

## How to use this book.

1. Read --- Any textbook , whether History , Science , English , or MATH , should be read regularly. The rules at the beginning of each lesson should be STUDIED and committed to memory. Any interested learner will read and re-read the text of which they are interested to re-learn and absorb the material from the past that is beginning to slip away.
2. Practice --- We call after school sports practice. We call after school academics (homework). What a disgrace!!!! We have to practice something to get good at it. After reading the text and studying the rules, you should do all of the practice problems for each section. The odd answers are at the end of each chapter to help you know whether or not you are doing it right. In athletics you practice the exact same procedure over and over again until you get it perfect and then you practice it more to stay fresh. We barely want to practice each math assignment once. To be good at math you should do each practice in this book more than once. If at any time during your studies you realize that a certain lesson is slipping away from your memory, then you know it is time to re-visit and redo that lesson.
3. Prioritize --- The student must realize the importance and value of a good education. With the right attitude and motivation , the learner will be well on his or her way to success in Algebra I.
4. Wishes --- It is the hope of this author that this book has been written so that any interested learner can find ~~easy~~ *success* to Algebra I and the latest State mandated testing. The author realizes that no book is any better than the effort put forth by the one who is using it. Algebra takes lots of effort no matter what textbook you use. This text is designed to give the learner an understanding of how basic math and Algebra I connect. I hope that this proves to be a beneficial approach to the building of "your" *foundation*, for higher mathematical skills.

Sincerely,

David Ballard

**Dedication:** This book is dedicated to the students of tomorrow. It was written by a person who believes strongly in preparing for the future. You the student are the future of this great nation. It is upon your shoulders that the burden of freedom and prosperity will some day lie. Will you be prepared to do your part in keeping the United States of America the greatest nation in the world? Don't take this responsibility lightly. Nations don't quickly fall. They gradually crumble like an old building that is never maintained. We must maintain a high level of moral values, a great love for our fellow Americans and enough knowledge and wisdom to perform our duties as laborers together in our respective jobs, so as to create that weave of love, protection, and production, that allows us to survive and flourish together. Each of us are dependent upon others for survival. It is to those who live their lives in pursuit of making the lives of others better, that this book is dedicated. May each student of tomorrow be such a person.

To you I am greatly indebted,  
David Ballard

EITHER Choose your destination and accept the way or  
Choose your way and accept the destination.

The way to your destination may not be an easy one, but you will end up where you want to be.

The easy way may be easy but you may end up in a bad place.

CHOOSE WISELY!

*David Ballard*

## Thank You's:

Who do I thank first? So many deserve to be first. I will begin with my children Jenni Kay Ballard and Joey Kyle Ballard who were a part of my life when this project began. They made the greatest sacrifice during the writing process. Any time that one dedicates to a project, takes away time that could have been spent in other areas. I have always tried to spend quality time with my kids but I know that I could have spent more time with them had I not written this text. They are great people. I am proud to have the honor of being their father. They make me look good. They make my life rich, fun, exciting and pleasant. To Jenni and Joey: I love you very much. Thanks for all of the good times.

I should thank Miss Nancy Breedlove for her willingness to to edit this book. She teaches Algebra II and up at Prairiland. Nancy is a great math teacher and I am proud to be her colleague. Even more thankful am I, that after her willingness to edit this text, she was willing to become my wife. To Nancy Ballard I give honor and praise. She is a true partner and friend. She has made home a more special place and has made life fun. To Nancy: I will always love and cherish you. Thank you for the honor of allowing me to be your partner. WOW!!!

To my parents Robert and Sis Ballard I am truly grateful. I had the childhood that people dream of. I had loving, fun, hardworking parents who loved God and loved their neighbor as themselves. We were loved, disciplined, trained, entertained, brought up in the Lord, exalted, humbled, praised, and reprimanded. There was just the right consistency of each. It is a special recipe that not everyone gets a hold of. To Robert and Sis Ballard: You are great parents. Thanks for the great life that you gave me as a child and for all of the help and love that you have continued to give me along the way. I love you.

To all of my teachers, fellow teachers, administrators, students, relatives, and friends: Thank you for being a part of my life.

Very Important Algebra Connections With Dimensional Analysis

page 1 To Add or Sub the names have to be the same.

In Algebra we call them like terms

$$\text{total } X^s = \text{starting } X^s + \text{gain in } X^s$$

Example #10  $11x = 5x + 6x$

page 37 The story must be all about one item because it is an addition problem.

Example #13 This story is all about speed.

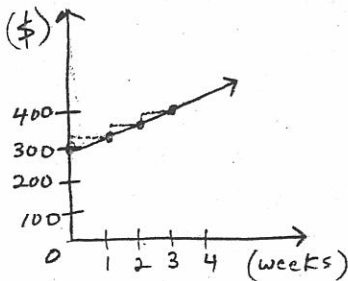
John's speed is 7 more than twice Kay's speed

$$J = 2K + 7$$

$$\text{total speed} = \text{starting speed} + \text{gain in speed}$$

page 41 This story is all about dollars. ( $\$ + \$ = \$$ )

Example #4 Rachael has \$300 and plans on saving \$30 per week



$$R = \$300 + \$30W$$

Annotations for the equation above:  
 -  $\$300$ : starting dollars  
 -  $\$30W$ : gain in dollars  
 -  $R$ : total dollars

$$y = b + mx$$

dimensional analysis

$$30W$$

$$\left(\frac{\Delta \text{ dollars}}{\Delta \text{ week}}\right) \cdot \frac{\text{weeks}}{1} = \Delta \text{ dollars}$$

page 63 This story is all about price.

Example #16 final price = starting price - loss in price

A percentage of the starting price.

$$\text{new price} = \text{original price} - \% \text{ of original} \cdot \text{original price}$$

$$y = b - mx$$

Notice that the x and the y-int are the same on percentages.

page 114

This story is all about y.

$$y = b + \boxed{mX}$$

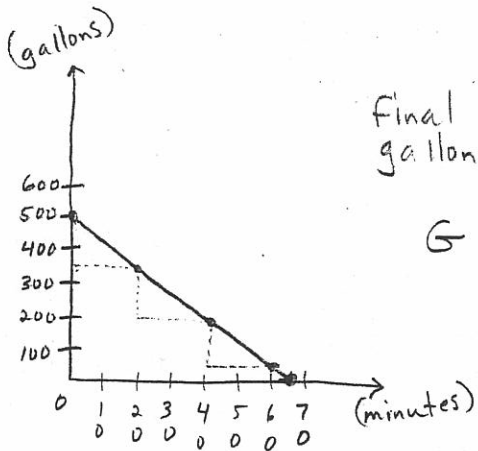
$\downarrow$  starting y       $\downarrow$  gain in y  
 $\downarrow$  final y

dimensional analysis

$$m = \text{slope} = \frac{\Delta y}{\Delta x}$$

$$mX = \frac{\Delta y}{\Delta x} \cdot \frac{X}{1} = \Delta y$$

Example #1 This story is all about the number of gallons of water in the pool.



$$\text{final gallons} = \text{starting gallons} - \text{loss of gallons}$$

$$G = 500 - \boxed{7.5M}$$

dimensional analysis

$$(\text{per}) \leftarrow \frac{\Delta \text{gallons} \cdot \cancel{\text{minutes}}}{\cancel{\Delta \text{minutes}} \cdot 1} = \Delta \text{gallons}$$

MORE DIMENSIONAL ANALYSIS

AMOUNTS

$$\text{total amount} = \text{starting amount} + \frac{\text{amount} \cdot \# \text{ of items}}{\text{item} \cdot 1}$$

$$y = b + mX$$

$$\text{final distance} = \text{beginning distance} + \frac{\text{distance} \cdot \text{time}}{\text{time} \cdot 1}$$

→ If zero then  $d = r \cdot t$

PERCENTS

$$\text{part} = \% \text{ of that part} \cdot \text{whole}$$

$$\text{part} = \frac{\text{part}}{\text{whole}} \cdot \frac{\text{whole}}{1}$$

percent as a fraction

# Important Rules for Algebra I for this Text

## I. Sign Rules (see p. 18)

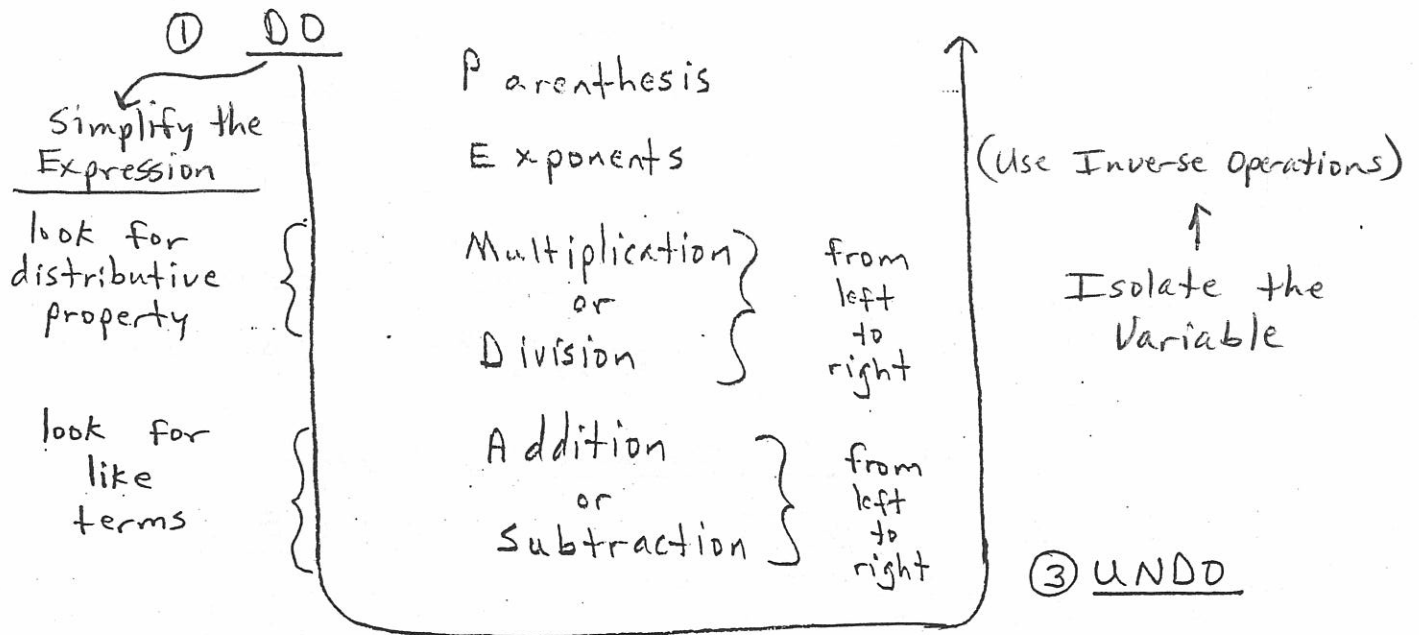
### A. Addition or Subtraction

1. Same sign → Add & take the common sign
2. different signs → subtract & take the larger sign

### B. Multiplication or Division

1. Same sign → Answer is Positive
2. different signs → Answer is Negative
3. Odd number of Negatives → Answer is Negative
4. Even number of Negatives → Answer is Positive

## II. Order of Operations (see p. 33)



- ② Get the variable on one side of the equal sign. Remember to change the sign when you cross over the equal sign.



B. Standard Form (see p.194)

1.  $AX^2 + BX + C = 0$

a. line of symmetry  $X = \frac{-b}{2a}$

b. vertex  $(X, y)$

↳ Solve by plugging the x into the equation and solving for y.

C. Quadratic Formula (see p.221)

1.  $X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

2. For the calculator add these parenthesis.

$$X = \frac{(-b \pm \sqrt{(b)^2 - 4ac})}{(2a)}$$

V. Regression Rules (see p.97A, p.187, p.195, p.241, p.255+256)

A.  $\frac{\Delta y}{\Delta x}$  is constant  $\rightarrow$  linear

B.  $\Delta$  in  $\Delta y$  is  $+++$  or  $---$   $\rightarrow$  quadratic

C.  $\Delta$  in  $\Delta y$  is  $X \times X \times X \rightarrow$  exponential (base is factor)

1.  $X^2 \quad X^2 \quad X^2 \quad y = 2^x$

2.  $X^3 \quad X^3 \quad X^3 \quad y = 3^x$

a. To find  $y = \text{---} \cdot 3^x + \text{---}$  do a linear regression on so far + need

X	$y = 3^x$	y
---	-----------	---

D.  $\Delta$  in  $\Delta X$  is  $+++$  or  $---$   $\rightarrow$  square root

1.  $y = \sqrt{X}$

2. see V. C. 2. a. for how to find  $y = \text{---} \cdot \sqrt{X} + \text{---}$