ALGE-BLASTER!™

For pre-algebra and algebra students

algebra

- **Monomials & Polynomials**
- **Positive/Negative Numbers**
- **Factoring Polynomials & Trinomials**
- **Solving Equations & Systems of Equations**

D *Davidson.*

ALGE-BLASTER! T.M.

by Santa Barbara Softworks
in conjunction with
Davidson & Associates, Inc.

algebra

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INTRODUCTION

Welcome to *Alge-Blaster*!

Alge-Blaster is a comprehensive algebra program for pre-algebra and algebra students. Its emphasis is on understanding the algebraic process and developing the skills to solve problems. It was designed to accomplish three major objectives:

1. to provide a motivating format for improving algebra skills
2. to present the fundamental steps in solving algebraic problems
3. to offer effective practice in applying these steps.

Alge-Blaster contains over 670 problems in five subject areas:

Positive/Negative Numbers
    Add
    Subtract
    Multiply
    Divide

Monomials and Polynomials
    Add Monomials
    Add Polynomials
    Subtract Monomials
    Subtract Polynomials
    Multiply Monomials
    Multiply Polynomials by Monomials
    Multiply Polynomials

Factoring

Find the Greatest Common Factor

Factor Polynomials

Find the Difference of Squares

Factor Trinomials

Factor Polynomials Completely

Equations

Solve the Form x+a=b

Solve the Form ax+b=c

Solve by Factoring

Systems of Equations

Solve by Addition/Subtraction

Solve by Substitution

Alge-Blaster contains three activities:
1. a tutorial which presents sample problems and describes each step in their solutions
2. a practice activity with step-by-step "prompts" available to help you solve the problems
3. a quiz which challenges you to solve the problems on your own.

Alge-Blaster was designed to supplement, not replace, instruction in the classroom. It can be an especially effective in reinforcing the material already presented in class. *Alge-Blaster* will also serve as an excellent review for students who wish to brush up on their algebra before taking a College Board Exam or a higher level math course.

GETTING STARTED

Before you begin using *Alge-Blaster*, please complete and return the registration card. This will register your warranty and ensure that you receive technical support for *Alge-Blaster* and information on updates and new products. Davidson & Associates, Inc. will replace, free of charge, any malfunctioning or damaged disk for a period of **five years** after purchase. The program files are copy protected. You may purchase a back-up copy for $10.00 at the time you send in the registration card, or by writing to Davidson & Associates, Inc.

Starting the APPLE Version

To use *Alge-Blaster*, Apple version, you need:
- an Apple IIc, IIe, or II+ with at least 64K and 1 or 2 drives
- a monitor or tv (color or monochrome)
- the *Alge-Blaster* disk (Program on Side 1, Data on Side 2)
- a printer (optional)
- paper and pencil.

To run the program, follow these steps.
1. Boot the Program (Side 1).
2. After a brief introduction, you will be asked to type your name and to make several option choices. You will be instructed when to turn the disk over and reinsert it, data side up.

Starting the IBM Version

To use *Alge-Blaster,* IBM version, you need:
- an IBM Personal Computer with 1 or 2 disk drives and Color/Graphics Adapter **or** a PCjr with 1 or 2 drives
- 128K and DOS 2.0 or higher
- a monitor (or tv)
- the *Alge-Blaster* disk
- a printer (optional)
- paper and pencil.

To run the program, follow these steps:
1. Insert the DOS disk into the drive and turn on the computer.
2. Enter the date and time.
3. Remove the DOS disk and insert the *Alge-Blaster* disk. At the A>, type **alg** <Return>.
4. After a brief introduction, you will be asked to type your name and make several option choices.

Making *Alge-Blaster* Self-Booting

Alge-Blaster can be made self-booting by transferring the DOS system files and command.com file to the *Alge-Blaster* disk.
1. Boot the DOS disk; enter the date and time.
2. At the A>, type **sys b:** <Return>. Follow any directions on the screen.
3. When the A> reappears, type **copy command.com b:** <Return>.
4. When the A> reappears, the self-booting process is completed.

Note to hard disk users: To make *Alge-Blaster* self-booting if DOS is on a hard disk and you have one floppy drive, at the C> type sys **a:** <Return>. When the C> reappears, type **copy command.com a:** <Return>. When the C> reappears, the self-booting process is completed.

Starting the COMMODORE Version

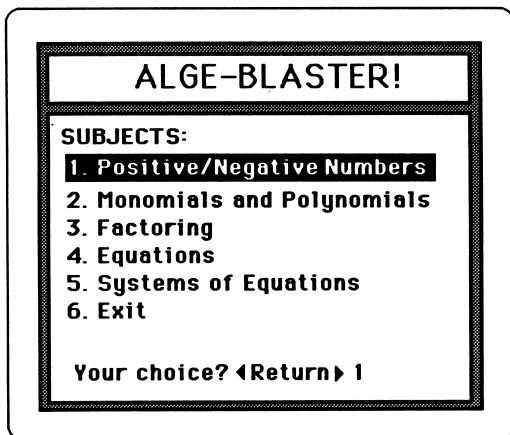To use *Alge-Blaster*, Commodore version, you need:
- a Commodore 64 or 128 computer with a 1541 or compatible disk drive
- a monitor (or tv)
- the *Alge-Blaster* disk (Program on Side 1, Data on Side 2)
- a printer (optional)
- paper and pencil.

To run the program, follow these steps.
1. Be sure that the computer is off and that there is no disk in the disk drive. First, turn on the disk drive; then, turn on the computer. If you are using a Commodore 128, switch it to the 64 mode before you begin.
2. Insert the Program (Side 1) into the disk drive. Type **LOAD"ALG",8** <Return>.
3. When the drive stops, type **RUN** <Return>. Be patient; the program takes about a minute and a half to load.
4. After a brief introduction, you will be asked to type your name and to make several option choices. You will be instructed when to remove the Program disk and reinsert it Data side up.

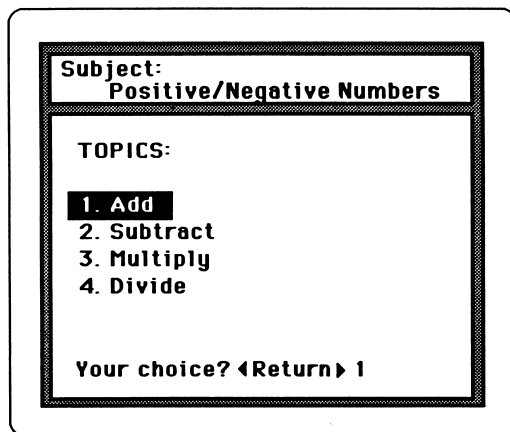# The Menus

The Subject menu will appear on the screen.

```
┌─────────────────────────────────────┐
│  ┌───────────────────────────────┐  │
│  │        ALGE-BLASTER!          │  │
│  ├───────────────────────────────┤  │
│  │ SUBJECTS:                     │  │
│  │ ▐1. Positive/Negative Numbers▌│  │
│  │  2. Monomials and Polynomials │  │
│  │  3. Factoring                 │  │
│  │  4. Equations                 │  │
│  │  5. Systems of Equations      │  │
│  │  6. Exit                      │  │
│  │                               │  │
│  │  Your choice? ◄Return► 1      │  │
│  └───────────────────────────────┘  │
└─────────────────────────────────────┘
```

Select a subject (1-5). You may use <-- and --> arrow keys or enter
a number from the keyboard; press <Return > to enter your choice.

A Topic menu will appear. If you select Positive/Negative Numbers
as your subject, the following choice of topics will appear:

```
┌─────────────────────────────────────┐
│  ┌───────────────────────────────┐  │
│  │ Subject:                      │  │
│  │      Positive/Negative Numbers│  │
│  ├───────────────────────────────┤  │
│  │  TOPICS:                      │  │
│  │                               │  │
│  │  ▐1. Add▌                     │  │
│  │   2. Subtract                 │  │
│  │   3. Multiply                 │  │
│  │   4. Divide                   │  │
│  │                               │  │
│  │                               │  │
│  │  Your choice? ◄Return► 1      │  │
│  └───────────────────────────────┘  │
└─────────────────────────────────────┘
```

After you select a topic, you may choose from these activities.

```
Subject:
 Positive/Negative Numbers
Topic:
 Add

ACTIVITIES:
       1.  Study the Steps
       2.  Build Your Skill
       3.  Solve It
       4.  New Subject
       5.  New Topic
       6.  Exit
Your choice? ◄Return► 1
```

Items 1 through 3 are sequential learning activities. In the next chapter, Using the Program, each activity will be described in detail. Item 4 allows you to select a new subject; item 5 allows you to select a new topic within the same subject, and item 6 allows you to exit the program. You may return to a previous menu at any time by pressing <Esc> (Apple, IBM) or <f1> (Commodore).

USING THE PROGRAM

Once you have selected a subject and a topic, begin with Study the Steps and continue working through the activities in the order they are presented.

Study the Steps

For each of the twenty-one topics, you will see two sample problems. Each problem will be presented along with all the steps for its solution.

```
      (2a+4b-3c)+(c-2b+3a)
      (2a+4b-3c)+(3a-2b+c)
---▶ (2a+3a)+(4b-2b)+(-3c+c)
      (2+3)a+(4-2)b+(-3+1)c=
      5a+2b-2c


            Add Polynomials


         Group like terms.


    ◀-- --▶: Move arrow   ◀Esc▶ Menu
```
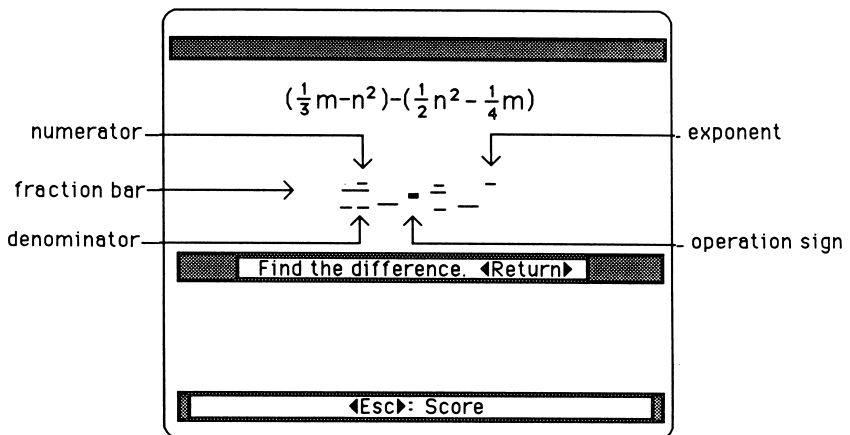
A written description of each step is presented at the bottom of the screen. Press the right arrow key to see the next step. If you wish to return to a previous step, press the left arrow key. It is important that you know and understand the vocabulary used in Study the Steps. The glossary in the back of this manual will help you if you are unsure of any of the vocabulary terms.

Build Your Skill

In this activity, a problem is presented at the top of the screen. Enter your answer using the cursor (represented by a flashing vertical bar) as your guide. Move the cursor to any place in the answer by using the arrow keys. Use the <-- and --> arrow keys to move across a line. Use the vertical arrow keys to move the cursor up or down from one line to the next. (If your computer does not have vertical arrow keys, use <Ctrl>A to move up, and <Ctrl>B to move down.) On the Commodore computer, use the Commodore key with the appropriate arrow key to move the cursor up or to the left.

The horizontal bars indicate the kind of character required.
- A **low** bar indicates that a number or letter is required.
- A **thick** mid-horizontal bar indicates that an operation sign (+ or -) is required.
- A **thin** mid-horizontal bar indicates a fraction.
- A **high** horizontal bar indicates that an exponent is required.

$$(\tfrac{1}{3}m - n^2) - (\tfrac{1}{2}n^2 - \tfrac{1}{4}m)$$

numerator — exponent

fraction bar —

denominator — operation sign

Find the difference. ◄Return►

◄Esc►: Score

You may ask for help by holding down the <Ctrl> key and pressing **P** (for prompt). The first step in the solution will appear. For further help, repeat the process. You may need to use pencil and paper.

$$-3x^2y - (-5xy^2) - x^2y^2$$

$$\blacksquare \_\_ {}^-\_ {}^-\_ {}^-\blacksquare\_\_\_{}^-$$

Find the difference. ◄Return►

$$(-3-1)x^2y^2+5xy^2$$

◄Ctrl► P: Prompt   ◄Esc►: Score

When you reach the end of the file, the scoreboard will appear. Pressing **P** will allow you to print a copy of the scoreboard. *Alge-Blaster* keeps track of the problems you miss and gives you an opportunity to retake them. Retake them until you get a perfect score.

NAME: Chris Davidson DATE: 12/3/85
FILE: Add Monomials

Problems attempted: ☞1 - ☞20
Problems correct: 15
Percentage correct: 75%
Incorrect problems:☞1,☞4,☞5,☞9,☞11

◄Return► to solve more problems.
◄ESC► for menu.
P to print.

Solve It

This activity contains 20 additional problems in the topic area you have selected. These are presented without prompts. When a problem appears on the screen, work the problem on paper, type in the answer and press <Return>. Your correct answers will be reinforced with encouraging messages and graphic displays. When you finish, your score will be displayed, and you may make a printout for your records. Press <Esc> (Apple and IBM) or <f1> ((Commodore) at any time to see your score; you may then resume the lesson or retake missed problems. Retake any problems you miss until you get a perfect score.

Special Features

Positive Reinforcement - Throughout the *Alge-Blaster* program, your correct answers are rewarded with positive, encouraging messages. You are never penalized for an incorrect answer. If your first response is incorrect, you will be asked to "Try again." After a second incorrect response, you may press <Return> to see the correct answer.

Reviewing Items Missed - At the conclusion of the Build Your Skill and Solve It activities, you will have an opportunity to retake the items you missed, allowing you to concentrate your efforts on only those kinds of problems you have not yet mastered.

Sound Effects - *Alge-Blaster* has sound effects which are activated by each correct response in both the Build Your Skill and Solve It activities. You may select this option on the sign-in screen.

Escape Feature - The escape key <Esc> (Apple, IBM) or <f1> (Commodore) allows you to return to the previous menu or leave an exercise at any time during the program. Press the escape key to see your score. You may retake the problems that you have missed, or resume the exercise at the point you left it.

Print Feature - You may make a printout of your score on the Build Your Skill and Solve It activities. Pressing **P** from the Scoreboard screen will give you a printout showing your name, date, problems attempted, number correct, and percentage correct. The printout will also list the numbers of any incorrect problems.

USING THE EDITOR

You can enter your own lists of problems using *Alge-Blaster's* editor. The problems you enter can be used only with the Solve It activity.

To use the editor, you will need:
- the *Alge-Blaster* Disk (Side 1 - Apple, Commodore)
- any disk formatted for your computer.
  Apple - Use DOS 3.3
  IBM - Use the DOS command **format**, followed by the drive designation (i.e.format b:).
  Commodore - type **OPEN15,8,15,"N:A,BB"** <Return>.
  At the cursor, type **CLOSE15** <Return>.

Accessing the Editor

- Insert the *Alge-Blaster* disk in the drive and boot the system.
- Press E (for Editor) while the program is booting. (It may be necessary to tap on the E key if your computer does not have a repeating key feature).
- Indicate the number of drives you are using, and follow the screen prompts to insert your formatted data disk.

Note: Some fast-load cartridges will not allow the editor to work properly on the Commodore. If you have trouble creating or saving a file, remove the cartridge before accessing the editor.

Commands of the Editor

To use the editor, you will need to become familiar with its commands:

--> (right arrow)	to move cursor one space to the right
<-- (left arrow)	to move cursor one space to the left
up arrow or <Ctrl>A	to move cursor up one line
down arrow or <Ctrl>B	to move cursor down one line
<Delete> or <Ctrl>D	to delete to the right of the cursor, one character at a time
<Ctrl>X	to delete to the end of a line
<Ctrl>E	to enter exponent
<Ctrl>F	to enter fraction
<Ctrl>S	to select any character which is to appear as a "given" in the answer
<Ctrl>V	to view problems
<Ctrl>I	to list the commands on the screen

Special Notes on the Editor

Please read the following suggestions before entering your data file.

1. When a problem can have more than one possible configuration, use a "given" in the answer to prevent entering the correct terms in the wrong order. For example: when factoring $a^2 - 4$, either $(a + 2)(a - 2)$ or $(a - 2)(a + 2)$ is correct. Since the computer can accept only one correct answer, make the + appear as a "given" in the first pair of parentheses (_+_)(___). The student will then know in which order the parts of the answer must be entered.

To select a **"given"**, first type in the complete answer. Then, move the cursor to the left of the character that is to be the "given." Press **<Ctrl>** and **S** at the same time, thereby highlighting the character.

Any character that is **not** a letter, numeral, or operation sign (+, -) will automatically appear as a "given" in your answer. For example, in the answer (a + b)(a - b), both pairs of ( ) are automatically supplied in the answer space, but if you wish the + or the - to be provided also, you must perform the steps described above.

2. We recommend using variables such as **a, b, c,** or other full-space characters in your problems. Thin letters such as **i** and **l** and **t** may cause spacing difficulties in the problem.

3. Follow these steps to enter an **exponent** in a problem or answer.
   - Press **<Ctrl>E.**
   - Enter the exponent.
   - Press the right arrow to move the cursor.

4. Follow these steps to enter a **fraction** in a problem or an answer.
   - Press **<Ctrl>F.**
   - Enter the numerator.
   - Press the right arrow to move the cursor.
   - Enter the denominator.
   - Press the right arrow to move the cursor.

5. You may use these special characters in your problems or answers.
   Type @ to get a $\sqrt{}$; type % to get a ÷ ; type * to get a •

Entering the Problems

```
          ALGE-BLASTER!
               EDITOR


     EDITOR OPTIONS:  1

        1. Create New File
        2. Load Existing File

     Your choice? ‹Return› 1
```
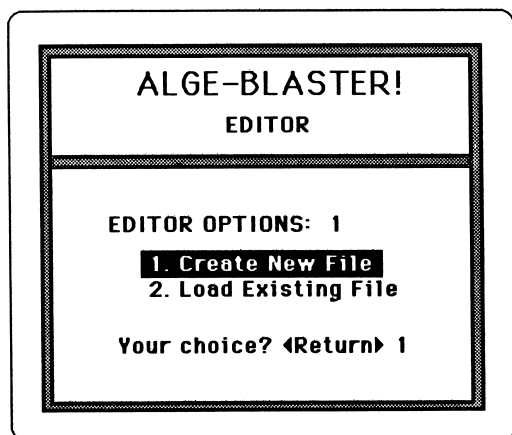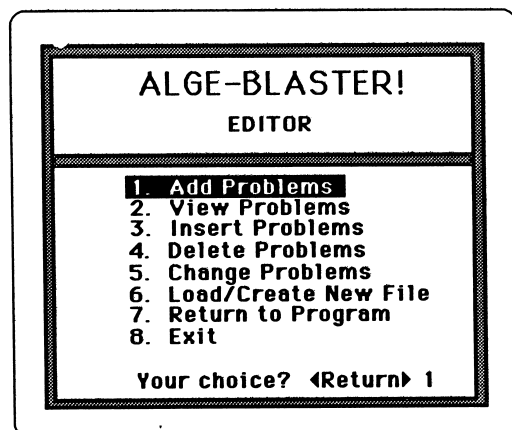
From the editor option screen, select **1. Create New File.** Enter
a name for your file <Return>. You may enter 20 problems in a file.
APPLE - 18 characters and spaces maximum
IBM - 8 characters with no spaces
COMMODORE - 15 characters and spaces

The following menu will appear on the screen:

```
          ALGE-BLASTER!
               EDITOR

        1.  Add Problems
        2.  View Problems
        3.  Insert Problems
        4.  Delete Problems
        5.  Change Problems
        6.  Load/Create New File
        7.  Return to Program
        8.  Exit

     Your choice?  ‹Return› 1
```

Select **1. Add Problems.** The screen will look like this.

```
This is problem ✱ 1
|


Answer:




Ctrl I(nstructions)   Add Problems
```

- Enter a problem <Return>. You may use 2 lines per problem.
  If you use only the first line, press <Return> a second time.
- Enter the answer <Return>. You may use 2 lines per answer.
  If the answer occupies only the first line, press <Return> a
  second time.

When all your problems have been entered, press **<Esc>** (Apple,
IBM) or **<f1>** (Commodore) to return to the Editor menu. Do not
skip this step. Pressing **<Esc>** or **<f1>** will save your entire file to
the disk.

To view your new file, Select **2. View Problems** from the Editor
menu. You may view all the problems or ask for a specific problem
by number. Use the right arrow key to view the next problem or the
left arrow key to view the previous problem.

Editing a File

You may make corrections in a file by accessing the editor options
screen and selecting **2. Load Existing file.** Choose the file
you wish to load into memory.

To make a change in a problem or correct an error, select **5.Change
Problems,** from the Editor menu. Type in the number of the
problem you want to correct and press <Return>. When the problem
appears, press <Return> again to activate the cursor.

To insert a problem into your file, select **3. Insert Problems.** After
problem #1 appears on the screen, you will be asked for a new
problem number. If, for example, you wish to insert a new problem
in your list between #2 and #3, type 3. Problem #3 will appear on the
screen. Press <Return> again; that problem will automatically become
problem #4, allowing you a blank space in which to enter a new
problem #3. When you have finished, press <Esc> (Apple, IBM) or
<f1> (Commodore) to return to the Editor menu. Be sure to press
<Esc> or <f1>. This saves your change on the disk.

To delete a problem, select **4. Delete Problems,** from the Editor
menu. Enter the number of the problem you wish to delete. When the
problem appears, you will be asked "Are you sure? Y/N." If you type
Y, the problem will be deleted and the problems following it will be
renumbered. Press <Esc> or <f1> to save your changes to the disk
and return to the Editor menu.

Using Your New File

Follow these steps to use your new file with the *Alge-Blaster* program.

- Boot the *Alge-Blaster* disk.
- When you are asked to insert the data disk, insert the disk which contains the data file you wish to access.
- A list of the files you have entered will be displayed.
- Type the number of the file you wish to use.

You may use your new file only with the Solve It activity.

NOTE TO TEACHERS

Alge-Blaster has been used extensively in our testing lab as well as in the classroom. The following suggestions are from teachers who have tested and used *Alge-Blaster*.

Building a Math Vocabulary - To get the most out of *Alge-Blaster*, students need to understand clearly the meanings of all of the math vocabulary words used in the Study the Steps activity. The glossary at the end of the manual is a handy reference. Making flash cards, playing word games, or even using the editor of *Word Attack*, another Davidson software program, to enter and study the words are all effective ways students can learn the necessary math vocabulary.

Class Presentation - Teachers were most successful in presenting *Alge-Blaster* after they had covered the material in class. *Alge-Blaster* was also used for diagnostic (pre and post) testing, as an incentive or reward for completing homework, as a review before tests, and to help students who had been absent from class. Teachers also found it helpful to collect the score report printouts, showing specific problems missed during each session. Students then began the next session by retaking the problems missed.

Editor - You can create, or have your students create, sets of problems to meet the particular needs of your class or of individual students.

GLOSSARY

Additive inverse - An additive inverse is the opposite of a number or a variable (letter). One number is the additive inverse of another when their sum equals 0.

For example, **10** is the additive inverse of **-10**.

Base - In an exponential expression, the base is the value which is being multiplied by itself.

For example, **3** is the base in the expression 3^2.

Binomial - A binomial expression is an expression consisting of two terms separated by a + or - sign.

For example, **5a - 6** and **3x + 2y** are binomials.

Binomial Factor - A binomial factor is a binomial which is one factor of a polynomial expression.

For example, **(x + 2)** and **(x + 1)** are the binomial factors of $x^2 + 3x + 2$.

Coefficient - A coefficient is usually the numerical factor of a term. In the term **5x**, **5** is the numerical coefficient of **x**. See also: "literal coefficient."

Constant - A constant is a symbol (usually a number) which always represents the same value.

Examples: **4, 32,** and **102** are constants.

Denominator - The denominator is the number below the dividing line in a fraction.

In the fraction **5/6, 6** is the denominator.

Distribution - Distribution is the method by which a product is written as a sum or difference.

Examples: product--> **6(b + c)** = **6b + 6c** <--sum

product--> **3(a - b)** = **3a - 3b** <--difference

Equation - An equation is a statement of equality. The values on each side of the equal sign are of the same value.

For example, in **4x = 20**, the value of **4 times x** equals 20.

Exponent - An exponent is a symbol placed to the right of and above a base number or variable. It represents the number of times to multiply the base by itself. See also: "power."

For example, in 3^2, the **2** is the exponent.

***Rules for multiplying exponents:

1) If the terms include exponents of the same base, keep the base and add the exponents.
   Example: $(a^2)(a^3) = a^5$
2) When raising the power of a term with an exponent, keep the base and multiply the exponents. If there is a coefficient, raise its power also.
   For example: $(3a^3)^2 = 9a^6$.

Expression - An expression is any group of terms connected by addition or subtraction signs.

For example: **3 + 4, 3x - 1, 5a + b - c.**

Factor - A factor is any number or variable (letter) to be multiplied to form a product.

For example, **2a** and **3** are factors in the equation **2a(3) = 6a**

Factoring - Factoring is the process of separating the factors of a product.

For example, **3** and **x** are factors of **3x**.

FOIL method - Each letter stands for the order in which binomial terms are multiplied.

First **(a + b)(c + d)**, Outer **(a + b)(c + d)**, Inner **(a + b)(c + d)**, Last **(a + b)(c + d)**.

Greatest Common Factor (GCF) - The greatest common factor is the largest monomial term which is a factor of all the numbers or variables in the problem.

Example: **5a** is the greatest common factor in the expression **10a + 5ab**.

Inverse - An inverse is the opposite of a number or variable.

For example, **3** and **-3, a** and **-a** are inverses.

Inverse operations - Inverse operations are those operations that "undo" each other.

For example, addition and subtraction are inverse operations.

Integer - An integer is a positive or negative whole number, including 0.

Examples: **-12, -2, 0, 5, 29** are all integers.

Like terms - Like terms are terms which have the same variable or variables, sometimes called "similar terms."

Example: **x** and **4x** are like terms; **b** and **3c** are unlike terms.

Linear equation - A linear equation is any equation which can be written in the form ax+by=c, where a, b, and c are real numbers.

Example: **7x + 2y = 20**.

Literal coefficient - A literal coefficient is the literal (letter) factor, or product of the literal factors of a term.

For example, in the term **5xy**, **xy** is the literal coefficient and **5** is the numerical coefficient.

Magnitude - Magnitude means greatness of size.

For example, **4** has a greater magnitude than **2**.

Monomial - Monomial means one term. The term may be either a numeral or a variable, or a product of both.

For example, **x, 5, 5x**, and **5xy²** are all monomials.

Multiplicative inverse - One number is the multiplicative inverse of another when their product equals 1. Another name for the multiplicative inverse is "reciprocal."

For example, **1/2** is the multiplicative inverse of **2**.

Negative number - A negative number is any number which is to the left of zero on the number line and whose value is less than zero. Negative numbers are preceded by a minus sign (-).

Examples: **-5, -8, -1/2**.

Numerator - The numerator is the number above the dividing line in a fraction.

   In the fraction **5/6, 5** is the numerator.

Numerical Coefficient - The numerical coefficient is the "number" factor of a term.

   In the term **5xy, 5** is the numerical coefficient and **xy** is the literal coefficient.

Order (same order) - Expressions are usually written with the terms arranged in alphabetical order with the highest exponents first.

   Example: $4x^2 - 2xy + 2y^3 + 7$.

Polynomial - Polynomials are two or more monomial terms connected by plus or minus signs.

   Example: **6x + 5y - 3**.

Positive number - A positive number is a number which is greater than zero. Positive numbers may be preceded by a plus sign (+). A number which is not preceded by any sign is assumed to be positive.

   Examples: **3, 14, 345**.

Power - A power is a number which denotes how many times to multiply the base by itself. See also: "exponent."

   For example, a^3 would be **a • a • a**.

Real number - A real number is any number on the number line.

   Examples: **2, .7, 0, -.3972, -1/2**.

Reciprocal - One number is the reciprocal of another when their product equals 1. See also: "multiplicative inverse."

For example, **1/2** is the reciprocal of **2**.

Sign - A sign is a symbol used to indicate positive or negative numbers. A plus sign (+) in front of a number shows that it is greater than zero, or positive. A minus sign (-) in front of a number shows that it is less than zero, or negative.

Square root - The square root is the factor of a number which, when multiplied by itself, results in that number.

For example, **3** is the square root of **9**, since **(3)(3) = 9**.

System of equations - A system of equations contains a set of linear equations with the same variables.

Example: $x + y = 7$ and $x - y = 3$.

Term - A term can be a number or variable (letter), or the product or quotient of numbers and variables.

Examples: **3, y, 5xy, 2/7x**.

Trinomial - A trinomial is an expression with three terms.

Example: $4x^2 + 2x + 3$.

Variable - A variable is a symbol (usually a letter) which is used to represent an unknown value.

In the equation $5x = 25$, x is the variable.

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Dr. Jan Davidson's principal objective in founding Davidson and Associates, Inc. was to provide high quality educational software that adheres to fundamental, proven teaching criteria. Programs currently published by Davidson & Associates, Inc. are *Speed Reader II, Word Attack!, Math Blaster!, Spell It!, Grammar Gremlins, Homeworker,* and *Classmate.* Many have won national recognition for high quality and excellent sales.

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SANTA BARBARA SOFTWORKS

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IBM HARD DISK INSTRUCTIONS

To install Alge-Blaster onto your hard disk:
- Boot the hard disk as usual.
- Insert the **Alge-Blaster** disk into Drive A.
- At the C>, type **a:hdinstal c:** and press <Enter>. (If your hard disk is not C, type in the correct designator in place of C.) A subdirectory named **alg** will be created and all the files copied into it.

To run Alge-Blaster from the hard disk:
- Boot your computer as usual.
- At the C>, type **cd alg** and press <Enter>. This will access the Alge-Blaster subdirectory.
- Type **alg**. (The program will ask you to insert the key disk briefly the first time you run the program after booting.)

To save your own data files to the hard disk:
- Using DOS 2.1 or more, create a special subdirectory for your own files by typing, at the C>, **mkdir\alg\mydata**
  Note: Make sure you do **not** put them in the **alg** subdirectory with the program's regular data files.
- When the Editor asks for the location of your data, **\alg\mydata** is the pathname you will enter.

APPENDIX
Positive/Negative Numbers
Add - Build Your Skill

8+(–9)=–1
–5+7=2
11+(–15)=–4
71+(–52)=19
11 1/6+(–15 1/2)=–4 1/3
6+(–5)+(–11)=–10
–9+13(–10)+7=1
–15+(–21)+16=–20
25+(–75)+625+(–50)=525
6.1+(–7.01)+(–9.9)=–10.81

Add - Solve It

55+78=133
–6+(–7)=–13
–15+(–23)=–38
22+7+15=44
–8+(–9)+(–5)=–22
125+51+201=377
–215+(–2015)+(–15)=–2245
–206+400=194
–6 1/4+(–5 3/4)=–12
4+11 1/5+7 2/5=22 3/5
–7 1/2 +5 1/3=–2 1/6
–7 1/6+(–11 5/6)+(–3 1/3)=–22 1/3
–16.23+(–11.3)=–27.53
–101.1+80.6=–20.5
–5.1+(–31.6)+(–16.8)=–53.5
–107+(–29)+47=–89
21 1/5+(–16 2/5)+19=23 4/5
–7 1/2+(–3 1/3)+4 1/2=–6 1/3
720+(–360)+(–473)+15=–98
.006+(–1.1)+(–.07)=–1.164

Subtract - Build Your Skill

9–(+5)=4
11–(+15)=–4
106–(+77)=29
55–(+70)=–15
39–(+43)=–4
8–(–13)=21
–16–(–27)=11
–31–(–23)=–8
–126–(–49)=–77
31.9–(–6.7)=38.6

Subtract - Solve It

10–(+7)=3
15–(–9)=24
–23–(+17)=–40
–16–(+8)=–24
–7–(–5)=–2
–42–(–21)=–21
98–(–29)=127
19–(–62)=81
607–(+49)=558
–136–(–47)=–89
87–58=29
–531–(–107)=–424
4 3/4–1 1/4=3 1/2
13 1/3–(4 2/3)=8 2/3
9 1/2–(–2 1/4)=11 3/4
–6 1/3–(–2/3)=–5 2/3
–16.6–(+7.4)=–24
63.8–(–31.7)=95.5
–27.7–(–36.6)=8.9
–106.5–(–29.9)=–76.6

Multiply - Build Your Skill

(25)(5)(10)=1250
(4/5)(2/3)(7/8)=7/15
(.01)(2.7)=.027
(-8)(-7)=56
(-1/7)(-2/9)=2/63
(7)(-3)=-21
(23)(-6)=-138
(-11)(-2)(-3)=-66
(100.1)(-.3)=-30.03
(250)(-5)(-10)(-4)=-50000

Multiply - Solve It

(4)(7)=28
(-3)(-2)=6
(11)(8)=88
(-9)(8)=-72
(2)(5)(6)=60
(5)(-4)(2)=-40
(-13)(-5)=65
(9)(3)(4)=108
(10)(100)(4)=4000
(-6)(-4)(-2)(-1)=48
(-10)(-6)(-2)(-3)=360
(-33)(-2)(-3)(-5)=990
(3/7)(-2/3)=-2/7
(-6/11)(-5/12)(-6/7)=-15/77
(7 1/2)(3 1/3)=25
(-8/9)(-3/4)(-2/3)(-1/4)=1/9
(-2.4)(1.1)=-2.64
(-2.1)(-3.01)=6.321
(6.1)(2.2)=13.42
(-1.2)(-.2)(-.1)(-3)=.072

Divide - Build Your Skill

$25 \div 5 = 5$
$2/3 \div 4/7 = 7/6$
$412 \div .4 = 1030$
$(-33) \div (-11) = 3$
$(-4/5) \div (-8/9) = 9/10$
$(-3.76) \div (-.004) = 940$
$(-7/11) \div (-49/44) = 4/7$
$(-18) \div 3 = -6$
$(-10.8) \div (.02) = -540$
$9/22 \div (-15/11) = -3/10$

Divide - Solve It

$8 \div 2 = 4$
$48 \div 16 = 3$
$(-15) \div (-3) = 5$
$(-10) \div (2) = -5$
$(14) \div (-7) = -2$
$(-12) \div (-3) = 4$
$(36) \div (-12) = -3$
$125 \div 25 = 5$
$(-64) \div (-4) = 16$
$1000 \div 20 = 50$
$169 \div 13 = 13$
$(-20) \div (-25) = 4/5$
$(-196) \div (14) = -14$
$(-625) \div (-125) = 5$
$850 \div (-25) = -34$
$(3/4) \div (-3/16) = -4$
$11/15 \div 22/25 = 5/6$
$7.2 \div 3 = 2.4$
$(4.2) \div (-6) = -.7$
$(-60.4) \div (-.2) = 302$

Monomials and Polynomials

Add Monomials - Build Your Skill

$11b+2b+7b=20b$

$3x+y+2x+5y=5x+6y$

$.63c+.1c+2.2c=2.93c$

$11b^3+b^2+9b^3=20b^3+b^2$

$4x^2y+6xy^2+7x^2y+11xy^2=11x^2y+17xy^2$

$2.6ab+4.5ab=7.1ab$

$20c^2+35c+15c^2+5c=35c^2+40c$

$1/4bc+1/5bc=9/20bc$

$6x^3y^2+4x^2y^3+3x^3y^2+7x^2y^3=9x^3y^2+11x^2y^3$

$8a^2+14a+6a^2+7a=14a^2+21a$

Add Monomials - Solve It

$6a^2+a^2=7a^2$

$13a+4a+5a=22a$

$8x+2 1/2x=10 1/2x$

$4.1xy+7.9xy=12xy$

$2/3y^2+1/2y^2=1 1/6y^2$

$17z+6 1/3z=23 1/3z$

$8.6y+7.5y=16.1y$

$16x+5x+17x=38x$

$25x^2y^2+10x^2y^2=35x^2y^2$

$1/3x^2+1/5x^2=8/15x^2$

$41m^2n^2+26m^2n^2=67m^2n^2$

$7x+2y+4x+8y=11x+10y$

$5x+2y+7x+11y=12x+13y$

$15a^2+21a+7a^2+13a=22a^2+34a$

$.3a^2b+ab+4.7a^2b+6.1ab=5a^2b+7.1ab$

$17b^3+b^2+8b^3=25b^3+b^2$

$11a^2+27a+9a^2+14a=20a^2+41a$

$7x^3y^2+3x^2y^3+4x^3y^2+2x^2y^3=11x^3y^2+5x^2y^3$

$11x^2y+4xy^2+5x^2y+6xy^2=16x^2y+10xy^2$

$m^2n+.3mn+.7m^2n+.9mn=1.7m^2n+1.2mn$

Add Polynomials - Build Your Skill

$(2a+4)+(a+7)=3a+11$

$(3a^2-2ab)+(a^2+ab+b)=4a^2-ab+b$

$(8c+6cd-d)+(2d-c-cd)=7c+5cd+d$

$(6.3m-.8)+(2.1m+6.3)=8.4m+5.5$

$(1/2x+2/3y)+(1/3x-1/3y)=5/6x+1/3y$

$(.3x+y)+(5x+2y-z)=5.3x+3y-z$

$(4m^2-3mn)+(-3m^2+mn)=m^2-2mn$

$(1/2x^3+2/3x+1)+(6-1/2x^2+1/4x)=1/2x^3-1/2x^2+11/12x+7$

$(.8z^2+4.1z)+(.9z-5z^2)=-4.2z^2+5z$

$(9a^2-5b^2)+(6a^2-7ab+b^2)=15a^2-7ab-4b^2$

Add Polynomials - Solve It

$(3b+7)+(b+8)=4b+15$

$(5x+1)+(6+x)=6x+7$

$(6x^2-2x+1)+(x^2-1)=7x^2-2x$

$(y^2-1)+(16-8y+y^2)=2y^2-8y+15$

$(a^2+2a-6)+(7-a^2)=2a+1$

$(4ab-15)+(a^2b^2+6ab-1)=a^2b^2+10ab-16$

$(5x^2-7xy)+(x^2+4xy+y^2)=6x^2-3xy+y^2$

$(a^2b+ab^2)+(ab-a^2b-ab^2)=ab$

$(4a+7ab-b)+(-a-ab+2b)=3a+6ab+b$

$(6mn+5m^2)+(11m^2-4mn)=16m^2+2mn$

$(x^2y-xy)+(xy^2+xy+y^2)=x^2y+xy^2+y^2$

$(.6a+.2b-c)+(.4c-8a)=-7.4a+.2b-.6c$

$(.6x+y)+(7x+4y-3z)=7.6x+5y-3z$

$(3m^2-7n^2)+(m^2-9mn+9n^2)=4m^2-9mn+2n^2$

$(x^4+3x^3-x)+(2x^2-6x^3+7)=x^4-3x^3+2x^2-x+7$

$(4.3x-.7)+(7.8x+6.4)=12.1x+5.7$

$(.6z^2+3.7z)+(.4z-9z^2)=-8.4z^2+4.1z$

$(1/3x-1/4y)+(1/4x+3/4y)=7/12x+1/2y$

$(.7z^2+6.2z)+(.8z-12z^2)=-11.3z^2+7z$

$(2/5m-3/7n)+(1/3m+5/7n)=11/15m+2/7n$

Subtract Monomials - Build Your Skill

$5a-12a=-7a$

$16c-8d-4c-(-d)=12c-7d$

$4.6a-(-1.7a)-2b-(-b)=6.3a-b$

$1/2m^2-n^2-(-1/3m^2)-(-1/2n^2)=5/6m^2-1/2n^2$

$11a^2b^2-(-3a^2b^2)-(-a^2b)=14a^2b^2+a^2b$

$51x-16y-16x-(-5y)=35x-11y$

$a^2b-4ab^2-2a^2b=-a^2b-4ab^2$

$-4a^2-(-.6a)-7.1a=-4a^2-6.5a$

$1/7mn-(-1/14mn)-mn=-11/14mn$

$-3x^2y^2-(-5xy^2)-x^2y^2=-4x^2y^2+5xy^2$

Subtract Monomials - Solve It

$11a-7a=4a$

$7x-5x=2x$

$6x-y-x=5x-y$

$22a-11b-2a=20a-11b$

$4m^2-2m^2-(-6m^2)=8m^2$

$6n^3-4n^2-n^3=5n^3-4n^2$

$24c-9d-16c-(-2d)=8c-7d$

$4a^2b^2-(-8a^2b^2)-(-ab^2)=12a^2b^2+ab^2$

$37x-28y-14x-(-7y)=23x-21y$

$7m^2n-6mn^2-4m^2n=3m^2n-6mn^2$

$-x^2-(-y^2)-(-x^2y^2)-y^2=-x^2+x^2y^2$

$4x^2y^2-(-9xy^2)-2x^2y^2=2x^2y^2+9xy^2$

$3.6x-.8x-(-2.lx)=4.9x$

$-7a^2-3.7a-(-.8a)=-7a^2-2.9a$

$.4x-.3y-(2.7x)-(-y)=-2.3x+.7y$

$2.5x-(-1.6x)-3y-(-y)=4.1x-2y$

$3/5xy-(-2/5xy)-1/3xy=2/3xy$

$2/5mn-(-3/10mn)-mn=-3/10mn$

$1/3x^2-(-1/2y^2)-2x^2-y^2=-5/3x^2-1/2y^2$

$1/2m^2-(-1/3n^2)-m^2-n^2=-1/2m^2-2/3n^2$

Subtract Polynomials - Build Your Skill

$(3a+b)-(4a+2b)=-a-b$
$(5m-15)-(2m-6)=3m-9$
$(x^2-xy+3y^2)-(-y^2+4xy)=x^2-5xy+4y^2$
$(1/5x+1/3y)-(2/3y+2/5x)=-1/5x-1/3y$
$(.9a-2.1b)-(.8a+.8b)=.1a-2.9b$
$(6x-3y+2z)-(4z-5y+x)=5x+2y-2z$
$(4n^2+n-1)-(2n^2+1)=2n^2+n-2$
$(.6a-b)-(2a-3ab+.7b)=-1.4a+3ab-1.7b$
$(6z^2-10)-(7z^2+6z-2)=-z^2-6z-8$
$x^2+y^2-(x^2-y^2)=2y^2$

Subtract Polynomials - Solve It

$(x+y)-(x-y)=2y$
$(5a+2b)-(3a+b)=2a+b$
$(x-5)-(x+7)=-12$
$(y^2+z^2)-(y^2-z^2)=2z^2$
$(7c-17)-(5c-11)=2c-6$
$(a^2+b)-(b-a^2)=2a^2$
$(4x^2+x-3)-(3x^2+1)=x^2+x-4$
$(m^2-mn+5n^2)-(-n^2+7mn)=m^2-8mn+6n^2$
$(4a^2b-b^2)-(b^2+ab^2-a^2b)=5a^2b-ab^2-2b^2$
$(9xy-x^2y^2)-(x^2y^2+xy-y)=-2x^2y^2+8xy+y$
$(x^2y-xy)-(-x^2-x^2y+2xy)=x^2+2x^2y-3xy$
$(4m^2+2mn)-(7m^2n-3m^2)=7m^2-7m^2n+2mn$
$(mn-1)-(m^2n^2+mn-n^2-1)=-m^2n^2+n^2$
$(3x-4y+7z)-(5z-8y+x)=2x+4y+2z$
$(6a^2-9)-(4a^2+3a-5)=2a^2-3a-4$
$(.7x-y)-(3x-6xy+.4y)=-2.3x+6xy-1.4y$
$(3.3a^2-.6a)-(1.4a-a^2)=4.3a^2-2a$
$(.4a-3.7b)-(.3a+.7b)=.1a-4.4b$
$(1/3c+1/5d)-(2/5d+1/2c)=-1/6c-1/5d$
$(1/3m-n^2)-(1/2n^2-1/4m)=7/12m-3/2n^2$

Multiply Monomials - Build Your Skill

$(3y^2)(-4y)=-12y^3$
$(5b^2)(-5b)^2=125b^4$
$(3ab)^2(2a^3b)^3(-2a)=-144a^{12}b^5$
$(1/6x^3)(12x)(-2x^3)=-4x^7$
$(0.2m^2)(4m^2)(5m)=4m^5$
$(4ab)(a^2b)=4a^3b^2$
$(11m)(-2n)(3mn)=-66m^2n^2$
$(1/2n)(2/3n^2)(1/3n^3)=1/9n^6$
$(a^2)^2(3a)=3a^5$
$(3x)^2(x^2)^3=9x^8$

Multiply Monomials - Solve It

$(x^2)(x^3)=x^5$
$(a^3)(a)(a^4)=a^8$
$y(y^4)=y^5$
$(b^2)(b)(b^3)=b^6$
$(2x)(-xy)=-2x^2y$
$(x^2y)(xy^2)=x^3y^3$
$(7x^2y)(-xy^2)=-7x^3y^3$
$(z^2)(-z)(-z^3)(-z^4)=-z^{10}$
$(-k^2)(k)(k^2)^4=-k^{11}$
$(mn^2)(2mn)(m^3n)=2m^5n^4$
$(m^2n^3)^2(mn)=m^5n^7$
$(4b)(-2b^2)^3=-32b^7$
$(4xy)(-2x^2)(-3xy^2)^2=-72x^5y^5$
$(1/3m)(2/3n)(mn^2)=2/9m^2n^3$
$(4x^2y)^2(3x)^3=432x^7y^2$
$(4.1x)(-.6x)(x^2)=-2.46x^4$
$(-.7y)(-4.3y)(y^2)=3.01y^4$
$(-1/9x)(x^2y)^2(3y)^3=-3x^5y^5$
$(xyz)(-x^2z)(yz^2)(2z)^2=-4x^3y^2z^6$
$(.1n)^2(-4n)(m^2)=-.04m^2n^3$

Multiply Polymonials by Monomials - Build Your Skill

$a^2(2a+5)=2a^3+5a^2$
$-x^2(3x^2-2x^4)=-3x^4+2x^6$
$4r^2s(3r^2s^2-4rs+3)=12r^4s^3-16r^3s^2+12r^2s$
$-9z(-3+8z-9z^2)=27z-72z^2+81z^3$
$2n^2(mn-m^2n+mn^2)=2mn^3-2m^2n^3+2mn^4$
$3xy(x^2-2y^2)=3x^3y-6xy^3$
$1/3x(x^2-1/2x+1/4)=1/3x^3-1/6x^2+1/12x$
$-6.1y(3-.2y-.1y^2)=-18.3y+1.22y^2+.61y^3$
$-5x^2y(3x+4xy^2-6y)=-15x^3y-20x^3y^3+30x^2y^2$
$5.2c^2(.3-1.2c+c^2)=1.56c^2-6.24c^3+5.2c^4$

Multiply Polynomials by Monomials - Solve It

$5(x-6)=5x-30$
$4(a+b)=4a+4b$
$x(xy-1)=x^2y-x$
$3z(z^2-z)=3z^3-3z^2$
$.2(m-2n)=.2m-.4n$
$b(b^2-2b+3)=b^3-2b^2+3b$
$6m(m^2-2m+1)=6m^3-12m^2+6m$
$-4y(y^3+7y^2-4y-1)=-4y^4-28y^3+16y^2+4y$
$3x(2x^2+4x-5)=6x^3+12x^2-15x$
$-11a^2(ab-2b^2)=-11a^3b+22a^2b^2$
$ab(a^2-ab-b^2)=a^3b-a^2b^2-ab^3$
$-5y^3(7y^2-3y+4)=-35y^5+15y^4-20y^3$
$-1/2y(6y^3-4y+12)=-3y^4+2y^2-6y$
$5m^2n(-m^2+2mn+n^2)=-5m^4n+10m^3n^2+5m^2n^3$
$3/4cd(8c^2-16c+24)=6c^3d-12c^2d+18cd$
$2x^2y(3x^2y+7xy^2-6xy)=6x^4y^2+14x^3y^3-12x^3y^2$
$-m^2n^3(-2m^2n+mn^3-5mn^2)=2m^4n^4-m^3n^6+5m^3n^5$
$6x^2y^3(2x^2-3xy-6y^2)=12x^4y^3-18x^3y^4-36x^2y^5$
$1/5mn(-50m^2n+5mn+25m-5n)=-10m^3n^2+m^2n^2+5m^2n-mn^2$
$3.1z^2(-.2y^2z+2yz^2+z^3)=-.62y^2z^3+6.2yz^4+3.1z^5$

Multiply Polynomials - Build Your Skill

$(a+b)(a+c)=a^2+ab+ac+bc$
$(2x+1)(x-2)=2x^2-3x-2$
$(2y-1)(y^2+6y-9)=2y^3+11y^2-24y+9$
$(2y+3)(y-2)=2y^2-y-6$
$(9-2y)(4+3y)=36+19y-6y^2$
$(2y+3)^2=4y^2+12y+9$
$(a+5)(a^2-5a+3)=a^3-22a+15$
$(2n-3)(3n+1)=6n^2-7n-3$
$(6n^2-7)(7+6n^2)=36n^4-49$
$(2m^2+m-2)(m^2+3m+5)=2m^4+7m^3+11m^2-m-10$

Multiply Polynomials - Solve It

$(x+2)(x+1)=x^2+3x+2$
$(y-1)(y+3)=y^2+2y-3$
$(c+d)(c-d)=c^2-d^2$
$(z-9)(z-1)=z^2-10z+9$
$(n-2)(n-4)=n^2-6n+8$
$(7-y)(7-y)=49-14y+y^2$
$(x^2-1)(x^2+1)=x^4-1$
$(y-5)(2y+3)=2y^2-7y-15$
$(5m+2)(2m-5)=10m^2-21m-10$
$(5a-3)(3a-5)=15a^2-34a+15$
$(5x+1)(7x+8)=35x^2+47x+8$
$(13b-8)(13b+8)=169b^2-64$
$(2a^2-1)(a+4)=2a^3+8a^2-a-4$
$(5x-4)^2=25x^2-40x+16$
$(3y-12)(3y+12)=9y^2-144$
$(x+1)(x^2+2x+1)=x^3+3x^2+3x+1$
$(6ab-1)(a^2+3ab)=6a^3b+18a^2b^2-a^2-3ab$
$(x-y)(x^2+xy+y^2)=x^3-y^3$
$(x-2y)(3x+y-4z)=3x^2-5xy-4xz+8yz-2y^2$
$(a^2+2a+1)(a^2-2a+1)=a^4-2a^2+1$

Factoring

Find the Greatest Common Factor - Build Your Skill

$18y^3$ and $24y^2$ is $6y^2$
$7m^2n$ and $56mn^2$ is $7mn$
$12r^2s^2$ and $60r^3s$ is $12r^2s$
$80a^4b^3$ and $52a^2b$ is $4a^2b$
$12d^2$ and $36cd$ is $12d$
$35m^2n$ and $70n^2$ is $35n$
$125x^2$ and $625x$ is $125x$
$6x^2y$ and $11x^2y^2$ is x^2y
$12c^2d^3$ and $64c^3d^2$ is $4c^2d^2$
$4y^3$ and $18y^2$ is $2y^2$

Find the Greatest Common Factor - Solve It

$3x^2$ and $15x$ is $3x$
$6a$ and $6a^2b$ is $6a$
$9y^3$ and $27y^2$ is $9y^2$
x^2y and $3xy^2$ is xy
$6x^4$ and $8x^3$ is $2x^3$
$5x^2y^2$ and $30xy$ is $5xy$
$15mn^2$ and $-10m^2n$ is $5mn$
$-7x^2y$ and $-56x^4y^3$ is $-7x^2y$
$6a^2b^3c$ and $11ab^2$ is ab^2
$52x^2y^3$ and $80x^3y^2$ is $4x^2y^2$
$36r^4s^3$ and $54r^2s^5$ is $18r^2s^3$
$35c^3d$ and $105c^2d^3$ is $35c^2d$
$7a^2bc^3$ and $-28ab^2c^2$ is $7abc^2$
$-102a^2b^4$ and $42a^6b^3$ is $6a^2b^3$
$80y^5z^3$ and $120y^3z^2$ is $40y^3z^2$
$12a^2b^5$ and $60ab^6$ is $12ab^5$
$114a^5b^7$ and $-38a^3b^2$ is $38a^3b^2$
$250y$ and $625y^2$ is $125y$
$108y^2z^7$ and $-114y^3z^5$ is $6y^2z^5$
$176x^3y^3z^2$ and $208x^2y^3z^4$ is $16x^2y^3z^2$

Factor Polynomials - Build your Skill

$4a^2-a=a(4a-1)$
$9r^2-27r^2s=9r^2(1-3s)$
$-50u^2+25v^2+75uv=25(-2u^2+v^2+3uv)$
$2yz^2-6y^2z=2yz(z-3y)$
$12a^2b+16ab^2-4ab=4ab(3a+4b-1)$
$-13y+26y^2+39y^3=13y(-1+2y+3y^2)$
$4cd+8c^2d^2+12c^3d^3=4cd(1+2cd+3c^2d^2)$
$25ab-5a^2b^2=5ab(5-ab)$
$15x^2-18x+45=3(5x^2-6x+15)$
$8a^2b^3-2a^2b^2+6ab^2=2ab^2(4ab-a+3)$

Factor Polynomials - Solve It

$3y^2-y=y(3y-1)$
$4x-16=4(x-4)$
$21a^2-7ab=7a(3a-b)$
$28y^2-7y=7y(4y-1)$
$8x^2y-24xy^2=8xy(x-3y)$
$3m^2-6m+21=3(m^2-2m+7)$
$2x^2+4xy+80y^2=2(x^2+2xy+40y^2)$
$3b^4-12b^3+6b^2-21b=3b(b^3-4b^2+2b-7)$
$5a^2b-10ab^2+35ab=5ab(a-2b+7)$
$16a^3-8a^2+12a=4a(4a^2-2a+3)$
$48cd+72c^2d^2+60c^3d^3=12cd(4+6cd+5c^2d^2)$
$28x^3y^5-42x^5y^3=14x^3y^3(2y^2-3x^2)$
$30a^2b-24ab^2+36a^3b=6ab(5a-4b+6a^2)$
$56c^3d^3-72c^2d^2-64cd=8cd(7c^2d^2-9cd-8)$
$3x^4-12x^3+6x^2-21x=3x(x^3-4x^2+2x-7)$
$32x^2y^4-16xy^3+48x^3y^5=16xy^3(2xy-1+3x^2y^2)$
$14y^4+28y^2-35y-7y^5=7y(2y^3+4y-5-y^4)$
$18m^3n^2-45m^2n^3+81m^2n^2=9m^2n^2(2m-5n+9)$
$75a^5b^2-225a^2b^5+375a^3b^3=75a^2b^2(a^3-3b^3+5ab)$
$121a^2b^3-33a^2b^2+88ab^2=11ab^2(11ab-3a+8)$

Find the Difference of Squares - Build Your Skill

$16x^2-1=(4x+1)(4x-1)$
$a^2-36b^2=(a+6b)(a-6b)$
$81x^2-121y^4=(9x+11y^2)(9x-11y^2)$
$a^2-9/25=(a+3/5)(a-3/5)$
$4y^6-9=(2y^3+3)(2y^3-3)$
$-36a^2+49b^2=(7b+6a)(7b-6a)$
$49m^2-64n^2=(7m+8n)(7m-8n)$
$625y^6-225=(25y^3+15)(25y^3-15)$
$y^2-4/9=(y+2/3)(y-2/3)$
$-4x^2+36x^2y^2=(6xy+2x)(6xy-2x)$

Find the Difference of Squares - Solve It

$a^2-b^2=(a+b)(a-b)$
$x^2-1=(x+1)(x-1)$
$y^2-100=(y+10)(y-10)$
$1-9x^2=(1+3x)(1-3x)$
$25-c^4=(5+c^2)(5-c^2)$
$y^2-4z^2=(y+2z)(y-2z)$
$25-4c^2=(5+2c)(5-2c)$
$16a^6-b^2=(4a^3+b)(4a^3-b)$
$x^2-36y^2=(x+6y)(x-6y)$
$x^2-121=(x+11)(x-11)$
$225b^2-1=(15b+1)(15b-1)$
$b^2-64c^4=(b+8c^2)(b-8c^2)$
$144-25y^2z^2=(12+5yz)(12-5yz)$
$64a^2-49b^2=(8a+7b)(8a-7b)$
$100m^2-121n^4=(10m+11n^2)(10m-11n^2)$
$144-121x^6y^6=(12+11x^3y^3)(12-11x^3y^3)$
$36a^2-1=(6a+1)(6a-1)$
$x^2-16/25=(x+4/5)(x-4/5)$
$25/64c^4-1=(5/8c^2+1)(5/8c^2-1)$
$x^4-1=(x+1)(x-1)(x^2+1)$

Factor Trinomials - Build Your Skill

$8m^2-9mn+n^2=(8m-n)(m-n)$
$3b^2-5b-2=(3b+1)(b-2)$
$a^2+24a-52=(a-2)(a+26)$
$24k^2+7k-6=(3k+2)(8k-3)$
$10x^2-29x+10=(5x-2)(2x-5)$
$x^2-5x-50=(x+5)(x-10)$
$15x^2+16xy+4y^2=(5x+2y)(3x+2y)$
$4x^2-12x+9=(2x-3)(2x-3)$
$4m^2+7m-2=(4m-1)(m+2)$
$9cd-4d^2+9c^2=(3c-d)(3c+4d)$

Factor Trinomials - Solve It

$x^2+5x-14=(x+7)(x-2)$
$a^2-3a-10=(a-5)(a+2)$
$b^2-4b-32=(b-8)(b+4)$
$b^2-9b+8=(b-8)(b-1)$
$y^2+5y+6=(y+2)(y+3)$
$m^4-8m^2+16=(m^2-4)(m^2-4)$
$x^2+4xy-5y^2=(x+5y)(x-y)$
$m^2+mn-6n^2=(m-2n)(m+3n)$
$x^2-xy-6y^2=(x-3y)(x+2y)$
$a^2-10a-24=(a-12)(a+2)$
$z^4-4z^2-21=(z^2-7)(z^2+3)$
$2u^2-uv-3v^2=(2u-3v)(u+v)$
$9x^2+9x-4=(3x+4)(3x-1)$
$9c^2-3cd-2d^2=(3c+d)(3c-2d)$
$8y^2+3y-5=(8y-5)(y+1)$
$16a^2-16a-5=(4a+1)(4a-5)$
$16m^2-11m-5=(16m+5)(m-1)$
$18a^2-9a-14=(6a-7)(3a+2)$
$16y^2-50y+25=(2y-5)(8y-5)$
$-6x^2-5x+6=(-3x+2)(2x+3)$

Factor Polynomials Completely - Build Your Skill

$15x^2-60=15(x+2)(x-2)$
$ax^4-8ax^2+15a=a(x^2-3)(x^2-5)$
$x^3-xy^2=x(x+y)(x-y)$
$3a^2-3a-60=3(a+4)(a-5)$
$9y^3-18y^2z+9yz^2=9y(y-z)^2$
$m^5-4m^3+3m=m(m-1)(m+1)(m^2-3)$
$6x^2-24y^2=6(x-2y)(x+2y)$
$a^2b-4ab^2-45b^3=b(a+5b)(a-9b)$
$7xy-y^2+18x^2=(9x-y)(2x+y)$
$8a^4+14a^2-4=2(2a+1)(2a-1)(a^2+2)$

Factor Polynomials Completely - Solve It

$y^3-9y=y(y+3)(y-3)$
$-3m^2+30m-75=-3(m-5)^2$
$a^3-ab^2=a(a+b)(a-b)$
$5x^2-5x-100=5(x-5)(x+4)$
$3a^2-27b^2=3(a+3b)(a-3b)$
$18y^3-60y^2+50y=2y(3y-5)^2$
$75k^2-147m^2=3(5k+7m)(5k-7m)$
$9m^2+6m-27m^3=-3m(3m-2)(3m+1)$
$4a^2b^2+20ab+24=4(ab+2)(ab+3)$
$18x^3y^2-27x^2y^3=9x^2y^2(2x-3y)$
$18ab^2-36a^2b+18a^3=18a(b-a)^2$
$-16x^2y-10x^2yz-x^2yz^2=-x^2y(2+z)(8+z)$
$-4m^3+10m^2+6m=-2m(2m+1)(m-3)$
$9b^4-18b^3c+9b^2c^2=9b^2(b-c)^2$
$-27mn-42m-3mn^2=-3m(n+7)(n+2)$
$16xy+18x^2-2y^2=(9x-y)(2x+2y)$
$n^5-16n=n(n^2+4)(n-2)(n+2)$
$m^2n^3+2m^2-n^3-2=(m+1)(m-1)(n^3+2)$
$12a^4+21a^2-6=3(2a+1)(2a-1)(a^2+2)$
$9x^4+8x^2-1=(3x+1)(3x-1)(x^2+1)$

Equations

Solve the Form x+a=b - Build Your Skill

a–5=11	a=16
21=x–14	x=35
m+31=17	m=–14
4+n=27	n=23
30=y+45	y=–15
m–17=21	m=38
a+11=–3	a=–14
y–12=42	y=54
25=a+6	a=19
9=c+36	c=–27

Solve the Form x+a=b - Solve It!

0=x–7	x=7
6=y–5	y=11
20=d+11	d=9
y+3=22	y=19
10+x=9	x=–1
48=y+26	y=22
10=a–15	a=25
y–7=19	y=26
30=x+8	x=22
18=x+3	x=15
n+9=26	n=17
n–5=–7	n=–2
x+17=4	x=–13
43=b–21	b=64
14=s–9	s=23
29=a–17	a=46
–16=x+2	x=–18
42+b=28	b=–14
r–27=108	r=135
7=m+88	m=–81

Solve the Form ax+b=c - Build Your Skill

5a−12=33	a=9
y/4−2=6	y=32
5(m−2)−2m+21=−1	m=−4
a−1/2a−6=0	a=12
a/4=3/4	a=3
3(y−1)+2y=8	y=11/5
2(a+3)−6=0	a=0
3c−(2c−3)=−8	c=−11
1=3/4(8−x)+1	x=8
−5c+2(c+4)−6=−19	c=7

Solve the Form ax+b=c - Solve It!

11x=231	x=21
x/10=13	x=130
.6=n/5	n=3
3m+7=31	m=8
42=3/5y	y=70
1.6y=32	y=20
−63=3+6r	r=−11
51=z/4+11	z=160
4y−y=−15	y=−5
12−3x−2x=−3	x=3
0=125−17x−8x	x=5
42=3n+5n−n	n=6
3(n−1)+4=−2	n=−1
(m+1)+(m+2)=41	m=19
9b−(6b−4)=−8	b=−4
5(x+2)+4(x−4)+6=45	x=5
1−2/5(10−x)=1	x=10
3(x−4)+(4−x)2=16	x=20
3/8a+1/4a=25	a=40
3=2/3(m+9)−1	m=−3

Solve by Factoring - Build Your Skill

$9a^2=3a$	a=0	a=1/3
$2x^2+1=9$	x=2	x=–2
$a^2+6a=-8$	a=–4	a=–2
$4b(b+2)=5$	b=1/2	b=–5/2
$4x^2=28x$	x=0	x=7
$16x^2-60=4$	x=2	x=–2
$4m(m+3)+12=3$	m=–3/2	
$9y^2=9(y-1)+7$	y=1/3	y=2/3
$(x+1)(x-1)+1=0$	x=0	
$21/a-3=a-7$	a=0	a=10

Solve by Factoring - Solve It!

$x^2=1$	x=1,–1
$4y^2=1$	y=1/2,–1/2
$x^2-64=0$	x=8,–8
$x^2+x-20=0$	x=–5,4
$y^2-3y-18=0$	y=6,–3
$2x^2-5x-3=0$	x=3,–1/2
$6z^2+5z+1=0$	z=–1/2,–1/3
$x^2-3x+8=6$	x=1,2
$2y^2=7y+4$	y=4,–1/2
$n(6n-5)=4$	n=4/3,–1/2
$(z+1)(z-6)=18$	z=8,–3
$(y+2)(2y+1)=6y+5$	y=3/2,–1
$x^2-10x+25=4(x-2)$	x=3,11
$(x-2)(3x-1)=100$	x=7,–14/3
$(z+3)(z-3)=2z-1$	z=4,–2
$3y-2/5=8/y$	y=4,–10/3
$1=6m-9m^2$	m=1/3
$(y-5)^2-1=0$	y=4,6
$2x^2-x-10=2(x+5)$	x=4,–5/2
$z^2=14+5z$	z=–2,7

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Systems of Equations

Solve by Addition/Subtraction - Build Your Skill

$a+2b=14$
$a-3b=-11$
  $a=4$
  $b=5$

$x+2y=5$
$3x+2y=17$
  $x=6$
  $y=-1/2$

$10m+4n=20$
$13m-4n=-66$
  $m=-2$
  $n=10$

$m=4-n$
$n=4+m$
  $m=0$
  $n=4$

$3b-5a=-19$
$2a+3b=-5$
  $a=2$
  $b=-3$

$a+2b=1$
$3a+b=8$
  $a=3$
  $b=-1$

$8x-3y=-22$
$y-x=-1$
  $x=-5$
  $y=-6$

$5x+6y=16$
$6x-5y=7$
  $x=2$
  $y=1$

$2m+2n=4$
$5m+7n=18$
  $m=-2$
  $n=4$

$-7m-13=2n$
$3n+4m=0$
  $m=-3$
  $n=4$

Solve by Addition/Subtraction - Solve It

$a+2b=14$
$a-3b=-11$
  $a=4$
  $b=5$

$3a-2b=-1$
$3a-4b=9$
  $a=-11/3$
  $b=-5$

$2a-5b=9$
$3a+4b=2$
  $a=2$
  $b=-1$

$3m-n=18$
$3m+n=60$
  $m=13$
  $n=21$

$y-x=-2$
$x=6-y$
  $x=4$
  $y=2$

$5a+2b=11$
$6a-3b=24$
  $a=3$
  $b=-2$

$5x+3y=17$
$x+3y=1$
  $x=4$
  $y=-1$

$2y=21-5x$
$7x=2y+39$
  $x=5$
  $y=-2$

$3x+2y=10$
$2x=5y-25$
  $x=0$
  $y=5$

$2y+5z=-10$
$4y-5z=10$
  $y=0$
  $z=-2$

$3m+5n=9$
$9m+2n=-12$
  $m=-2$
  $n=3$

$3x+2y=7$
$4x-3y=-2$
  $x=1$
  $y=2$

$5x=4y$
$3x-4y=8$
  $x=-4$
  $y=-5$

$r+11s=-6$
$2r+s=9$
  $r=5$
  $s=-1$

$1/2x+1/2y=5$
$3/2x-3/4y=-3$
  $x=2$
  $y=8$

$10b=38-6a$
$12b=48-6a$
  $a=-2$
  $b=5$

$2a+5b=15$
$12a-10b=30$
  $a=15/4$
  $b=3/2$

$m/n+5=-4/n$
$-2m-3n=-6$
  $m=6$
  $n=-2$

$2a-3b=-3$
$5a+3b=10$
  $a=1$
  $b=5/3$

$5y-3x=7$
$1+7y=-12x$
  $x=-2/3$
  $y=1$

Solve by Substitution - Build Your Skill

m+5n=2
m=−3n
  m=−3
  n=1

3m−n=5
2m+n=15
  m=4
  n=7

r−s=2
3r+2s=5
  r=9/5
  s=−1/5

b=3a+5
5a−b=−1
  a=2
  b=11

y+2z=−1
3y−5z=8
  y=1
  z=−1

m=10n+2
n=10m+1
  m=−4/33
  n=−7/33

a−b/2=2
2a−3b=3
  a=9/4
  b=1/2

2x−y=3
x−2y=−6
  x=4
  y=5

x−y=16
x/2+y/2=37
  x=45
  y=29

2c−d=2
3c−2d=3
  c=1
  d=0

Solve by Substitution - Solve It

$2a=b$	$x=4-3y$	$4x-3y=15$
$3a+b=5$	$2y+x=7$	$x-2y=0$
$a=1$	$x=13$	$x=6$
$b=2$	$y=-3$	$y=3$
$m=4-n$	$x-y=1$	$6=y-3z$
$n=4+m$	$x+y=-5$	$28=y-z$
$m=0$	$x=-2$	$y=39$
$n=4$	$y=-3$	$z=11$
$y=-3$	$x+2y=5$	$3y+5z=26$
$2x-y=7$	$3x+2y=17$	$y+2z=10$
$x=2$	$x=6$	$y=2$
$y=-3$	$y=-1/2$	$z=4$
$a+2b=1$	$m-3n=-4$	$a+2b=14$
$3a+b=8$	$2m+6n=5$	$a-3b=-11$
$a=3$	$m=-3/4$	$a=4$
$b=-1$	$n=13/12$	$b=5$
$8x-3y=-22$	$m-2n=-20$	$3x+4y=12$
$y-x=-1$	$2n+m=48$	$2y=-3x$
$x=-5$	$m=14$	$x=-4$
$y=-6$	$n=17$	$y=6$
$3x-2y=-11$	$3a-4b=5$	$3a-4b=5$
$x+y=-2$	$a+7b=10$	$a+7b=10$
$x=-3$	$a=3$	$a=3$
$y=1$	$b=1$	$b=1$
$b=10-a$	$8y+9z=-45$	
$2a-b=-4$	$y+6z=9$	
$a=2$	$y=-9$	
$b=8$	$z=3$	

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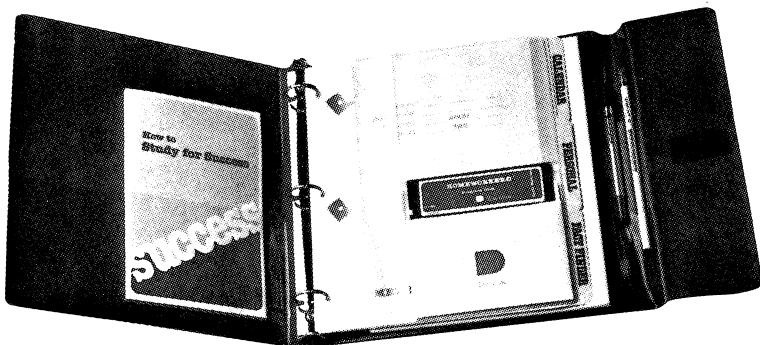
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LEVEL: 7th through 12th grade

$$(4ab-15)+(a^2b^2+6ab-1)$$

$$a^2b^2+10ab-16$$

Find the sum. ◄Return►

Awesome!

◄Esc►: Score
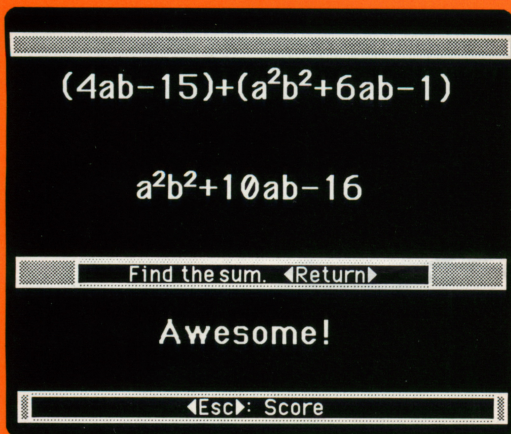
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- Positive and Negative Numbers
$$8 + (-9) = -1$$
$$(-8)(-7) = 56$$

- Monomials and Polynomials
$$5a + 6a + 7a = 18a$$
$$(a^2 + 2a - 6) + (7 - a^2) = 2a + 1$$

- Factoring Polynomials and Trinomials
$$4a^2 - a = a(4a - 1)$$
$$a^2 - 3a - 10 = (a - 5)(a + 2)$$

- Solving Equations
$$5a - 12 = 33 \quad a = 9$$
$$2x^2 + 1 = 9 \quad x = 2, x = -2$$

- Systems of Equations
$$\left.\begin{array}{l} a + 2b = 14 \\ a - 3b = -11 \end{array}\right\} \quad \begin{array}{l} a = 4 \\ b = 5 \end{array}$$

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