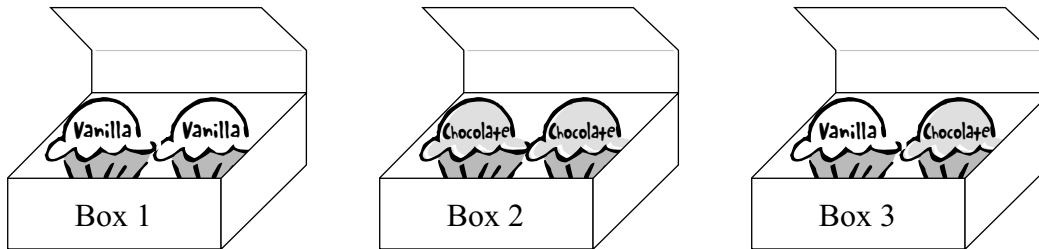


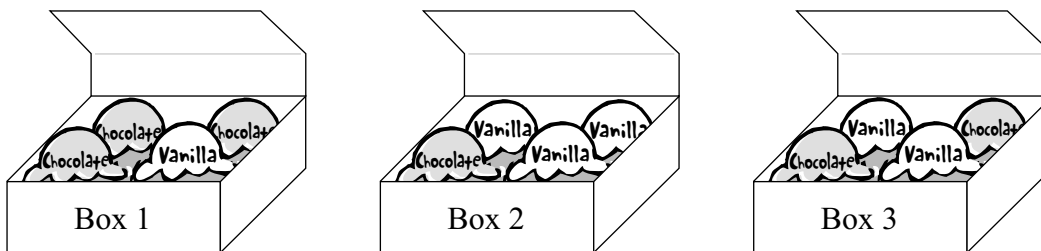
## PROBLEM 4

### Probability

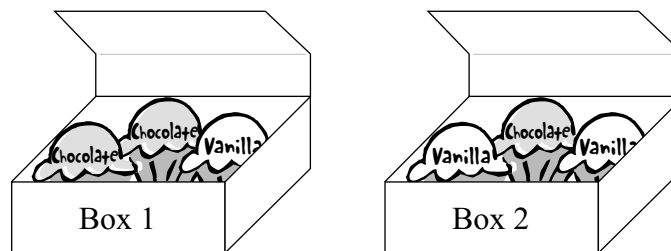
- a) A Mathematics 12 student arrives at a school Math party with three boxes and announces “These three boxes I am carrying each contain 2 cupcakes—one box has 2 vanilla, one box has 2 chocolate, and one box has 1 of each.” She then randomly selects a box, opens it and randomly selects a cupcake. This first cupcake is chocolate. If the other cupcake is then pulled from the **same** box, what is the probability that it will be chocolate?



- b) Another student walks in carrying three boxes and announces “These three boxes I am carrying each contain 4 cupcakes—one box has 3 chocolate and 1 vanilla, one box has 3 vanilla and 1 chocolate, and one box has 2 of each.” He then randomly selects a box, opens it and randomly selects a cupcake. This first cupcake is vanilla. If one more cupcake is then randomly pulled from the **same** box, what is the probability that it will be vanilla?



- c) Finally, the Mathematics teacher arrives carrying 2 boxes and announces “These 2 boxes I am carrying each contain 3 cupcakes—one box has 2 chocolate and 1 vanilla, and the other box has 2 vanilla and 1 chocolate.” She then randomly selects a box, opens it and randomly selects a cupcake. This first cupcake is chocolate. If one more cupcake is then randomly pulled from the **same** box, what is the probability that it will be vanilla?



**Note:** In all of the above problems, there is an equal probability of each cupcake being the initial cupcake.