Chapter

2

Using Algebra to Explain

Contents

2-1 The Distributive Property and Removing Parentheses

2-2 The Distributive Property and Adding Like Terms

2-3 Explaining Number Puzzles

2-4 Opposites

2-5 Testing Equivalence

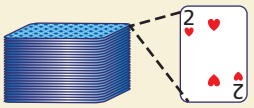
2-6 Equivalent Expressions with Technology

2-7 Explaining Addition and Subtraction Related Facts

2-8 Explaining Multiplication and Division Related Facts

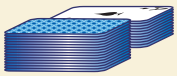
Here is a card trick that can be explained using algebra. The trick is typically performed with two people: an illusionist and a spectator. The spectator should not read the directions while the illusionist is performing the trick.

Directions

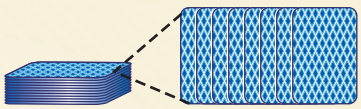


Step 1 Before the trick begins, shuffle a deck of cards. Look at the card in the ninth position from the top of the deck. Without letting the spectator see, write what the card is on a piece of paper, fold the paper several times, and give it to the spectator. Tell the spectator not to open it.

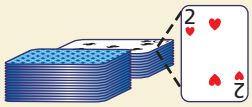
Step 2 Ask the spectator to choose any number from 10 to 19. Count out that number of cards from the top of the deck. For example, if the spectator chooses 17, count out 17 cards from the top of the deck. Put them in a smaller, new pile faceup next to the deck of cards.



Step 3 Tell the spectator to add the digits of the number they choose. Count out that number of cards from the top of the smaller pile and place them back on top of the original deck. For example, the sum of the digits of 17 is 8. So place 8 cards from the smaller pile back on top of the original deck.



Step 4 Tell the spectator to open the piece of paper. The top card on the smaller deck should match the card written on the piece of paper.



In this chapter, you will use the properties of algebra to explain relationships among numbers, show equivalence, and explain why number tricks, such as this one, work.