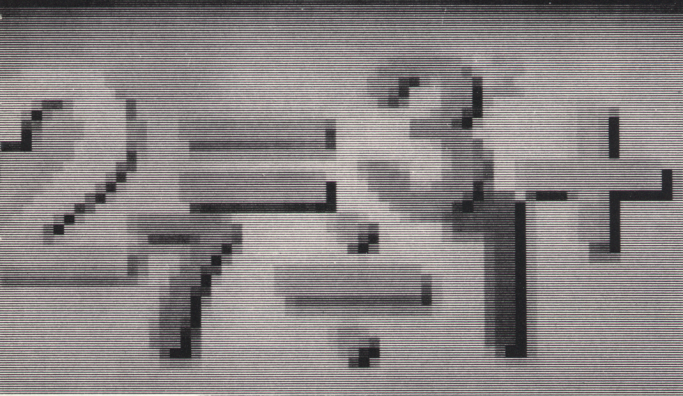# SUCCESS WITH MATH™

Fractions: Addition and Subtraction

User's Manual

CBS
SOFTWARE

Setting up your Computer

Following manufacturer's instructions, hook up your computer to a monitor or TV. Make sure your disk drive or program recorder is connected.

For Disk:
1. Insert the program disk into the disk drive and close the drive door.
2. Turn your computer and monitor on. Adjust the volume on your monitor.
3. a. Apple® and Atari® disk drives will automatically boot disks.
   b. Commodore 64™ users type **LOAD "CBS MATH", 8** and press **[RETURN]**. Then type **RUN** and press **[RETURN]** again.

For Cassette:
1. Insert the program cassette into the program recorder following cassette label instructions.
2. Turn computer and monitor on. Adjust the volume on your monitor.

Atari® Users
3. Make sure BASIC cartridge is in computer.
4. Type **CLOAD** to load the program and push down PLAY button on your program recorder. Press **[RETURN]**.
5. Once program has loaded, type **RUN** and press **[RETURN]**.

Commodore 64™ Users
3. Type **LOAD** and press **[RETURN]**.
4. *New Models Only—*
Wait for program to be found and press [**C=**].
5. After program has loaded, "Ready" will appear on screen. Type **RUN** and press **[RETURN]**.

Program Objective

This SUCCESS WITH MATH™ program provides comprehensive practice in addition and subtraction of fractions with unequal denominators. Further emphasis is placed on improving the user's understanding of the least common denominator and the different procedures used in determining it.

Program Descriptions

Adding Fractions
All problems are generated randomly so that new problems are presented each time the program is run.

The screen is divided into two sections: work area and message/instruction area. When each new problem is presented, the message/instruction area lists three options. For example:

$$\frac{3}{8}$$

$$+$$

$$\frac{5}{6}$$

Choose one (or S to stop)

1) Change to least common denominator
2) Add
3) Reduce

If, as in our example, the denominators of the two fractions to be added are not the same, the user should first choose option 1. The user is asked to enter the correct LCD. If the user is unable to do so after two attempts, the program branches into an explanation of how to find the LCD using two different methods: (a) multiples of the denominators and (b) prime factors. The LCD in this case is 24.

The program then returns to the original problem where the user is asked to enter the correct LCD. After doing so, the user must change the form of each fraction to a fraction with the LCD.

$$\frac{3}{8} \quad \times \quad \frac{()}{()} \quad = \quad \frac{()}{()}$$

$$+$$

$$\frac{5}{6} \quad \times \quad \frac{()}{()} \quad = \quad \frac{()}{()}$$

LCD = 24

The brackets above indicate each of the locations a white square (called a cursor) will appear as, step by step, the user converts each fraction to its correct form. The user enters the multipliers and performs all necessary multiplication. After this procedure is completed, the list of choices reappears and our example then looks like this:

$$\frac{3}{8} \quad \text{x} \quad \frac{3}{3} \quad = \quad \frac{9}{24}$$

$$+ \qquad\qquad\qquad +$$

$$\frac{5}{6} \quad \text{x} \quad \frac{4}{4} \quad = \quad \frac{20}{24}$$

LCD = 24

Choose one (or S to stop)

1) Change to least common denominator
2) Add
3) Reduce

The user may then select option 2, add the two numerators and enter the correct denominator. If the resulting sum $(\frac{29}{24})$ can be reduced, the user is directed to a portion of the program that allows him/her to do so. If the numerator is greater than or equal to the denominator, the user will be able to change the fraction to a whole number or a mixed fraction $(1\frac{5}{24})$.

Subtracting Mixed Fractions
All problems are generated randomly so that a new set of problems is presented each time the program is run.

The screen is divided into two sections: work area and message/instruction area. When each new problem is presented, the message/instruction area contains a list of four options. For example:

$$5\frac{3}{8}$$

$$-$$

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

The user may first choose option 1 if the denominators of the two fractions are not the same. If the user is unable to enter the correct LCD after two attempts, the program branches into an explanation of how to find the LCD. The LCD in this case is 24.

The program then returns to the original problem where the user is asked to enter the corrrect LCD. After doing so, the user must change the form of each fraction to a fraction with the LCD.

$$5\frac{3}{8} \quad \times \quad \frac{()}{()} \quad = \quad 5\frac{()}{()}$$

$$-$$

$$2\frac{5}{6} \quad \times \quad \frac{()}{()} \quad = \quad 2\frac{()}{()}$$

<div align="right">

LCD = 24

</div>

The brackets above indicate each of the locations the cursor will appear as, step by step, the user converts each fraction to its correct form. The user enters the multipliers and performs all necessary multiplication. After this procedure is completed, the list of choices reappears and our example then looks like this:

$$5\frac{3}{8} \quad \times \quad \frac{3}{3} \quad = \quad 5\frac{9}{24}$$

$$-$$

$$2\frac{5}{6} \quad \times \quad \frac{4}{4} \quad = \quad 2\frac{20}{24}$$

<div align="right">

LCD = 24

</div>

Choose one (or S to stop)

1) Change to least common denominator
2) Borrow from whole number part
3) Subtract
4) Reduce fractional part

If, as in our example, the fractional part of the minuend (the first term) is less than the fractional part of the subtrahend (the second term), the user may select option 2 to borrow from the whole number part of the minuend before performing the subtraction. After doing so, the user must redefine the minuend. Our example then looks like this:

$$5\frac{3}{8} \quad x \quad \frac{3}{3} \quad = \quad 5\frac{9}{24} \quad = \quad 4\frac{33}{24}$$

$$-$$

$$2\frac{5}{6} \quad x \quad \frac{4}{4} \quad = \quad 2\frac{20}{24} \quad = \quad 2\frac{20}{24}$$

LCD = 24

The user then selects option 3 from the list of choices and enters the correct numerator, denominator and whole number resulting from the subtraction ($2\frac{13}{24}$). If the final difference can be reduced, the user is directed to a portion of the program that allows him/her to do so.

In both Addition and Subtraction, all errors are called out and explained as they occur and the user may then try a new solution. Errors are divided into three categories: incorrect use of a rule, error in computation and error in determining the Least Common Denominator. The program tracks type and number of errors made and displays the totals on the screen after the solution is reached.

It is important to note that the user must enter the correct answer for each step before the program will continue on to the next step in the solving process. *The user always succeeds in solving the problem and knows exactly where errors have been made.*

Other Programs in the Success with Math™ series from CBS Software:

Addition and Subtraction
Grade Levels 1 to 4

Multiplication and Division
Grade Levels 2 to 8

Fractions: Multiplication and Division
Grade Levels 5 to 8

Decimals: Addition and Subtraction
Grade Levels 5 to 8

Decimals: Multiplication and Division
Grade Levels 5 to 8

Linear Equations
Grade Levels 7 to 11

Quadratic Equations
Grade Levels 9 to 12

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