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Elementary Statistics | (9th Edition)

Problem

Use random numbers to simulate the experiments. The number in parentheses is the number of times the experiment should be repeated.

Prizes in Caramel Corn Boxes A caramel corn company gives four different prizes, one in each box. They are placed in the boxes at random. Find the average number of boxes a person needs to buy to get all four prizes. (40)

Step-by-step solution

Step 1 of 3

Step 1: List all possible outcomes. They are 1, 2, 3, 4.

Step 2: Assign the probabilities. Each outcome has a probability of $\frac{1}{4}$.

Step 3: Set up a correspondence between the random number and the outcome. Use random numbers 1 through 4. Omit the numbers 5, 6, 7, 8, 9 and 0.

Step 4: Select a block of random numbers, and observed 1 though 4 until to get all four prizes.

Step 5: Repeat the experiment and tally the outcomes.

Comment

Step 2 of 3

Trail	Random Numbers	Number of tosses
1	1 4 1 1 1 3 2	8
2	1 1 1 4 1 4 1 1 4 1 4 2 3	13
3	2 1 2 1 2 2 3 4	9
4	3 2 3 3 3 1 2 2 3 4	9
5	2 3 3 4 2 1	6
6	1 4 3 1 2	5
7	4 1 3 4 3 2	6
8	2 2 2 3 3 4 1	7

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11	3 1 3 3 4 2	6		
12	4 2 1 3	4		
13	3 2 4 3 1	5		
14	1 3 3 4 4 3 3 1 3 4 1 4 4 4 1 1 3 2 2 1 3 1 1 2	24		
15	1 1 2 4 1 3	6		
16	4 4 2 1 4 1 1 2 1 2 3	11		
17	4 1 3 2	4		
18	1 1 1 4 2 1 2 3	8		
19	4 1 2 1 3 2 1 1 1 2 4	11		
20	4 3 4 4 2 2 2 4 2 4 2 3 1	13		
21	1 1 1 4 1 3 4 4 1 3 4 4 3 2	14		
22	1 3 2 1 1 3 4	7		
23	1 2 2 3 1 1 4	7		
24	3 2 1 2 2 2 4	7		
25	1 4 4 1 4 2 4 3	8		
26	4 2 3 2 3 1	6		
27	4 3 4 2 3 1	6		
28	1 2 1 1 4 3	6		
29	1 1 3 4 4 3 2	7		
30	3 3 1 1 2 4	6		
31	4 4 4 4 1 4 3 4 3 3 4 2	12		
32	3 3 3 3 3 2 3 1 1 3 1 4	12		
33	3 1 1 4 1 3 4 2	8		
34	2 1 2 3 1 3 3 2 3 1 3 1 1 4	14		



36	3 3	Chapter 14.3, Problem 16E	1 Bookmark	Show all steps: ON
37	3 2 2 1 2 4	6		
38	1 2 2 3 4	5		
39	1 1 3 3 3 2 2 4	9		
40	2 3 2 3 2 3 4 3 3 4 3 3 2 1	14		
	Total:	337		

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Step 3 of 3

Step 6: Compute the result and draw a conclusion. In this case, we find the average.

$$\begin{aligned}\bar{X} &= \frac{\sum X_i}{n} \\ &= \frac{337}{40} \\ &= 8.425\end{aligned}$$

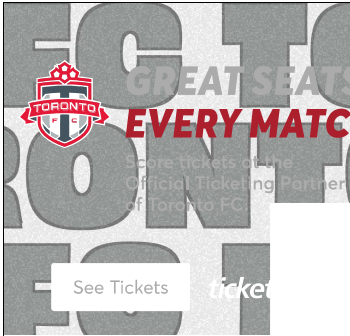
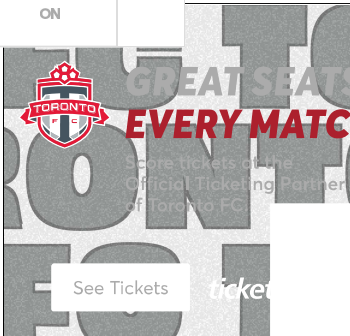
The average number of boxes needs to buy to get all four prizes is 8.

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