.75 = 11.00$, return premium.

Figure prorata cancellations for three- and five-year policies in the same way. The reciprocals follow:

1 year	.00274
3 years	.000913
5 years	.000548

NOTE: In most cases a table is used in determining the number of days from cancellation to expiration date.

Prorating

Prorating is the distributing of amounts proportionately. The problem in percentages on the opposite page is also a prorating problem. Another type of prorating problem is shown below.

Problem:

Five men invest \$6684 as given below. The net earnings are \$1240. Find each one's share of the earnings.

		Earnings
A Invests	\$1500.00	\$ 278.28
B Invests	2200.00	-----
C Invests	750.00	-----
D Invests	984.00	-----
E Invests	1250.00	-----
Totals	\$6684.00	\$1240.00

If \$6684, the total investment, earns \$1240, the earnings of one dollar may be found by dividing \$1240 by \$6684. Answer \$.185518.

Since "A's" investment is \$1500, his share of the earnings is $1500 \times \$.185518$ or \$278.28.

Earnings on the other investments may be found by multiplying each investment by the earnings of one dollar.

NOTE: In actual prorating work the total of the individual items will usually not be exactly 100 per cent (or its equivalent), due to the fact that fractions are not always completely carried out. For example, the total of the individual earnings in the above problem is \$1240.01. One cent may be deducted from any of the answers in order to balance.

Figuring Lumber

Lumber is sold by the board foot, and is usually priced by the thousand feet. A board foot contains 144 cubic inches. Thus a piece of lumber 1" thick, 12" wide and 1' long contains one board foot. Likewise a piece 2" x 6" x 1' contains one board foot. Therefore, the number of board feet is figured as follows:

Rule: Number of pieces \times thickness in inches \times width in inches \times length in feet \div 12 = board feet.

Example: How many board feet in 16 pieces 2" thick by 6" wide by 9' long?

$$\text{Operation: } \frac{16 \times 2 \times 6 \times 9}{12} = 144 \text{ board feet}$$

Find the total board feet in the following problems:

1 78 pieces 3" x 8" x 11'

2 36 pieces 4" x 16" x 14'

3 28 pieces 2" x 6" x 20'

4 14 pieces 2" x 6" x 20'

Using a Lumber Table

A table, showing the number of board feet in each piece may be obtained to shorten the operation of figuring lumber. In using such a table, it is only necessary to multiply the number of pieces by the number of board feet in each piece, as shown in the table.

Example: Find the number of board feet in 35 boards 1" x 8" x 14'.

The number of board feet in each piece is shown in a table to be 9.33333.

Operation: $35 \times 9.33333 = 326.666$, or 327 board feet.

Add one board foot for a fraction of one-half or over in the total board feet. The total value is found by multiplying the total board feet by the price.

Lumber Table

LENGTH IN FEET

Sizes in Inches	8	10	12	14	16	18	20	22
1 x 2	1.33333	1.66667	2.	2.33333	2.66667	3.	3.33333	3.66667
1 x 3	2.	2.5	3.	3.5	4.	4.5	5.	5.5
1 x 4	2.66667	3.33333	4.	4.66667	5.33333	6.	6.66667	7.33333
1 x 5	3.33333	4.16667	5.	5.83333	6.66667	7.5	8.33333	9.16667
1 x 6	4.	5.	6.	7.	8.	9.	10.	11.
1 x 8	5.33333	6.66667	8.	9.33333	10.66667	12.	13.33333	14.66667
1 x 10	6.66667	8.33333	10.	11.66667	13.33333	15.	16.66667	18.33333
1 x 12	8.	10.	12.	14.	16.	18.	20.	22.
1 x 14	9.33333	11.66667	14.	16.33333	18.66667	21.	23.33333	25.66667
1 x 16	10.66667	13.33333	16.	18.66667	21.33333	24.	26.66667	29.33333
1 x 18	12.	15.	18.	21.	24.	27.	30.	33.
1 x 20	13.33333	16.66667	20.	23.33333	26.66667	30.	33.33333	36.66667
1 1/4 x 4	3.33333	4.16667	5.	5.83333	6.66667	7.5	8.33333	9.16667
1 1/4 x 5	4.16667	5.20833	6.25	7.29167	8.33333	9.375	10.41667	11.45833
1 1/4 x 6	5.	6.25	7.5	8.75	10.	11.25	12.5	13.75
1 1/4 x 8	6.66667	8.33333	10.	11.66667	13.33333	15.	16.66667	18.33333
1 1/4 x 10	8.33333	10.41667	12.5	14.58333	16.66667	18.75	20.83333	22.91667
1 1/4 x 12	10.	12.5	15.	17.5	20.	22.5	25.	27.5
1 1/2 x 4	4.	5.	6.	7.	8.	9.	10.	11.
1 1/2 x 5	5.	6.25	7.5	8.75	10.	11.25	12.5	13.75
1 1/2 x 6	6.	7.5	9.	10.5	12.	13.5	15.	16.5
1 1/2 x 8	8.	10.	12.	14.	16.	18.	20.	22.
1 1/2 x 10	10.	12.5	15.	17.5	20.	22.5	25.	27.5
1 1/2 x 12	12.	15.	18.	21.	24.	27.	30.	33.
2 x 4	5.33333	6.66667	8.	9.33333	10.66667	12.	13.33333	14.66667
2 x 6	8.	10.	12.	14.	16.	18.	20.	22.
2 x 8	10.66667	13.33333	16.	18.66667	21.33333	24.	26.66667	29.33333
2 x 10	13.33333	16.66667	20.	23.33333	26.66667	30.	33.33333	36.66667
2 x 12	16.	20.	24.	28.	32.	36.	40.	44.
2 x 14	18.66667	23.33333	28.	32.66667	37.33333	42.	46.66667	51.33333
2 x 16	21.33333	26.66667	32.	37.33333	42.66667	48.	53.33333	58.66667
2 1/2 x 12	20.	25.	30.	35.	40.	45.	50.	55.
2 1/2 x 14	23.33333	29.16667	35.	40.83333	46.66667	52.5	58.33333	64.16667
2 1/2 x 16	26.66667	33.33333	40.	46.66667	53.33333	60.	66.66667	73.33333
3 x 6	12.	15.	18.	21.	24.	27.	30.	33.
3 x 8	16.	20.	24.	28.	32.	36.	40.	44.
3 x 10	20.	25.	30.	35.	40.	45.	50.	55.
3 x 12	24.	30.	36.	42.	48.	54.	60.	66.
3 x 14	28.	35.	42.	49.	56.	63.	70.	77.
3 x 16	32.	40.	48.	56.	64.	72.	80.	88.
4 x 4	10.66667	13.33333	16.	18.66667	21.33333	24.	26.66667	29.33333
4 x 6	16.	20.	24.	28.	32.	36.	40.	44.
4 x 8	21.33333	26.66667	32.	37.33333	42.66667	48.	53.33333	58.66667
4 x 10	26.66667	33.33333	40.	46.66667	53.33333	60.	66.66667	73.33333
4 x 12	32.	40.	48.	56.	64.	72.	80.	88.
4 x 14	37.33333	46.66667	56.	65.33333	74.66667	84.	93.33333	102.66667
6 x 6	24.	30.	36.	42.	48.	54.	60.	66.
6 x 8	32.	40.	48.	56.	64.	72.	80.	88.
6 x 10	40.	50.	60.	70.	80.	90.	100.	110.
6 x 12	48.	60.	72.	84.	96.	108.	120.	132.
6 x 14	56.	70.	84.	98.	112.	126.	140.	154.
6 x 16	64.	80.	96.	112.	128.	144.	160.	176.
8 x 8	42.66667	53.33333	64.	74.66667	85.33333	96.	106.66667	117.33333
8 x 10	53.33333	66.66667	80.	93.33333	106.66667	120.	133.33333	146.66667
8 x 12	64.	80.	96.	112.	128.	144.	160.	176.
8 x 14	74.66667	93.33333	112.	130.66667	149.33333	168.	186.66667	205.33333
10 x 10	66.66667	83.33333	100.	116.66667	133.33333	150.	166.66667	183.33333
10 x 12	80.	100.	120.	140.	160.	180.	200.	220.
10 x 14	93.33333	116.66667	140.	163.33333	186.66667	210.	233.33333	256.66667

Decimal Equivalents for Fractional Parts of a Gross

When commodities are priced per gross, but the quantities are expressed in number of pieces or in dozens and fractional parts of a dozen, a division by 144 is necessary. This table eliminates the division by reducing the problem to simple multiplication.

Example—73 pieces @ \$6.25 per gross. The decimal equivalent opposite 73 is .5069. Multiply .5069 by 6.25. The dials show 3168125. Point off six places—four for the decimal equivalent and two for cents. The answer is \$3.17.

Example—2 11/12 dozen @ \$3.47 per gross. The decimal equivalent of 2 11/12 is .2431. Multiply .2431 by 3.47. The dials show 843557. After pointing off six places, the answer is \$.84.

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
			24	2-	.1667	48	4-	.3333	72	6-	.5	96	8-	.6667	120	10-	.8333
1		.0069	25	2-1	.1736	49	4-1	.3403	73	6-1	.5069	97	8-1	.6736	121	10-1	.8403
2		.0139	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	.375	78	6-6	.5417	102	8-6	.7083	126	10-6	.875
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-	.25	60	5-	.4167	84	7-	.5833	108	9-	.75	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	.125	42	3-6	.2917	66	5-6	.4583	90	7-6	.625	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

Table of Net Decimal Equivalents of Chain Discounts

The net equivalent of a chain discount is the same regardless of the sequence of the separate discounts. For instance, 60-10-5% is the same as 10-5-60%.

In discounting amounts of less than \$10, it is not necessary to use more than four figures of the decimal equivalent.

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

Decimal equivalents not shown in this table may be found as follows:

Rule—Multiply the complements of the discounts. The product will be their net decimal equivalent.

Example: Find the net decimal equivalent for 45-20-10%.

Discounts: .45—.20—.10

Complements: .55 × .80 × .90 = .396, Net Decimal Equivalent.

Reciprocals or Multiplying Equivalents of Divisors from 1 to 1000

Preceding ciphers are omitted in this table. The number of preceding ciphers in any reciprocal is one less than the number of whole figures in the divisor. (The reciprocal of 5 is .2, of 50 is .02, of 500 is .002.)

1	100	200	300	400	500	600	700	800	900
1 1	1 9900 990	1 4975 124	1 3322 259	1 2493 766	1 1996 008	1 1663 894	1 1428 534	1 1248 439	1 1109 878
2	2 9803 922	2 4950 495	2 3311 258	2 2487 562	2 1992 032	2 1661 130	2 1424 501	2 1246 883	2 1108 647
3	3 3333 333	3 9708 738	3 4926 108	3 3300 330	3 2481 390	3 1988 072	3 1658 375	3 1422 475	3 1245 330
4	4 25	4 9615 385	4 4901 961	4 3289 474	4 2475 248	4 1984 127	4 1655 629	4 1420 455	4 1243 781
5	5 1666 667	5 9523 810	5 4878 049	5 3278 689	5 2469 136	5 1980 198	5 1652 893	5 1418 440	5 1242 236
6	6 1428 571	6 9435 794	6 4854 369	6 3267 974	6 2463 054	6 1976 285	6 1650 165	6 1416 431	6 1240 695
7	7 125	7 9259 559	7 4830 918	7 3257 329	7 2457 002	7 1972 387	7 1647 446	7 1414 427	7 1239 157
8	8 1111 111	8 9174 312	8 4784 689	8 3236 246	8 2444 988	8 1968 504	8 1644 737	8 1412 429	8 1237 624
9	9 10	9 8711 909	9 4746 905	9 3225 806	9 2439 024	9 1964 637	9 1642 036	9 1410 437	9 1236 094
10	11 9090 909	11 9009 009	11 4739 336	11 3215 434	11 2433 090	11 1956 947	11 1636 651	11 1406 470	11 1233 068
12	12 8333 333	12 8928 571	12 4716 981	12 3205 128	12 2427 184	12 1953 125	12 1633 987	12 1404 494	12 1231 527
13	13 7692 308	13 8849 558	13 4694 836	13 3194 888	13 2421 308	13 1949 318	13 1631 321	13 1402 525	13 1230 012
14	14 7142 857	14 8771 930	14 4672 897	14 3184 713	14 2415 459	14 1945 525	14 1628 664	14 1400 560	14 1228 501
15	15 6666 667	15 8695 652	15 4651 163	15 3174 603	15 2409 639	15 1941 748	15 1626 016	15 1398 601	15 1226 994
16	16 625	16 8620 690	16 4629 630	16 3164 557	16 2403 846	16 1937 984	16 1623 377	16 1396 648	16 1225 490
17	17 5882 353	17 8547 009	17 4608 295	17 3154 574	17 2398 082	17 1934 236	17 1620 746	17 1394 700	17 1223 990
18	18 5555 556	18 8474 577	18 4587 156	18 3144 654	18 2392 344	18 1930 502	18 1618 123	18 1392 758	18 1222 494
19	19 5263 158	19 8403 361	19 4566 210	19 3134 796	19 2386 635	19 1926 782	19 1615 509	19 1390 821	19 1221 001
20	20 5	20 8333 333	22 4545 455	32 3125	42 2380 952	52 1923 077	62 1612 903	72 1388 889	82 1219 512
21	21 4761 905	21 8264 463	21 4524 887	21 3115 265	21 2375 297	21 1919 386	21 1610 306	21 1386 963	21 1218 027
22	22 4545 455	22 8196 721	22 4504 505	22 3105 590	22 2369 668	22 1915 709	22 1607 717	22 1385 042	22 1216 545
23	23 4347 826	23 8130 081	23 4484 305	23 3095 975	23 2364 066	23 1912 046	23 1605 136	23 1383 126	23 1215 067
24	24 4166 667	24 8064 516	24 4464 286	24 3086 420	24 2358 491	24 1908 397	24 1603 564	24 1381 215	24 1213 592
25	25 4	25 7936 508	25 4444 444	25 3076 923	25 2352 941	25 1904 762	25 16	25 1379 310	25 1212 121
26	26 3846 154	26 7874 016	26 4424 779	26 3067 485	26 2347 418	26 1901 141	26 1597 446	26 1377 410	26 1210 656
27	27 3703 704	27 7812 5	27 4405 286	27 3058 104	27 2341 920	27 1897 533	27 1594 896	27 1375 516	27 1209 190
28	28 3571 429	28 7751 938	28 4385 965	28 3048 780	28 2336 449	28 1893 939	28 1592 357	28 1373 626	28 1207 729
29	29 3448 276	29 7692 308	29 4376 826	29 3039 514	29 2331 002	29 1890 359	29 1589 825	29 1371 742	29 1206 273
30	30 3333 333	31 7692 308	31 4347 826	31 3030 303	43 2325 581	53 1886 792	63 1587 302	73 1369 863	83 1204 819
31	31 3225 806	31 7633 588	31 4329 004	31 3021 148	31 2320 186	31 1883 239	31 1584 786	31 1367 989	31 1203 369
32	32 3125	32 7575 758	32 4310 345	32 3012 048	32 2314 815	32 1879 699	32 1582 278	32 1366 120	32 1202 923
33	33 3030 303	33 7518 797	33 4291 845	33 3003 003	33 2309 469	33 1876 173	33 1579 779	33 1364 256	33 1200 480
34	34 2941 176	34 7462 687	34 4273 504	34 2994 012	34 2304 147	34 1872 659	34 1575 287	34 1362 398	34 1199 041
35	35 2857 143	35 7407 407	35 4255 319	35 2985 075	35 2298 851	35 1869 159	35 1574 803	35 1360 544	35 1197 605
36	36 2777 778	36 7352 941	36 4237 288	36 2976 190	36 2293 578	36 1865 672	36 1572 327	36 1358 696	36 1196 172
37	37 2702 703	37 7299 270	37 4219 409	37 2967 359	37 2288 300	37 1862 197	37 1569 859	37 1356 852	37 1194 743
38	38 2631 579	38 7246 377	38 4201 681	38 2958 580	38 2283 105	38 1858 736	38 1567 398	38 1355 014	38 1193 317
39	39 2564 103	39 7194 245	39 4184 100	39 2949 853	39 2277 904	39 1855 288	39 1564 945	39 1353 180	39 1191 895
40	40 25	40 7142 857	40 4166 667	40 2941 176	40 2272 727	50 1851 852	60 1562 5	70 1351 351	80 1190 476
41	41 2439 024	41 7092 199	41 4149 378	41 2932 551	41 2267 574	41 1848 429	41 1560 062	41 1349 528	41 1189 061
42	42 2380 952	42 7042 254	42 4132 231	42 2923 977	42 2262 443	42 1845 018	42 1557 632	42 1347 709	42 1187 648
43	43 2325 581	43 6993 007	43 4115 226	43 2915 452	43 2257 366	43 1841 621	43 1555 210	43 1345 895	43 1186 240
44	44 2272 727	44 6944 444	44 4098 361	44 2906 977	44 2252 252	44 1838 235	44 1552 795	44 1344 086	44 1184 834
45	45 2222 222	45 6896 552	45 4081 633	45 2898 551	45 2247 191	45 1834 862	45 1550 388	45 1342 282	45 1183 432
46	46 2173 913	46 6849 315	46 4065 041	46 2890 173	46 2242 152	46 1831 502	46 1547 988	46 1340 483	46 1182 033
47	47 2127 660	47 6802 721	47 4048 583	47 2881 844	47 2237 136	47 1828 154	47 1545 595	47 1338 688	47 1180 638
48	48 2083 333	48 6756 757	48 4032 258	48 2873 563	48 2232 143	48 1824 318	48 1543 210	48 1336 898	48 1179 245
49	49 2040 816	49 6711 409	49 4016 064	49 2865 330	49 2227 171	49 1821 494	49 1540 832	49 1335 133	49 1177 856
50	50 2	50 6666 667	25 4	35 2857 143	45 2222 222	55 1818 182	65 1538 462	75 1333 333	85 1176 471
51	51 1960 784	51 6622 517	51 3984 064	51 2849 003	51 2217 295	51 1814 882	51 1536 098	51 1331 558	51 1175 088
52	52 1923 077	52 6578 947	52 3968 254	52 2840 909	52 2212 389	52 1811 594	52 1533 742	52 1329 787	52 1173 709
53	53 1886 792	53 6535 948	53 3952 569	53 2832 861	53 2207 503	53 1808 318	53 1531 394	53 1328 021	53 1172 333
54	54 1851 852	54 6493 506	54 3937 008	54 2824 859	54 2202 646	54 1805 054	54 1529 052	54 1326 260	54 1170 960
55	55 1818 182	55 6451 613	55 3921 569	55 2816 901	55 2197 802	55 1801 802	55 1526 718	55 1324 503	55 1169 591
56	56 1785 714	56 6410 256	56 3906 25	56 2808 989	56 2192 982	56 1798 561	56 1524 390	56 1322 751	56 1168 224
57	57 1754 386	57 6369 427	57 3891 051	57 2801 120	57 2188 184	57 1795 332	57 1522 070	57 1321 004	57 1166 851
58	58 1724 138	58 6329 114	58 3875 969	58 2793 296	58 2183 406	58 1792 115	58 1519 757	58 1319 261	58 1165 501
59	59 1694 915	59 6289 308	59 3861 004	59 2785 515	59 2178 649	59 1788 909	59 1517 451	59 1317 523	59 1164 144
60	60 1666 667	160 625	260 3846 154	360 2777 778	460 2173 913	560 1785 714	660 1515 152	760 1315 789	860 1162 791
61	61 1639 344	61 6211 180	61 3831 418	61 2770 083	61 2169 197	61 1782 531	61 1512 859	61 1314 060	61 1161 440
62	62 1612 903	62 6172 840	62 3816 794	62 2762 431	62 2164 502	62 1779 359	62 1510 574	62 1312 336	62 1160 093
63	63 1587 302	63 6134 969	63 3802 281	63 2754 821	63 2159 827	63 1776 199	63 1508 296	63 1310 616	63 1158 749
64	64 1562 5	64 6097 561	64 3787 879	64 2747 253	64 2155 172	64 1773 050	64 1506 024	64 1308 991	64 1157 407
65	65 1538 462	65 6060 606	65 3773 585	65 2739 726	65 2150 538	65 1769 912	65 1503 759	65 1307 190	65 1156 069
66	66 1515 152	66 6024 096	66 3759 398	66 2732 240	66 2145 923	66 1766 784	66 1501 502	66 1305 483	66 1154 734
67	67 1492 537	67 5988 024	67 3745 318	67 2724 796	67 2141 328	67 1763 668	67 1499 250	67 1303 781	67 1153 403
68	68 1470 588	68 5942 381	68 3731 343	68 2717 391	68 2136 752	68 1760 563	68 1497 006	68 1302 083	68 1152 074
69	69 1449 275	69 5917 160	69 3717 472	69 2710 027	69 2132 196	69 1757 469	69 1494 768	69 1300 390	69 1150 748
70	70 1428 571	70 5882 353	70 3703 704	70 2702 703	70 2127 660	70 1754 386	70 1492 537	70 1298 701	70 1149 425
71	71 1408 545	71 5847 953	71 3690 037	71 2695 418	71 2123 142	71 1751 313	71 1490 313	71 1297 017	71 1148 106
72	72 1388 889	72 5813 953	72 3676 471	72 2688 172	72 2118 644	72 1748 252	72 1488 095	72 1295 337	72 1146 789
73	73 1369 863	73 5780 347	73 3663 004	73 2680 965	73 2114 165	73 1745 201	73 1485 884	73 1293 661	73 1145 473
74	74 1351 351	74 5747 126	74 3649 635	74 2673 797	74 2109 705	74 1742 160	74 1483 680	74 1291 990	74 1144 165
75	75 1333 333	75 5714 286	75 3636 364	75 2666 667	75 2105 263	75 1739 130	75 1481 481	75 1290 323	75 1142 857
76	76 1315 789	76 5681 818	76 3623 188	76 2659 574	76 2100 841	76 1736 111	76 1479 290	76 1288 660	76 1141 553
77	77 1298 701	77 5649 718	77 3610 108	77 2652 520	77 2096 436	77 1733 102	77 1477 105	77 1287 001	77 1140 251
78	78 1282 051	78 5617 978	78 3597 122	78 2645 503	78 2092 050	78			

Table of
Constants for Computing Interest

At rates from $\frac{1}{8}\%$ to $12\frac{7}{8}\%$ on the basis of 360 days in a year
(Amounts in this table represent the interest on \$1.00 for one day.)

		$\frac{1}{8}\%$	$\frac{1}{4}\%$	$\frac{3}{8}\%$	$\frac{1}{2}\%$	$\frac{5}{8}\%$	$\frac{3}{4}\%$	$\frac{7}{8}\%$
0%		.00000347	.00000694	.00001042	.00001389	.00001736	.00002083	.00002431
1%	.00002778	.00003125	.00003472	.00003819	.00004167	.00004514	.00004861	.00005208
2%	.00005556	.00005903	.0000625	.00006597	.00006944	.00007292	.00007639	.00007986
3%	.00008333	.00008681	.00009028	.00009375	.00009722	.00010069	.00010417	.00010764
4%	.00011111	.00011458	.00011806	.00012153	.000125	.00012847	.00013194	.00013542
5%	.00013889	.00014236	.00014583	.00014931	.00015278	.00015625	.00015972	.00016319
6%	.00016667	.00017014	.00017361	.00017708	.00018056	.00018403	.0001875	.00019097
7%	.00019444	.00019792	.00020139	.00020486	.00020833	.00021181	.00021528	.00021875
8%	.00022222	.00022569	.00022917	.00023264	.00023611	.00023958	.00024306	.00024653
9%	.00025	.00025347	.00025694	.00026042	.00026389	.00026736	.00027083	.00027431
10%	.00027778	.00028125	.00028472	.00028819	.00029167	.00029514	.00029861	.00030208
11%	.00030556	.00030903	.0003125	.00031597	.00031944	.00032292	.00032639	.00032986
12%	.00033333	.00033681	.00034028	.00034375	.00034722	.00035069	.00035417	.00035764

Calculation Tables

Below is a partial list of tables that may be obtained from any Burroughs salesman. Each is printed on a separate card.

Reciprocals of numbers from 1 to 1000.

*Reciprocals of numbers from 1 to 10,000 (Book).

Decimal equivalents of common fractions.

Decimal equivalents of fractional parts of a gross.

Decimal equivalents of fractional parts of an hour, fractional parts of a day, and fractional parts of a month.

Months and days expressed in decimal equivalents of a year.

Table of chain discounts—to determine either amount of discount or net amount.

*Constants for computing interest on the basis of 360 days in a year at rates of 1% to 7% in gradations of $\frac{1}{8}\%$ for 1 day to 180 days. Set of 48 tables on 24 cards.

*Constants for computing interest on the basis of 365 days in a year at rates of 2% to 8% in gradations of $\frac{1}{2}\%$ for 1 day to 180 days. Set of 13 tables on 7 cards.

Constants for computing interest on the basis of 360 days in a year at rates of $\frac{1}{8}\%$ to $12\frac{7}{8}\%$ for one day.

Constants for computing interest on the basis of 365 days in a year at rates of $\frac{1}{8}\%$ to $12\frac{7}{8}\%$ for one day.

Payroll tables for calculating overtime.

Decimal equivalents of fractional parts of a bushel.

Lumber table.

Table for figuring steel beams.

Turnover table.

Mark-up table.

Unit cost and selling price table.

Decimal part of a foot for each $\frac{1}{16}$ of an inch.

Temperature correction chart for tank car billing.

*NOTE: A nominal charge is made for the tables designated by the asterisk. Others are gratis.

One User's Philosophy

"When I buy for service, I would rather know the men who guide the firm which makes the machine than listen to wearisome talk about superior materials and brilliant engineering skill.

"I don't know much about those qualities of different metals which make them the best for different purposes—nor do I know anything of the technical laws of mechanical engineering—but I do know human nature.

"I know that a concern with the right ideals of Service to its customers—the concern that has succeeded—has done so because its product has made good with the people who bought it.

"I'll bet on that concern—and I feel content when I have bought its product.

"It isn't good business for me to trade anywhere else. I cannot afford to do so."