



## Problem of the Week

### Problem B

### "Draft/Schraft"

#### Problem

In a hockey draft lottery, teams are given a certain percent chance of winning the # 1 pick, based on how they placed the year before. Their chances are represented by coloured ping pong balls, with each team having a percentage of balls based on their standings in the previous year. Suppose a possible set of results from last year gives the following chances:

- Columbus Red Coats 20% (20 chances out of 100 to win the number one pick);
- Toronto Maple Stumps 13.5% (13.5 chances out of 100 to win the number one pick);
- Arizona Toy Poodles 11.5%;
- Carolina Gentle Breezes 10%;
- Buffalo Lightsabres 8%;
- the remaining teams in the league have a combined 37% of the wins.

- a) Why can't a total of only 100 ping pong balls be used for the draw?
- b) What is the fewest number of balls needed to run the lottery?
- c) How many ping pong balls would Columbus get in the draw, assuming the fewest number of balls were used?
- d) How many balls would Toronto get?

EXTENSION: If Columbus wins the first pick and all their ping pong balls are removed from the draw, what is the probability that Buffalo will get the second pick? Give your answer as a fraction in lowest terms.

#### Solution

- a) A total of 100 ping pong balls is not enough, since it doesn't give any way of representing 0.5%.
- b) Since no fraction of a percent occurs other than 0.5% in the known data, the lottery can be run with a minimum of 200 balls. That is, one ball for each 0.5% in 100%.
- c) If 200 balls are used, Columbus would get 20% of the total, 20 balls for each hundred or a total of  $2 \times 20 = 40$  balls.. We can get the same result multiplying 200 by 0.2.
- d) If 200 balls are used, Toronto would get 13.5% of 200, or 27 balls.

EXTENSION: If Columbus wins the first pick, and their 40 balls are removed, there will now be  $200 - 40 = 160$  balls remaining. Buffalo's has 8% of 200 balls, or 16 balls of the remaining 160 balls.

Thus the probability of Buffalo getting the second pick is  $\frac{16}{160} = \frac{1}{10}$ .

