

7.3 PROJECT

THE BAKER'S DOZEN

In the sixteenth century, bakers in the United Kingdom who sold their goods by the dozen (12 items) were obligated to meet specific weight and quality standards. Failing to do so was considered a crime. To avoid punishment, it became a common practice to include an additional item with the dozen purchased to assure the law was properly obeyed. This became known as the baker's dozen.

One particular baker served six customers: Anne, Elinor, Giles, Lancelot, Rose, and Florence. The baker placed their orders on the counter and asked them to verify that their orders were correct and that the orders were, indeed, a baker's dozen each.

Anne nodded her head and confirmed, "Yes. 13." The other five nodded as well. Elinor said, "15 exactly!" Giles smiled, "23 for me. Perfect." Lancelot added, "1101 here. Thank you!" Rose happily counted, "10 for me! Yum!" Finally, Florence, about to sample a morsel, gave a thumbs up and said, "11. I love a baker's dozen!"

The baker looked confused. He knew he had put exactly the same number of items in each customer's box. As the pleased clients left the bakery, the solution to the puzzle dawned on him.

1. Explain the apparent contradiction with the numbers and how each customer arrived at their count. Be sure to support your explanation with useful mathematical expressions and equations.

Later that day, the baker asked his assistant to count the remaining inventory and determine how many items they sold during the day. The assistant counted that there were 22 items left in the inventory. The baker knew they started with 175 items and said, "We've sold 159 items today!" His assistant replied with "No! We sold 243 today."

2. Explain how both the baker and his assistant are correct.