

ALGE- BLASTER!TM

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

Apple/IBM Version

algeblor

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TABLE OF CONTENTS

INTRODUCTION 1

GETTING STARTED 4

Included in this Package	4
Starting the APPLE Version	5
Starting the IBM Version	6
The Menus	8

USING THE PROGRAM 10

Study the Steps	10
Build Your Skill	11
Solve It	13
Special Features	13
Positive Reinforcement	13
Reviewing Items Missed	13
Sound Effects	13
Escape Feature	14
Print Feature	14

USING THE EDITOR 15

Accessing the Editor	15
Commands of the Editor	16
Creating Your New Data File	17
Entering the Problems	17
Viewing Your New File	20
Editing a File	21
Using Your New File	22

NOTE TO TEACHERS	23
-------------------------	-----------

GLOSSARY	24
-----------------	-----------

APPENDIX	29
-----------------	-----------

Positive/Negative Numbers	29
Monomials and Polynomials	33
Factoring	40
Equations	45
Systems of Equations	48

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 the 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 of algebra:

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 to replace, algebra instruction in the classroom. It can be an especially effective instructional tool to reinforce 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.

ALGE-BLASTER was designed by a team of math teachers and computer education specialists at Davidson & Associates, Inc. and Santa Barbara Softworks. You will find the program interesting and easy to use, as well as educationally sound.

GETTING STARTED

Before you begin using ALGE-BLASTER, please complete the warranty card and return it to us. This will register your warranty and ensure that you receive important information and technical support for ALGE-BLASTER, announcements of updates, and information on new products.

The program files are protected and you will not be able to copy them. You may purchase a back-up copy for \$10.00 at the time you send in your warranty card, or later by writing to Davidson & Associates, Inc. Back-ups are not available for School Packs.

The data files are not protected and you may make your own back-up copy using the file copy program which came with your computer.

Included in this Package

In this package you will find:

- the ALGE-BLASTER! Disk
- the manual you are now reading.

Throughout this manual, the symbol <CR> will be used to indicate a Carriage Return, regardless of the type of computer being used.

Starting the APPLE Version

To use ALGE-BLASTER, APPLE version, you need:

- an Apple IIc, IIe, II+ (or equivalent computer) with at least 64K of memory
- one or two disk 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. Insert the Program (Side 1) into the disk drive and turn on your computer.
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 insert the data.

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 disk drives
- a monitor (or tv)
- 128 K / DOS 2.0 or higher
- the ALGE-BLASTER Disk
- a printer (optional)
- paper and pencil.

If you wish, you may copy the data files to the root directory of a hard disk.

To run the program, follow these steps.

1. Insert the DOS disk into the drive and turn on your computer to boot the disk.
2. When the drive stops, enter the date and time.
3. Remove the DOS disk and insert the ALGE-BLASTER disk.
At the A>, type **alg** <CR>.
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 file and command.com file to the ALGE-BLASTER disk. These instructions are for IBM computers only.

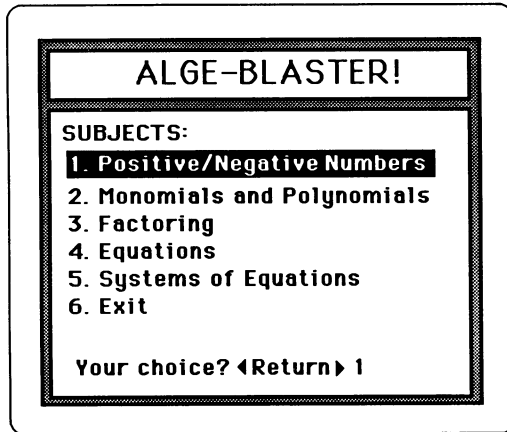
1. Boot the DOS disk; enter the date and time.
2. At the A>, type:
sys b: <CR>.
Follow any directions on the screen.
3. When the A> reappears, type:
copy command.com b: <CR>.
4. When the A> reappears, the self-booting process is completed.

Note to IBM Compatible Owners:

To make the disk self-booting, transfer the system files, then the command.com file to the ALGE-BLASTER disk. Follow the instructions in your computer user's manual.

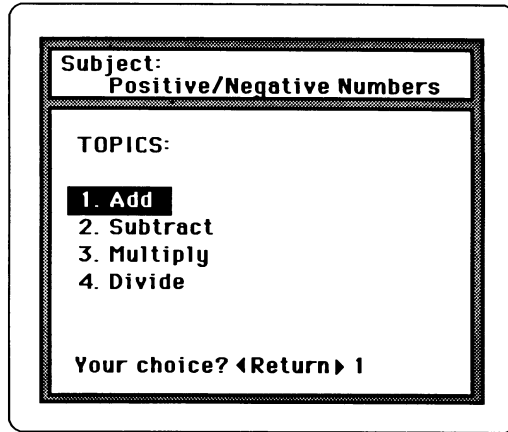
The Menu

The subject menu will appear on the screen.

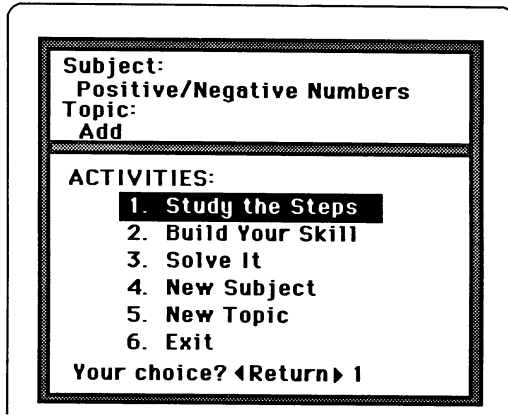


When the subject menu appears, select a subject (1-5). You may use the ← and → arrow keys or enter the appropriate number from the keyboard. Once you have made your choice, it will be highlighted; press <CR> to enter your choice.

The topic menu will appear. The topics will be different for each subject. If you select Positive/Negative Numbers as your subject, for example, the following choice of topics will appear:



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



Items 1 through 3 are sequential learning activities. In the next chapter, Using the Program, each activity is 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>.

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.

The screenshot shows a window with a dark border. Inside, the text is as follows:

$$(2a+4b-3c)+(c-2b+3a)$$
$$(2a+4b-3c)+(3a-2b+c)$$

---▶ $(2a+3a)+(4b-2b)+(-3c+c)$

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

Add Polynomials

Group like terms.

◀-- --▶: Move arrow ◀Esc▶ Menu

A written description of each step is presented at the bottom of the screen. After you study each step, press the right arrow key to see the next step. If at any time you wish to return to a previous step, press the left arrow key.

It is important that you know and understand each algebraic and mathematical term used in Study the Steps. The glossary in the back of this manual will help you if you are unsure of any of these terms.

Build Your Skill

In this activity, the problem is presented at the top of the screen. Enter your answer for each problem using the cursor (represented by a flashing vertical bar) as your guide. You may move your 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 the cursor up one line, and <CTRL> B to move the cursor down one line.

The horizontal bars indicate the kind of character required.

- A lower 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.
- An upper horizontal bar indicates that an exponent is required.

The diagram illustrates a computer screen interface for a math problem. At the top, the expression $(\frac{1}{3}m - n^2) - (\frac{1}{2}n^2 - \frac{1}{4}m)$ is displayed. Below the expression, there are four input fields for the answer, each with a horizontal bar indicating the type of character required. The bars are: a thick mid-horizontal bar (operation sign), a thin mid-horizontal bar (fraction), a thin mid-horizontal bar (fraction), and a thick mid-horizontal bar (operation sign). Labels with arrows point to these bars: 'numerator' points to the first thin bar, 'fraction bar' points to the second thin bar, 'denominator' points to the third thin bar, 'exponent' points to the first thick bar, and 'operation sign' points to the second thick bar. Below the input fields, a prompt reads 'Find the difference. <Return>'. At the bottom of the screen, a status bar shows '<Esc>: Score'.

You may ask for help by holding down the <CTRL> key and pressing P (for prompt). The first step will appear. If you need further help, repeat the process. Use your pencil and paper if you need to.

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

■ _ _ - _ - ■ _ _ _ -

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 <CR>. 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> at any time to see your score; you may then resume the lesson or stop to 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 <CR> 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. Shortly after starting the program, you will be asked if you want sound effects.

Escape Feature - The escape key <ESC> allows you to return to the previous menu or leave an exercise at any time during the program. Simply press <ESC> 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 list of problems with ALGE-BLASTER's easy-to-use editor. It allows you to make corrections with ease as well as add or remove items from the file. 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)
- any disk formatted for your computer. This may be a newly formatted disk or any previously formatted data disk.

Accessing the Editor

- Insert the ALGE-BLASTER disk in the drive and turn on the computer.
- Press E (for editor) while the program is booting.
- Indicate the number of drives you are using and follow the screen prompts to insert your formatted data disk.

Commands of the Editor

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

→ (right arrow) moves cursor one character to the right

← (left arrow) moves cursor one character to the left

up arrow or
<Ctrl> A moves cursor up 1 line

down arrow or
<Ctrl> B moves cursor down 1 line

<Delete> or
<Ctrl> D deletes to the right of the cursor,
one character at a time.

<Ctrl> X deletes to the end of the line

<Ctrl> E to enter exponent

<Ctrl> F to enter fraction

<Ctrl> S to select any character which will
appear as a “given” in the answer

<Ctrl> V to view problems

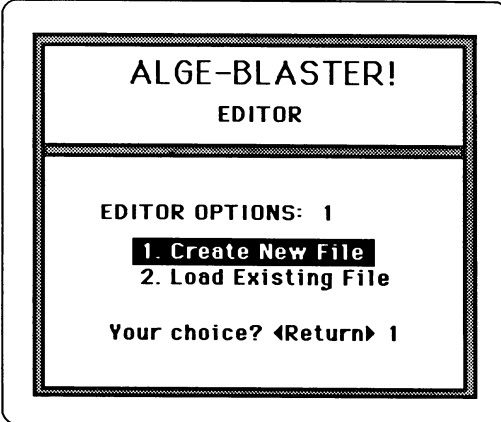
Creating Your New Data File

You may find the following useful when preparing your data file:

1. When a problem can have more than one possible configuration, use a “given” in the answer to prevent the student from 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, select the first + to appear as a “given” in the answer space $(_+_)(__)$. The student will then know in which order the parts of the answer must be entered. To enter letters, numbers, or operation signs as “givens” in the answer, follow the specific instructions which appear on page 20.

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

Entering the Problems



The screenshot shows a terminal window titled "ALGE-BLASTER! EDITOR". Below the title, it displays "EDITOR OPTIONS: 1" followed by a list of two options: "1. Create New File" and "2. Load Existing File". At the bottom, it prompts "Your choice? <Return> 1", where the number 1 is highlighted, indicating the user's selection.

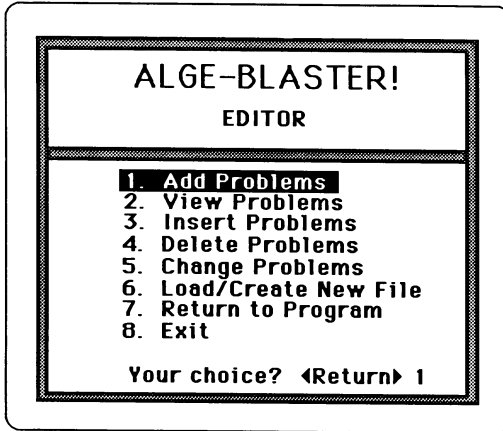
From the editor option screen, select **1. Create New File.**

Enter a name for your file <CR>.

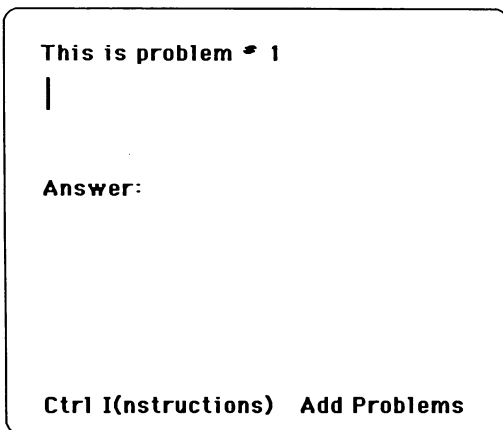
APPLE - (18 characters and spaces maximum)

IBM - (8 characters with no spaces)

The following menu will appear on the screen:



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



- Enter your problem <CR>.

Two lines are available for your problem. If your problem occupies only the first line, press <CR> a second time.

- Enter the answer <CR>.

Two lines are available for your answer. If your answer occupies only the first line, press <CR> a second time. Your problem and answer are now saved on the disk.

Remember that the action is always performed to the right of the cursor.

When entering an exponent:

- press <CTRL> E
- enter the exponent
- press the right arrow to move the cursor.

When entering a fraction:

- press <CTRL> F
- enter the numerator
- press right arrow to move cursor
- enter the denominator
- press right arrow to move cursor.

If you wish to have a letter, number, or operation sign appear as a “given” in the answer space during the exercise, first type the 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 $(a+b)(a - b)$, the pairs of () are givens, but if you wish the + or - to be a given as well, you must perform the operation above.

Special characters:

type @ to get a $\sqrt{\quad}$

type % to get a \div

type * to get a \cdot

If you need help in using the editor commands, refer to page 16 or use <CTRL> I to list the commands on the screen.

You may enter twenty problems in a file. When all your problems have been entered, press <ESC> to return to the editor menu.

Viewing 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 on your file by returning to the editor options screen and selecting **2. Load Existing File**.

To change 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 <CR>. When the problem appears, press <CR> again to activate the cursor.

To insert a problem anywhere in 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 <CR> again; the problem will automatically become problem #4, allowing you a blank space in which to enter a new #3 problem. When you are finished, press <ESC> to return to the editor menu.

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.

Using Your New File

To use your new file with the ALGE-BLASTER program, follow these steps:

- Boot the ALGE-BLASTER disk.
- When you are asked to insert the data disk, insert your new disk.
- 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. We hope they'll be useful for you.

Building a Math Vocabulary - To get the most out of ALGE-BLASTER, students need to clearly understand the meanings of all 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 sums equal 0.

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

Base - The base is the value in an exponential expression 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 a factor of a polynomial.

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 $\rightarrow 6(b+c)=6b+6c$ \leftarrow sum

product $\rightarrow 3(a-b)=3a-3b$ \leftarrow difference

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

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

Exponent - An exponent is a symbol placed to the right of and above an expression. It represents the number of times to multiply the expression 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 in an expression.

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 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 $5xy^2$ are all monomials.

Multiplicative inverse - One number is the multiplicative inverse of the other when their products equal 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, in a^3 , a would be multiplied by itself 3 times.

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

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

Reciprocal - One number is the reciprocal of another when their products equal 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.

For 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 , $4y$, $5xy$, $2/7x$.

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.

APPENDIX

Positive/Negative Numbers

Add - Build Your Skill

$$8+(-9)=-1$$

$$-5+7=2$$

$$11+(-15)=-4$$

$$71+(-52)=19$$

$$11\frac{1}{6}+(-15\frac{1}{2})=-4\frac{1}{3}$$

$$6+(-5)+(-11)=-10$$

$$-9+13(-10)+7=1$$

$$-15+(-21)+16=-20$$

$$25+(-75)+625+(-50)=525$$

$$6.1+(-7.01)+(-9.9)=-10.81$$

Add - Solve It

$$55+78=133$$

$$-6+(-7)=-13$$

$$-15+(-23)=-38$$

$$22+7+15=44$$

$$-8+(-9)+(-5)=-22$$

$$125+51+201=377$$

$$-215+(-2015)+(-15)=-2245$$

$$-206+400=194$$

$$-6\frac{1}{4}+(-5\frac{3}{4})=-12$$

$$4+11\frac{1}{5}+7\frac{2}{5}=22\frac{3}{5}$$

$$-7\frac{1}{2}+5\frac{1}{3}=-2\frac{1}{6}$$

$$-7\frac{1}{6}+(-11\frac{5}{6})+(-3\frac{1}{3})=-22\frac{1}{3}$$

$$-16.23+(-11.3)=-27.53$$

$$-101.1+80.6=-20.5$$

$$-5.1+(-31.6)+(-16.8)=-53.5$$

$$-107+(-29)+47=-89$$

$$21\frac{1}{5}+(-16\frac{2}{5})+19=23\frac{4}{5}$$

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

$$720+(-360)+(-473)+15=-98$$

$$.006+(-1.1)+(-.07)=-1.164$$

Subtract - Build Your Skill

$$\begin{aligned}9 - (+5) &= 4 \\11 - (+15) &= -4 \\106 - (+77) &= 29 \\55 - (+70) &= -15 \\39 - (+43) &= -4 \\8 - (-13) &= 21 \\-16 - (-27) &= 11 \\-31 - (-23) &= -8 \\-126 - (-49) &= -77 \\31.9 - (-6.7) &= 38.6\end{aligned}$$

Subtract - Solve It

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

Multiply - Build Your Skill

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

Multiply - Solve It

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

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

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

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

$$8x+2\frac{1}{2}x=10\frac{1}{2}x$$

$$4.1xy+7.9xy=12xy$$

$$2/3y^2+1/2y^2=1\frac{1}{6}y^2$$

$$17z+6\frac{1}{3}z=23\frac{1}{3}z$$

$$8.6y+7.5y=16.1y$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$5a - 12a = -7a$$

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

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

$$\frac{1}{2}m^2 - n^2 - (-\frac{1}{3}m^2) - (-\frac{1}{2}n^2) = \frac{5}{6}m^2 - \frac{1}{2}n^2$$

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

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

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

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

$$\frac{1}{7}mn - (-\frac{1}{14}mn) - mn = -\frac{11}{14}mn$$

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

Subtract Monomials - Solve It

$$11a - 7a = 4a$$

$$7x - 5x = 2x$$

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

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

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

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

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

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

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

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

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

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

$$3.6x - .8x - (-2.1x) = 4.9x$$

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

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

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

$$\frac{3}{5}xy - (-\frac{2}{5}xy) - \frac{1}{3}xy = \frac{2}{3}xy$$

$$\frac{2}{5}mn - (-\frac{3}{10}mn) - mn = -\frac{3}{10}mn$$

$$\frac{1}{3}x^2 - (-\frac{1}{2}y^2) - 2x^2 - y^2 = -\frac{5}{3}x^2 - \frac{1}{2}y^2$$

$$\frac{1}{2}m^2 - (-\frac{1}{3}n^2) - m^2 - n^2 = -\frac{1}{2}m^2 - \frac{2}{3}n^2$$

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 Polynomials 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

$$18y^3 \text{ and } 24y^2 \text{ is } 6y^2$$

$$7m^2n \text{ and } 56mn^2 \text{ is } 7mn$$

$$12r^2s^2 \text{ and } 60r^3s \text{ is } 12r^2s$$

$$80a^4b^3 \text{ and } 52a^2b \text{ is } 4a^2b$$

$$12d^2 \text{ and } 36cd \text{ is } 12d$$

$$35m^2n \text{ and } 70n^2 \text{ is } 35n$$

$$125x^2 \text{ and } 625x \text{ is } 125x$$

$$6x^2y \text{ and } 11x^2y^2 \text{ is } x^2y$$

$$12c^2d^3 \text{ and } 64c^3d^2 \text{ is } 4c^2d^2$$

$$4y^3 \text{ and } 18y^2 \text{ is } 2y^2$$

Find the Greatest Common Factor - Solve It

$$3x^2 \text{ and } 15x \text{ is } 3x$$

$$6a \text{ and } 6a^2b \text{ is } 6a$$

$$9y^3 \text{ and } 27y^2 \text{ is } 9y^2$$

$$x^2y \text{ and } 3xy^2 \text{ is } xy$$

$$6x^4 \text{ and } 8x^3 \text{ is } 2x^3$$

$$5x^2y^2 \text{ and } 30xy \text{ is } 5xy$$

$$15mn^2 \text{ and } -10m^2n \text{ is } 5mn$$

$$-7x^2y \text{ and } -56x^4y^3 \text{ is } -7x^2y$$

$$6a^2b^3c \text{ and } 11ab^2 \text{ is } ab^2$$

$$52x^2y^3 \text{ and } 80x^3y^2 \text{ is } 4x^2y^2$$

$$36r^4s^3 \text{ and } 54r^2s^5 \text{ is } 18r^2s^3$$

$$35c^3d \text{ and } 105c^2d^3 \text{ is } 35c^2d$$

$$7a^2bc^3 \text{ and } -28ab^2c^2 \text{ is } 7abc^2$$

$$-102a^2b^4 \text{ and } 42a^6b^3 \text{ is } 6a^2b^3$$

$$80y^5z^3 \text{ and } 120y^3z^2 \text{ is } 40y^3z^2$$

$$12a^2b^5 \text{ and } 60ab^6 \text{ is } 12ab^5$$

$$114a^5b^7 \text{ and } -38a^3b^2 \text{ is } 38a^3b^2$$

$$250y \text{ and } 625y^2 \text{ is } 125y$$

$$108y^2z^7 \text{ and } -114y^3z^5 \text{ is } 6y^2z^5$$

$$176x^3y^3z^2 \text{ and } 208x^2y^3z^4 \text{ is } 16x^2y^3z^2$$

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!

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

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

$$m+5n=2$$

$$m=-3n$$

$$m=-3$$

$$n=1$$

$$r-s=2$$

$$3r+2s=5$$

$$r=9/5$$

$$s=-1/5$$

$$y+2z=-1$$

$$3y-5z=8$$

$$y=1$$

$$z=-1$$

$$a-b/2=2$$

$$2a-3b=3$$

$$a=9/4$$

$$b=1/2$$

$$x-y=16$$

$$x/2+y/2=37$$

$$x=45$$

$$y=29$$

$$3m-n=5$$

$$2m+n=15$$

$$m=4$$

$$n=7$$

$$b=3a+5$$

$$5a-b=-1$$

$$a=2$$

$$b=11$$

$$m=10n+2$$

$$n=10m+1$$

$$m=-4/33$$

$$n=-7/33$$

$$2x-y=3$$

$$x-2y=-6$$

$$x=4$$

$$y=5$$

$$2c-d=2$$

$$3c-2d=3$$

$$c=1$$

$$d=0$$

Solve by Substitution - Solve It

$$\begin{aligned}2a &= b \\ 3a + b &= 5 \\ a &= 1 \\ b &= 2\end{aligned}$$

$$\begin{aligned}m &= 4 - n \\ n &= 4 + m \\ m &= 0 \\ n &= 4\end{aligned}$$

$$\begin{aligned}y &= -3 \\ 2x - y &= 7 \\ x &= 2 \\ y &= -3\end{aligned}$$

$$\begin{aligned}a + 2b &= 1 \\ 3a + b &= 8 \\ a &= 3 \\ b &= -1\end{aligned}$$

$$\begin{aligned}8x - 3y &= -22 \\ y - x &= -1 \\ x &= -5 \\ y &= -6\end{aligned}$$

$$\begin{aligned}3x - 2y &= -11 \\ x + y &= -2 \\ x &= -3 \\ y &= 1\end{aligned}$$

$$\begin{aligned}b &= 10 - a \\ 2a - b &= -4 \\ a &= 2 \\ b &= 8\end{aligned}$$

$$\begin{aligned}x &= 4 - 3y \\ 2y + x &= 7 \\ x &= 13 \\ y &= -3\end{aligned}$$

$$\begin{aligned}x - y &= 1 \\ x + y &= -5 \\ x &= -2 \\ y &= -3\end{aligned}$$

$$\begin{aligned}x + 2y &= 5 \\ 3x + 2y &= 17 \\ x &= 6 \\ y &= -1/2\end{aligned}$$

$$\begin{aligned}m - 3n &= -4 \\ 2m + 6n &= 5 \\ m &= -3/4 \\ n &= 13/12\end{aligned}$$

$$\begin{aligned}m - 2n &= -20 \\ 2n + m &= 48 \\ m &= 14 \\ n &= 17\end{aligned}$$

$$\begin{aligned}3a - 4b &= 5 \\ a + 7b &= 10 \\ a &= 3 \\ b &= 1\end{aligned}$$

$$\begin{aligned}8y + 9z &= -45 \\ y + 6z &= 9 \\ y &= -9 \\ z &= 3\end{aligned}$$

$$\begin{aligned}4x - 3y &= 15 \\ x - 2y &= 0 \\ x &= 6 \\ y &= 3\end{aligned}$$

$$\begin{aligned}6 = y - 3z \\ 28 = y - z \\ y &= 39 \\ z &= 11\end{aligned}$$

$$\begin{aligned}3y + 5z &= 26 \\ y + 2z &= 10 \\ y &= 2 \\ z &= 4\end{aligned}$$

$$\begin{aligned}a + 2b &= 14 \\ a - 3b &= -11 \\ a &= 4 \\ b &= 5\end{aligned}$$

$$\begin{aligned}3x + 4y &= 12 \\ 2y = -3x \\ x &= -4 \\ y &= 6\end{aligned}$$

$$\begin{aligned}3a - 4b &= 5 \\ a + 7b &= 10 \\ a &= 3 \\ b &= 1\end{aligned}$$

DAVIDSON & ASSOCIATES, INC.

Dr. Jan Davidson's principal objective in founding Davidson and Associates, Inc. was to provide quality educational software that adheres to fundamental, proven teaching criteria. All programs currently published by Davidson and Associates - SPEED READER II, WORD ATTACK!, MATH BLASTER!, SPELL IT! and CLASSMATE - have been teacher certified by the NEA, and have won national recognition for high quality and excellent sales.

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SANTA BARBARA SOFTWORKS

Santa Barbara Softworks is a software development group consisting of two partners, Gordon Morrell and George Taylor, their families, and many friends. We wish to dedicate this program to our wives, Sheila Morrell and Cindy Taylor, our children, John and Annie Taylor and Amy and Kate Morrell, and the many friends who helped and supported us through this project. We would also like to acknowledge the work of Anders Beitnes, the programmer for Alge-Blaster, and Wendy Barel, who provided the data files.

Gordon Morrell holds a Ph.D. in Education from the University of California, Santa Barbara, an M.Ed. in Counseling and Guidance from the University of Hartford, and a B.A. from Syracuse University. After teaching in the Hartford public school system, he spent three years as Assistant Professor of Education at the University of Maine in the Teacher Education and Counseling programs.

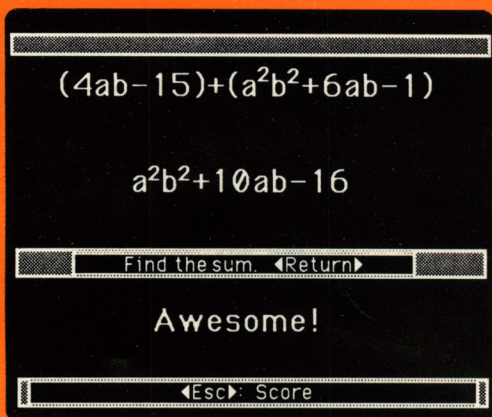
George Taylor holds an M.S. in Meteorology from the University of Utah, and a B.A. in Math from the University of California, Santa Barbara. An accomplished programmer and software designer, he also continues his work as a Certified Consulting Meteorologist.

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 $(-8)(-7) = 56$
- Monomials and Polynomials
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 $(a^2 + 2a - 6) + (7 - a^2) = 2a + 1$
- Factoring Polynomials and Trinomials
 $4a^2 - a = a(4a - 1)$
 $a^2 - 3a - 10 = (a - 5)(a + 2)$
- Solving Equations
 $5a - 12 = 33 \quad a = 9$
 $2x^2 + 1 = 9 \quad x = 2, x = -2$
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