

SUMthings Right®

by Jim Gomes

Welcome to **SUMthings Right**, the unique math cards that help you do exactly that—sum things right!

Part I: The Blue Deck—Integers

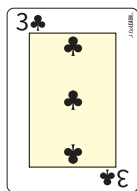
Purpose: Learn the fundamental concept of how to add and subtract integers. Bonus: Get introduced to adding and subtracting like terms.

Contents: 53 playing cards and 1 info card as follows:

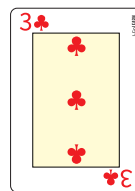
- black clubs and black hearts from 1–12, a subtotal of 24 cards;
- red clubs and red hearts from 1–12, a subtotal of 24 cards;
- one brown zero card (brown is neutral and so is zero—it has no sign); and
- two green ? and two = sign cards for playing Find the Missing Quantity.

How to Read Each Card

In the yellow box on every card: each ♣ or ♥ = +1 and each ♠ or ♦ = -1



= +3
Black cards represent positive amounts—companies “in the black” make money.

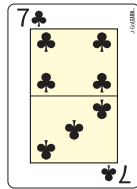
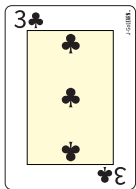


= -3
Red cards represent negative amounts—companies “in the red” lose money.

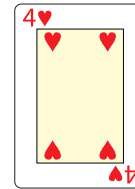
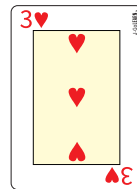
Note: Ignore the ♣ or ♥ symbol next to the number in the corner of the cards when working with integers. They will be used when introducing algebra.

Two-Card Sums

- Same colour cards



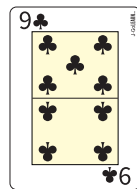
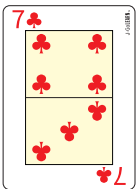
black 3 black 7
= black 10
= +3 + 7
= +10 or 10



red 3 red 4
= red 7
= -3 - 4
= -7

Teaching Point (TP): *The answer appears right in front of you!* Just total all symbols in the yellow boxes on the two cards.

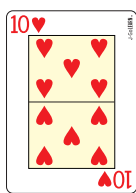
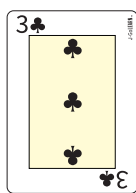
- Different colour cards



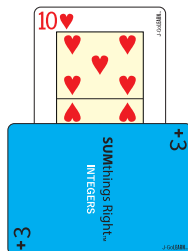
red 7 black 9
= black 2
= -7 + 9
= +2 or 2



TP: To see the answer, turn over the card with fewer symbols and cover that many symbols on the other card—the *answer (+2)* appears in the yellow box!
TP: If you have more black symbols than red the answer is always positive.

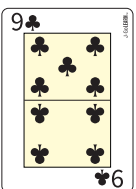
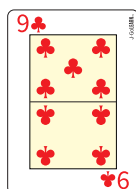


black 3 red 10
 = red 7
 = $+3 - 10$
 = -7

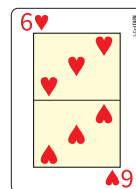
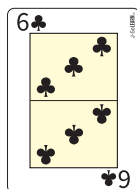


TP: If you have more red symbols than black, the answer is always negative. **TP:** If the first number is positive, the + sign can be omitted when writing out the problem e.g., $+3 - 10$ can be written as $3 - 10$.

• Opposites



red 9 black 9
 = $-9 + 9$
 = 0



black 6 red 6
 = $+6 - 6$
 = 0

TP: Opposites add to zero. **TP:** Zero has no sign. It is neither positive nor negative.

Blue and Gold Deck User Tips

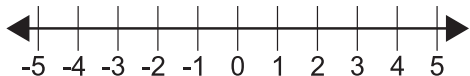
- Play games in order for a natural progression of concepts.
- Leave the ? and = sign cards in the box except for game 9.
- The dealer is a player unless instructed otherwise.
- Rotate the dealer and shuffle the cards after each run through the deck.
- Where practical, let players discover the Teaching Points (**TP**) and note them after each game.
- Master each game before moving to the next. To check for mastery, play each game with the blue or gold card backs using only the quantities shown in the corners of the cards.

Integer Games

1. Integer Order (1-4 players)

Purpose: Organize integers from smallest to largest.

Playing: Deal five cards to each player—players arrange the cards in the order they would appear on a number line. Repeat and increase the number of cards as you go; (this game has no winner). **TP:** Place red cards to the left and black cards to the right.



2. Integer War (2 -4 players)

Purpose: Learn to identify which integer is larger.

Set up: Deal the number cards into equal stacks, face down among the players. The blue card backs have numbers in the corner. Set a time limit or play until one player wins all the cards.

Playing: From their own stack, each player turns over a card—the player with the largest integer wins and collects the cards in a new pile. If players tie for the win, each of those players turns over another card until the tie is broken. When players run out of cards, they turn all the cards they have won face down to replenish their stack. Continue playing. The player with the most cards wins.

TP: Any black card (positive) beats any red card (negative). **TP:** On a number line, the number to the right is always larger. Example: $-3 < -2$; since $-3 + 1 = -2$ (adding 1 to any number always makes it larger). When placed on the number line, -2 is to the right of -3 .



3. Integer Sign for Sums (1-4 players)

Purpose: Determine quickly if a two-card sum is positive, negative, or has no sign.

Playing: Deal each player two cards—each player gives the sign of the answer only, not the sum

(this game has no winner). **TP:** two positives = positive result, two negatives = a negative result. **TP:** if the signs (colours) are the same you keep the sign. **TP:** if the signs (colours) are different, you take the sign of the one that contains more symbols in the yellow box. Example: red 7 black 5 has more red than black symbols—making the answer red or negative. In terms of money, think owe 7 have 5. The answer must be negative since we owe more than we have.

4. Two-Card Sums (1-4 players)

Purpose: Learn to add and subtract two integers.

Playing: Deal each player two cards face up. Each player in turn must say their sum correctly before a new round of cards is dealt. Players collect the cards that they were dealt and return them to the dealer when the cards run out (this game has no winner). **TP:** Start slow and build speed as you go. **Modification:** To build confidence quickly, use only red and black cards from 1 to 8 to start.

5. Rapid Fire Sums (1 dealer and 1 player works best)

Purpose: Learn to add and subtract two integers more rapidly.

Playing: Deal two cards. The player responds verbally. If correct, immediately deal two more cards. If incorrect, the dealer should respond with “incorrect” or “try again,” until the correct answer is given. Continue play until the cards run out. Alternate roles until a preset time limit is reached (this game has no winner). **Modification:** Split the decks in half if you don’t have enough decks to play in pairs or use groups of three and let the third person serve as a checker along with the dealer.

6. Integer Sum War (2 -4 players)

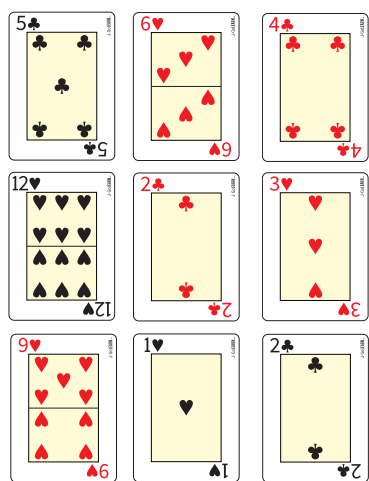
Purpose: Learn to add and subtract two integers, and identify which player has the largest sum.

Set up: Follow the instructions above for Integer War.

Playing: Each player turns over two cards from their stack—player with the largest sum must say their sum correctly to win the cards. If that player says an incorrect sum, the player with the second largest sum can win the cards if he/she gives the correct answer to the largest sum, and so on. Collect the cards and determine an overall winner the same as in Integer War. If players tie for the win, each of those players turns over another card until the tie is broken.

7. Zero Sums (1-4 players)

Purpose: Identify a group of 2-5 cards that make a zero sum using any of the nine cards in the array. This makes finding the sum of a long list of integers easier.



Set up: Deal nine cards face up in the middle of the table as shown.

Playing: Each player in turn removes any zero sum consisting of 2-5 cards, and keeps these cards (see examples in the **TP** below). The dealer replaces the missing cards before the next player takes a turn (When cards run out the player with the most cards wins). If a play cannot be made, the dealer returns the bottom row of cards to his stack and replaces them with three new cards with no loss of turn. Players return their cards to the dealer when the dealer runs out.

TP: (Refer to the 3x3 array). Select opposites to make a two-card zero sum e.g., 2 and 2. Identify three-card zero sums such as 2, 3 and 5. Find four-card zero sums such as 4, 3 and 5, 2. **TP:** Have players verbalize the opposites, such as “negative 7, positive 7.” For a simple five-card zero sum, combine the cards from the two and three-card zero sums above. **Modification: (2-4 players)** Deal nine cards as before. All players compete to create a zero sum using as many cards as possible. Use a timer (30-60s) or stop play when the dealer says “time” followed by the maximum number of cards, from 2 - 9, that make the dealer’s zero sum. Each player in turn can say “pass” or say a number bigger than the dealer’s in

an attempt to win the hand. The player who said the largest number reveals the cards that make the zero sum and keeps those cards. The dealer replaces the missing cards and play continues. To be fair, rotate the person who says “time” after each hand. When the deck runs out the player with the most cards is the winner. **TP:** Strategy: total the colour that has fewer symbols first—black 20 in the array provided. Now try to make a total of red 20 using as many cards as possible. This can be done using all the red cards except the red four creating an eight-card zero sum!

8. Multiple Card Sums (1-4 players)

Purpose: Determine the sum of three or more integers.

Set up: Deal each player three cards then work your way up.

Playing: Each player in turn must say their sum correctly before a new round of cards is dealt.

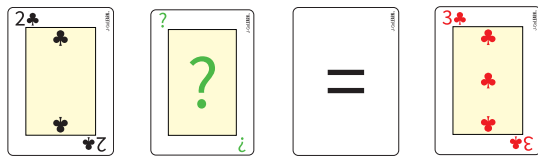
Players collect the cards they have been dealt and return them to the dealer once the cards have run out (this game has no winner). **TP:** First discard any zero sums. **TP:** Group positives and negatives. Total each group, then add these two integers to compute the answer **or** simply add the remaining cards in order. **Modifications:** 1) Challenge yourself—work your way up to 4, 5, 6 cards or more. 2) Play Integer Sum War using three or four-card sums.

9. Find the Missing Quantity (1- 4 players)

Purpose: Determine the value of the missing integer (?) to make the equation true—and to develop critical thinking skills.

Set up: Place a ? card followed by an = card in the middle of the table.

Playing: Deal two more cards as shown. Player 1 must determine the value of ? and answer aloud. When answered correctly, Player 1 removes the two outside cards, and two new cards are dealt for player 2, and so on (this game has no winner).



TP: In this case, think of having \$2 and ending up owing \$3. You must lose the \$2 then lose 3 more to get to -3 . In all, you must lose 5 making the answer red 5 or -5 .

10. Introducing Algebra—Like Terms (1- 4 players)

Purpose: Learn how to add and subtract like terms.

Set up: Sort the cards into two piles—hearts and clubs. Use two dealers, one for each suit.

Notes: We must now include the club or heart symbol with the number in the answer; (these games have no winner). **TP:** Only quantities with the same symbol called **like terms** (see Glossary) can be added or subtracted.

Playing: a) **One suit:** Deal two cards from the same suit to each player in turn. Examples: player 1 gets $5♣, 3♣ = 8♣$, response: “8 clubs,” player 2 gets $2♣, 5♣ = 7♣$, response: “negative 7 clubs,” and player 3 gets $7♣, 2♣ = 5♣$, response: “negative 5 clubs.” When the clubs run out, repeat using two hearts from the second dealer. Example: $7♥, 9♥ = 2♥$, response: “two hearts” ...

b) **Two suits:** Deal each player four cards using any combination of black and red cards. Players should group the like terms (cards of the same suit), then give the answer. For example: $5♣, 3♥, 8♣, 2♥$ when grouped = $5♣, 8♣, 3♥, 2♥ = 3♣, 5♥$, response: “3 clubs and negative 5 hearts” or more simply “3 clubs minus 5 hearts,” (see How to Read Answers below). **TP:** When the cards are rearranged the sign or colour of the card remains the same—the sign moves with the term.

How to Read Two-Term Answers

- To avoid creating double signs, read the answer $4♥, 6♣$ as “negative 4 hearts plus 6 clubs” instead of “negative 4 hearts and positive 6 clubs”. **Rule:** Replace “and positive” with “plus.”
- Similarly, read $3♣, 2♥$ as “3 clubs minus 2 hearts” instead of “3 clubs and negative 2 hearts.” **Rule:** replace “and negative” with “minus.” The use of single signs makes learning much easier.

Part II: The Gold Deck—Algebra

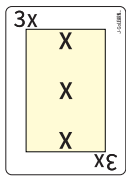
Purpose: Learn the fundamental concept of how to add and subtract **like terms** (see Glossary).

Contents: The Gold Deck replaces the familiar clubs and hearts of The Blue Deck with the suits X and Y. Each deck contains 52 playing cards and 2 info cards as follows:

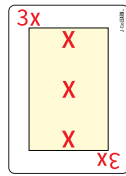
- black and red cards from 1-10 for both suits—a subtotal of 40 cards;
- an additional 10 integer cards are included from 1-5 in black and red;
- one green ? and one = sign card for playing Find the Missing Quantity; and
- two info cards, one that doubles as a spare ? card and the other as a spare = sign card.

How to Read Each Card

In the yellow box on every letter card: each X = +1X, and each Y = +1Y,
each **X** = -1X, and each **Y** = -1Y



= +3X
Black cards represent positive amounts of the variable.



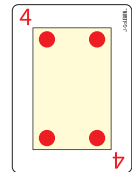
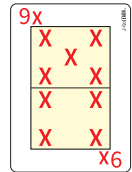
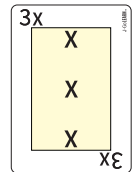
= -3X
Red cards represent negative amounts of the variable.

Companies “in the black” make money and companies “in the red” lose money.

Design Notes

To the best of our knowledge the Gold Deck is the first of its kind. It contains many design features that aid in the understanding of fundamental mathematics. For example:

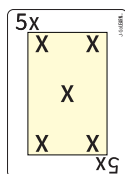
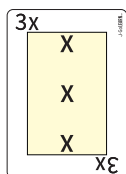
- The quantities in the corner of the card, such as the 3X shown, have the letter symbol (**variable**) next to the number as it would appear in any algebra text.
- Multiplication is a short form for repeated addition. This key algebraic concept is featured on all 40 letter cards. The 3X found in the corner of the card means 3 times X. It represents the sum of the three large X symbols inside the box, $3X = X + X + X$.
- The use of recognizable patterns allows for instant recognition of quantities eliminating the need for counting.
- Unlike most cards the symbols within the yellow box never overlap. This makes visualizing answers easier and facilitates the covering of symbols with another card (see Two-Card Sums—Different colours—below).
- The numbers in the corners of the 10 dot cards represent integers.



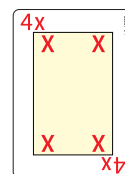
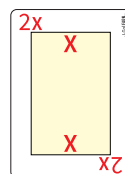
Two-Card Sums

When the cards are dealt, we now want to know how many X’s and Y’s we have or owe. This means that we must include the variables X and Y with the number in the answer where appropriate (these games have no winner). **Teaching Point (TP):** only quantities with the same symbol, known as **like terms** (see Glossary), can be added or subtracted.

- **Same colour and symbol**



black 3X black 5X
= black 8X
= +3X + 5X
= +8X or 8X



red 2X red 4X
= red 6X
= -2X - 4X
= -6X

Rule: Keep the sign (+ or -) of that colour, add the numbers, and include the letter symbol or variable.

TP: *The answer appears right in front of you*—total the symbols in the yellow boxes on both cards.

- **Different colours same symbol**

red 2Y black 7Y
 $=$ black 5Y
 $= -2Y + 7Y$
 $= +5Y$ or 5Y

Rule: Keep the sign (+ or -) of the colour that has more symbols, then ignore the colours and subtract ($7 - 2 = 5$) and include the variable. **TP:** Turn over the card with fewer symbols and cover that number of symbols on the other card—the answer ($+5Y$) appears in the yellow box on the card!

- **Opposites**

red 6Y black 6Y
 $= -6Y + 6Y$
 $= 0$

TP: Opposites add to zero.
TP: Zero has no sign.

Algebra Games—Like Terms

The Algebra Games continue the concepts learned from the 10 Integer Games.

11. Two-Card Sums (1-4 players)

Purpose: Learn to add and subtract like terms.

Set up: Separate the cards into three piles, X's, Y's, and number cards or **constants** (see Glossary). Use a different dealer for each pile if there are enough players.

Playing: Dealer 1 deals each player two X cards face up. Each player in turn must say their sum correctly before a new round of cards is dealt. Players collect their cards and return them to the dealer once the cards have run out. Then dealer 2 does the same for the Y cards, followed by dealer 3 for the constants (this game has no winner). **TP:** Start slow and build speed as you go.

Modification: To build confidence quickly—start by using only cards 1 to 8 for the X and Y suits.

12. Rapid Fire Sums (1 player, 1-3 dealers)

Purpose: Learn to add and subtract like terms more rapidly.

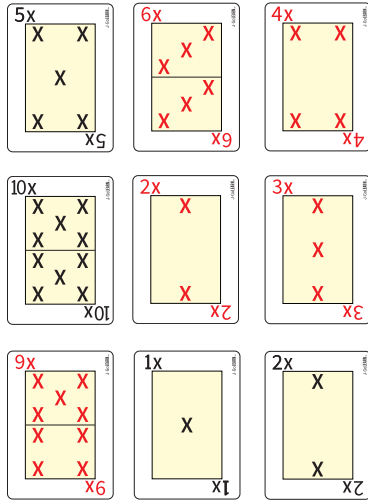
Set up: Separate the X's, Y's, and constants. A dealer is not a player until the roles are switched.

Playing: Deal two X cards to the player who responds verbally. If correct, immediately deal two more cards to the same player. If not, the dealer should respond with “incorrect” or “try again,” until the correct answer is given. When the X pile is empty continue play until all three piles are used up. At the same time, the player collects the cards and creates three separate piles. Shuffle all three piles when the cards run out. Alternate roles until a preset time limit is reached. In groups of three or four use multiple dealers. Extra dealers also serve as checkers.

13. Zero Sums (1-4 players)

Purpose: Identify a group of cards that make a zero sum. This will make it easier to find the sum of a long list of terms.

Set up: Separate the X's, Y's, and constants. Set aside the constants. Deal the X cards face up in a 3x3 array as shown.



Playing: Each player in turn removes any zero sum consisting of 2-5 cards, and keeps these cards (see the **TPs** below). The dealer replaces the missing cards in the 3 x 3 array before the next player takes a turn. If a play can't be made, the dealer returns the bottom row of cards to his stack and replaces them with three new cards without loss of turn. When the cards X cards run out, dealer 2 creates a new 3 x 3 array using the Y cards—continue play (keep your X and Y cards separate). When the Y cards run out the player with the most cards wins. **TP:** Look for opposites in the array such as $2X$ and $2x$. Identify three-card zero sums such as $2X$, $3X$ and $5X$, and four-card zero sums such as $4X$, $3X$ and $5X$, $2X$. **TP:** Have players verbalize the opposites such as “negative $7X$, positive $7X$.” For a simple five-card zero sum, combine any two and three-card zero sum. Follow the same **Modification** and **Teaching Points** as for game 7 Zero Sums.

14. Multiple Card Sums, One Variable (1-4 players)

Purpose: Determine the sum of three or more like terms.

Set up: Separate the X's, Y's, and constants. Set aside the constants. Use two dealers—one for the X cards and one for the Y cards.

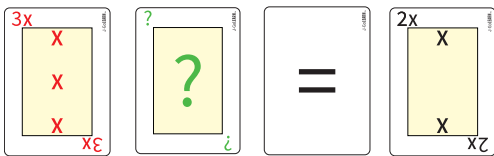
Playing: Follow the instructions and **TP's** for game 8. Use all the X cards first, then the Y cards.

Modification: Let each player decide the number of cards they wish to be dealt.

15. Find the Missing Quantity (1-4 players)

Purpose: Determine the value of the missing term (?) to make the equation true—and to develop higher level problem solving skills.

Set up: Separate the X's, Y's, and constants. Set aside the constants. Place a ? card followed by an = card in the middle of the table. Use two dealers—one for the X cards and one for the Y cards.



Playing: Deal one X card before the ? and another after the = sign, as shown. Follow the instructions and **TP** for game 9. When the X cards run out, continue play with the Y cards. (this game has no winner). Example: $3X$, $? = 2X$. Solution: $? = +5X$ or $5X$. **Modification:** In groups of 3 or 4 use the

spare ? and = sign cards and two dealers (one for the X's and one for the Y's) to speed up play.

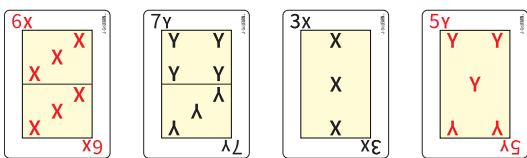
16. Multiple Card Sums, Two Variables (1-4 players)

Purpose: Learn to add and subtract multiple like terms in two variables.

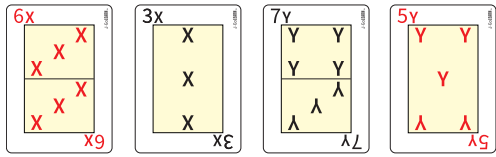
Set up: Separate the X's, Y's, and constants. Set aside the constants.

Use two dealers—one for the X's and one for the Y's.

Playing: The dealers work together alternating cards to create a four-card arrangement similar to the one below.



As shown below, Player 1 groups the cards by suit, X's with X's and Y's with Y's, before saying the answer aloud (“negative $3X$ plus $2Y$ ”).



Each player in the group watches the current player perform the grouping and serves as a checker for each hand. After a correct answer is given, player 1 collects the cards keeping the X's and Y's in separate piles. Then four cards are dealt to the next player and so on. Return cards to the proper

dealer when they run out. Work your way up to 5, 6, 7 cards or more—challenge yourself. You may wish to combine all the X and Y cards and use one dealer (this game has no winner). **TP:** Keep an eye out for zero sums—they can be discarded. **TP:** If a suit has three or more cards, you may want to subgroup them by colour as in the example below:

$$\begin{aligned}
 & 7X, 3Y, 8X, 6Y, 2X, 5Y, 4X \\
 = & 7X, 8X, 2X, 4X, 3Y, 6Y, 5Y \text{ (grouped by suit)} \\
 = & 8X, 4X, 7X, 2X, 6Y, 3Y, 5Y \text{ (subgrouped by colour)} \\
 = & 12X, 9X, 6Y, 8Y \\
 = & 3X, 2Y \\
 = & 3X - 2Y
 \end{aligned}$$

Modifications: 1) Vary the arrangement of the cards. Examples: X, Y, Y, X or X, Y, X, X (which has only one Y card). 2) Let each player decide the number of cards they wish to be dealt.

17. Multiple Card Sums, One Variable and Constants (1-4 players)

Purpose: Learn to add and subtract multiple like terms in one variable including constants.

Set up: Separate the X's, Y's, and constants. and set aside the Y's.

Use two dealers—one for the X cards and one for the constants.

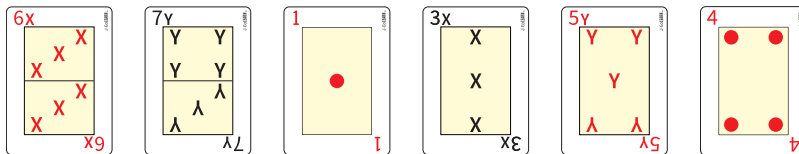
Playing: Follow the instructions for the previous game except, replace each Y card with a constant card. When the X's run out set them aside and repeat the game using the Y's and the constants.

18. Multiple Card Sums, Two Variables and Constants (1-4 players)

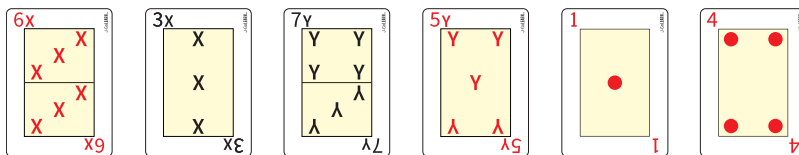
Purpose: Learn to add and subtract multiple like terms in two variables including constants.

Set up: Separate the X's, Y's, and constants. Use three dealers to start, if possible.

Playing: The dealers work together alternating to create a six-card arrangement similar to this.



Player 1 groups the X's, groups the Y's, and groups the constants. Covering can be done with the X's and the Y's to see the answer before say it out loud ("negative 3X plus 2Y minus 5").



Each member of the group watches the current player perform the grouping and serves as a checker for each hand. After a correct answer is given, player 1 collects

the six cards placing the X's, Y's, and constants into three separate discard piles. Six cards are dealt in a similar layout to the next player and so on. Cards are returned to the proper dealer once they have run out. Work your way up to 7, 8, 9 cards or more—challenge yourself. You may wish to combine all the X, Y, and constant cards and use one dealer (this game has no winner). **TP:** Keep an eye out for zero sums—they can be discarded. **TP:** Once grouped by suit, if a suit has three or more cards, you may choose to subgroup them by colour.

How to Read Answers

- When an answer contains two terms such as $4X$, $6Y$, it should be read as “negative $4X$ plus $6Y$ ” instead of “negative $4X$ and positive $6Y$.” This avoids the creation of double signs. **Rule:** replace “and positive” with “plus.”
- When an answer contains two terms such as $3X$, $2Y$, it should be read as “ $3X$ minus $2Y$ ” instead of “ $3X$ and negative $2Y$.” Rule: replace “and negative” with “minus.”

Reading and writing answers this way facilitates learning by using a single sign between each term.

Glossary

Constants – are quantities whose value does not change. Examples: 7, -3 , and 0.

Like Terms – have identical letter or variable parts. Examples: $8X$, $-6X$, $-4Y$, and $9Y$. They can also have no letter at all, appearing as numbers called constants. Examples: -4 , 7, 10, -1 . What makes like terms so important is that they can be added or subtracted.

For example:

$$\begin{aligned} &5X + 4Y - 1 + 2X - 9Y + 3 \text{ (first group the like terms)} \\ &= 5X + 2X + 4Y - 9Y - 1 + 3 \text{ (then add the like terms)} \\ &= 7X - 5Y + 2 \end{aligned}$$

The process of grouping, then adding and subtracting like terms can be performed beautifully using your **SUMthings Right**® cards.

Terms – can be numbers, letters, or the product of the two. Examples: 7, -8 , X , $3X$, $-5Y$. They can also contain fractions, decimals, and exponents.

Examples: $\frac{1}{2}W$, $1.5Y$, $4X^2$, but not on these cards.

Variable – is a letter or symbol that represents a value that can change.

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