

Courtney's Collection

Level D

Courtney's grandmother said, "Your grandpa has different shoeboxes with other stamps. One of his shoeboxes has just 4 cent, 6 cent, and 8 cent stamps. Which totals can you make with these stamps?"

Courtney said, "I wonder why there is a difference between the totals I can make based on the types of stamps in each box. I like finding all of the combinations I can make, but with Grandpa's box, I can make totals of any even number except 2. That means there are certain totals I cannot make, no matter how I combine the stamps. I wonder if this is true for some sets of stamps and not for others?" She continued, "I am going to investigate which three stamp amounts have totals that are impossible while others don't. I am going to compare three different sets. I will try 6 cents, 7 cents, and 8 cents. Then I will try 6 cents, 9 cents, and 12 cents. Finally, I will try 6 cents, 8 cents, and 9 cents."

Explain whether the three different sets of stamps have a finite or infinite set of totals that are impossible to make. What is it about the sets of values that distinguishes them in this way?

