

More Practice with Discrete Random Variables:

List complete *sample space*, determine the values of X for each event and the *probability distribution*.

1. A coin is tossed and a regular die is rolled. Let X be the sum of the number of Heads **and** the number of dots on the die.
2. Two dice are tossed. Let X = absolute value of the difference in their values. Find the distribution of X .
3. Suppose that 20 % of students own a mountain bike. If you sample 3 students at random and count the number, X , who own mountain bikes find the distribution of X
4. You draw two cards from a deck of 52 cards *without replacement* . Let X be the number of face cards. Find the distribution of X
5. A box contains chips numbered 2, 4, 6 and 8.
 - a) If a single chip X is drawn give the distribution of X
 - b) Suppose two chips are drawn without replacement and the average of the two chips is calculated. Give the sample space and the distribution of the average.

Answers - Discrete Random Variables

5.6

1

DIE COIN	1	2	3	4	5	6
H	2	3	4	5	6	7
T	1	2	3	4	5	6

$$n = 2 \times 6 = 12$$

X = Sum of # Heads + # on Dice

X	P(X)
1	1/12
2	2/12
3	2/12
4	2/12
5	2/12
6	2/12
7	1/12

2

2nd 1st	1	2	3	4	5	6
1	0	1	2	3	4	5
2	1	0	1	2	3	4
3	2	1	0	1	2	3
4	3	2	1	0	1	2
5	4	3	2	1	0	1
6	5	4	3	2	1	0

$$n = 6 \times 6 = 36$$

X = |Difference|

X	P(X)
0	6/36
1	10/36
2	8/36
3	6/36
4	4/36
5	2/36

3. X = # who own a mountain bike

$$P(\text{Bike}) = .20 \quad P(\bar{B}) = .80$$

X	P(X)
0	$(.80)^3 = .512$
1	$(.20)(.8)(.8) + (.8)(.2)(.8) + (.8)(.8)(.2) = .384$
2	$(.2)(.2)(.8) + (.2)(.8)(.2) + (.8)(.2)(.2) = .096$
3	$(.2)^3 = .008$

#4. $X = \# \text{ Face Cards}$

Face Cards = J, Q, K
(12 of 52)

X	P(X)
0	$\binom{40}{52} \binom{39}{51} = .588$
1	$\binom{40}{52} \binom{12}{51} + \binom{12}{52} \binom{40}{51} = .362$
2	$\binom{12}{52} \binom{11}{51} = .050$

#5 a) let $x = \#$ on the ~~draw~~ chip

X	P(X)
2	$\frac{1}{4}$
4	$\frac{1}{4}$
6	$\frac{1}{4}$
8	$\frac{1}{4}$

b) let $x = \text{average on 2 chips}$

2nd / 1st	2	4	6	8
2	X	3	4	5
4	3	X	5	6
6	4	5	X	7
8	5	6	7	X

X	P(X)
3	$\frac{2}{12}$
4	$\frac{2}{12}$
5	$\frac{4}{12}$
6	$\frac{2}{12}$
7	$\frac{2}{12}$

$n = 4 \times 3 = 12$