

GOLDENTAIL'S COLOSSAL CARD GAME



To play this game with your friends, you will need a deck of cards, paper, and a pencil.

- ◆ Let each person select a card. Tell them not to show it to you.
- ◆ Have each of them number their paper from 1 to 13 in a column. Instruct them to write "Ace" next to the number 1, "Jack" next to 11, "Queen" next to 12, and "King" next to 13.
- ◆ Assign each suit a value as follows: Clubs = 1, Diamonds = 2, Hearts = 3, Spades = 4.

Now, have your friends follow the steps below.

STEPS	EXAMPLE (King of Hearts)
Step 1: Write Down your card number.	13 ← (King = 13)
Step 2: Multiply that number by two.	$13 \times 2 = 26$
Step 3: Add three to the product.	$26 + 3 = 29$
Step 4: Multiply the sum by five.	$29 \times 5 = 145$
Step 5: Add your suit value to the product.	$145 + 3 = 148$ (Hearts = 3)



Let your friends know that you can guess their card if they tell you their totals. Don't be surprised if no one believes you can do it! Here's the secret:

Just subtract **15** from the total!

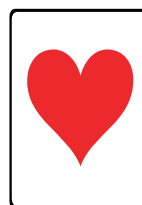
$$\begin{array}{r} 148 \\ - 15 \\ \hline \end{array}$$

133

◆ The hundreds digit and tens digit of the difference reveal the card value.

◆ The ones digit of the difference reveals the suit value.

King = 13

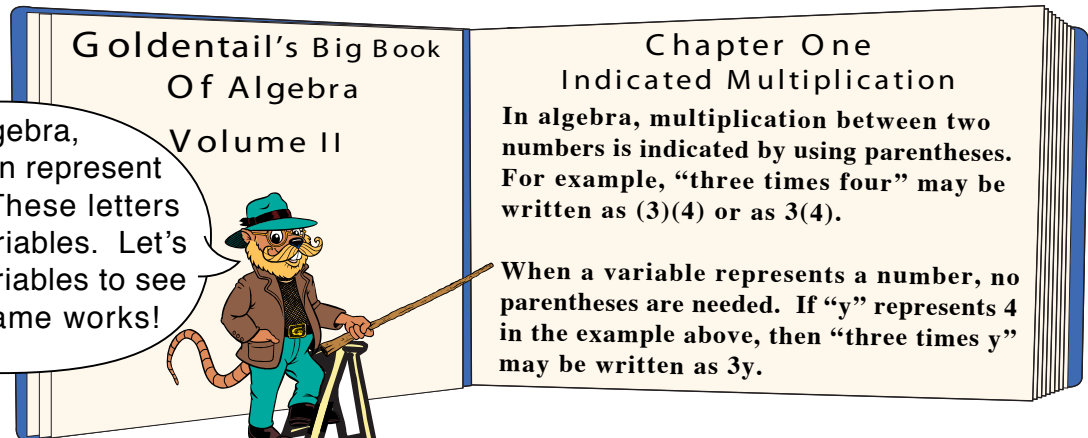


Hearts = 3

(See the following page for an algebra lesson based on this activity.)

THE ALGEBRA OF GOLDENTAIL'S COLOSSAL CARD GAME

To understand why 15 is the number that disguises a card's identity in Goldentail's Colossal Card Game, we must use algebra.



In algebra, letters often represent numbers. These letters are called variables. Let's use some variables to see how my game works!

Chapter One
Indicated Multiplication
In algebra, multiplication between two numbers is indicated by using parentheses. For example, "three times four" may be written as (3)(4) or as 3(4).
When a variable represents a number, no parentheses are needed. If "y" represents 4 in the example above, then "three times y" may be written as 3y.

Goldentail will never guess that I have the ace of hearts!

I'll use "c" as the variable for the card value and "s" for the suit value.



ELOISE'S EXAMPLE
 Step 1: Write your card number: 1
 Step 2: Multiply by 2: $1 \times 2 = 2$
 Step 3: Add 3: $2 + 3 = 5$
 Step 4: Multiply by 5: $5 \times 5 = 25$
 Step 5: Add your suit value: $25 + 3 = 28$
 The total for Eloise's card is 28

GOLDENTAIL'S ALGEBRA
 Step 1: Card number: c
 Step 2: $2 \times c = 2c$
 Step 3: $2c + 3$
 Step 4: $5(2c + 3) = 10c + 15^*$
 Step 5: $10c + 15 + s = 10c + s + 15^{**}$
 *distributive property **commutative property

My number is 28!

Let's see...
 $10c + s + 15 = 28$, so
 $(10c + s + 15) - 15 = 28 - 15$.
 That means $10c + s = 13$.
 $10(1) + 3 = 13$, so...
 $c = 1$, and $s = 3!$

Your card is the ace of hearts!



Remember, c is the variable for the card value, and s for the suit value.