Chance & Data

A Chance and data: Displaying sample spaces

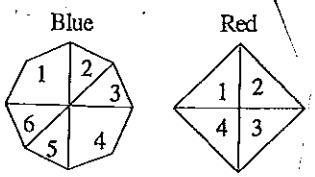
One bag contains red counters numbered 1 to 7 and another bag contains blue counters numbered 8 to 12. List the sample space of choosing:

1 One disk from each bag.

2 One disk from the first bag, it being replaced and another disk selected from the same bag.

B Chance and data: Probability of multiple independent events

1 Each of these spinners is spun once. Find the probability of:



(a) Spinning each number on the blue spinner

(b) spinning each number on the red spinner

(c) spinning two 1's

(d) spinning two 2's

(e) spinning two 3's

(f) spinning two 4's

(g) spinning two even numbers

(h) spinning two odd numbers

2 A bag contains 3 red and 4 blue balls. A ball is selected and its colour noted and then it is replaced. This process occurs two more times. Find the probability that:

(a) All the balls are red

(b) all the balls are blue

(c) the balls are chosen in the order red, blue, red

(d) one ball is red and the other two are blue

C Chance and data: Probability of multiple dependent events

A bag contains 7 red balls, 5 blue balls and 3 white balls. A ball is selected at random and kept out of the bag. This process continues another two times.

Find the probability of selecting:

1 Three red balls

2 three blue balls

3 three white balls

4 red, blue and white in that order

5 red, red then white in that order

6 three difference coloured balls in any order *

7 two red and a white ball in any order *

(*List the orders to help work it out.)

D Chance and data: Probability and gambling odds

1 Express the odds on these horses winning as probabilities (numbers between 0 and 1)

Blue Boy 4:1, Cousin Chris 2:3, Green Goblin 16:1, Ratty Matty 16:1, Red Brat 7:1, Helen's Boy 4:7, Jenny's Joy 4:3, Steve's Sprinter 5:8, Billy Boy 3:1, Una's Champ 100:1.

2 Find the payout for each of the horses in 1 for the win if $25 is bet in each case.

E Chance and data: Simulating experiments

1 Design a spinner to model the selection of a letter from this set:

$\{A, A, A, B, B, C, C, D, D, D\}$.

2 When the RAN button on a calculator is pressed, it shows a number less than 1, to three decimal places. Multiplying each of these numbers by 1000 will turn them into whole numbers between 0 and 999.

(a) Assign number ranges to represent to different letters in the bag described in 1.

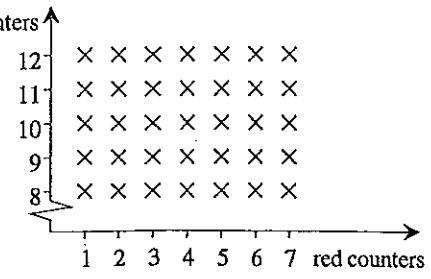
(b) Generate twenty random numbers using the method described above.

(c) Change the numbers into the letters that they represent.

This result models the drawing of a letter from the bag twenty times.

Chance & Data Answers

A 1



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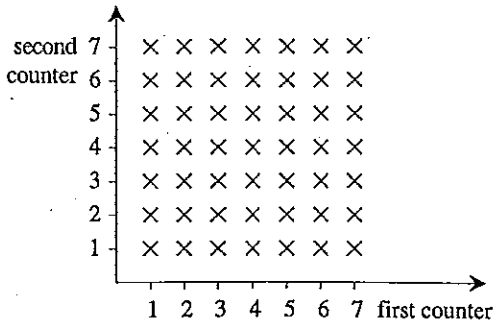


B 1 (a) Blue spinner

Number	1	2	3	4	5	6
Probability	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{8}$

(b) Red spinner

Number	1	2	3	4
Probability	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$

(c) $\frac{1}{16}$ (d) $\frac{1}{32}$ (e) $\frac{1}{32}$ (f) $\frac{1}{16}$

(g) $\frac{1}{4}$ (h) $\frac{1}{4}$

2 (a) $\frac{27}{343}$ (b) $\frac{64}{343}$ (c) $\frac{36}{343}$ (d) $\frac{144}{343}$

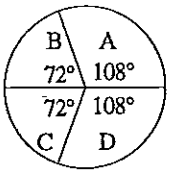
C 1 $\frac{1}{13}$ 2 $\frac{2}{91}$ 3 $\frac{1}{455}$ 4 $\frac{1}{26}$

5 $\frac{3}{65}$ 6 $\frac{3}{13}$ 7 $\frac{9}{65}$

D

	1 Probability of winning	2 Pay out
Blue Boy	$\frac{1}{5}$	\$125
Green Goblin	$\frac{1}{17}$	\$425
Red Brat	$\frac{1}{8}$	\$200
Jenny's Joy	$\frac{3}{7}$	\$58.33
Billy Boy	$\frac{1}{4}$	\$100
Cousin Chris	$\frac{3}{5}$	\$41.67
Ratty Matty	$\frac{1}{17}$	\$425
Helen's Boy	$\frac{7}{11}$	\$39.29
Steve's Boy	$\frac{8}{13}$	\$40.63
Una's Champ	$\frac{1}{101}$	\$2525

E 1



2

Letter	*Allocated Numbers*
A	0 → 299
B	300 → 499
C	500 → 699
D	700 → 999

Sample simulation:

742, 254, 63, 476, 61, 455, 560, 662, 746, 655, 49,
D A A B A B C C D C A
980, 688, 785, 181, 477, 84, 240, 651, 620
D C D A B A A C C