

# 4.1 Drawing Area Models to Find the Sample Space

Bucket 1 contains three marbles—one red and two green. Bucket 2 contains four marbles—one red, one blue, one green, and one yellow. The player draws a marble from each bucket.



Bucket 1



Bucket 2

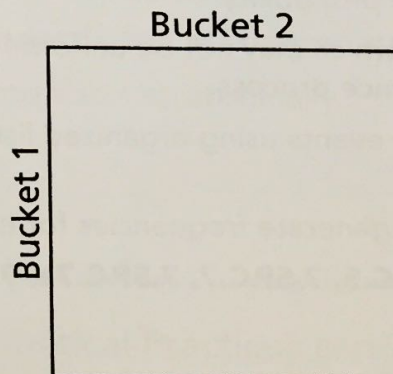


How can we analyze this two-stage situation so that we can predict what outcomes can occur and with what frequency?

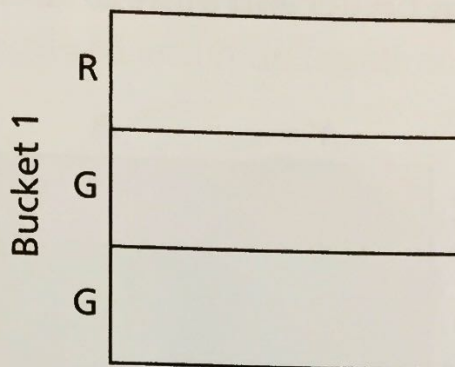


## Problem 4.1

Miguel draws a square to represent an area of 1 square unit. He will use the square's area to represent a probability of 1. The square represents the sum of all of the probabilities for all of the possible outcomes.



- A** Miguel adds to his diagram to help him find the theoretical probabilities of drawing marbles from Bucket 1.



1. Explain what Miguel has done so far. Does this look reasonable?
  2. Use the top edge to represent Bucket 2. How many sections do you need to represent the marbles in Bucket 2? Draw the lines and label the sections you need to represent Bucket 2.
  3. Now label each of the sections inside the square with two letters to represent the results of choosing two marbles. RR in a section would mean that two red marbles were drawn from the buckets.
- B** Use your probability area model from Question A to answer each part.
1. What are the probabilities for selecting each pair of marbles?
 

a. RR	b. RB	c. RG
d. RY	e. GR	f. GB
g. GG	h. GY	i. YY
  2. Use your drawing to answer these questions:
 

What is the probability of choosing a marble from each bucket and

    - a. getting at least one red?
    - b. getting at least one blue?
    - c. getting at least one green?
    - d. getting at least one yellow?