

Probability – Probability Distributions with Discrete Random Variables

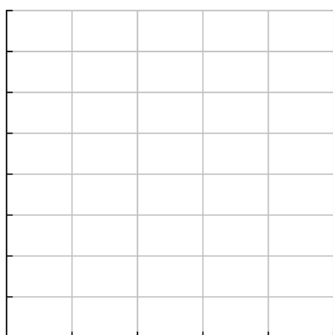
- **discrete random variable** → a variable whose _____ is the _____
- **probability distribution** → a function that maps the _____ to the _____ of the _____ in the sample space which can be visually represented by a _____

Examples: Complete each problem appropriately.

- 1.) The table shows the distribution of the number of heads when 4 coins are tossed.

H = Heads	0	1	2	3	4
Probability	$\frac{1}{16}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{1}{16}$

- a.) Create a probability histogram.



- b.) What is the probability of getting three heads?

- c.) What is the probability of getting at least two heads?

- d.) What is the probability of getting no more than one head?

- 2.) The instructor of a large class gives 15% of A's and D's, 30% of B's and C's, and 10% of F's. Let x be the random variable assigned to a student's grade on a 4-point scale, where $A = 4$, $B = 3$, etc.

- a.) Create a probability table that models the information above.

x = student's grade					
Probability					

- b.) If a student is selected at random from this class, what grade would we expect them to have?

- c.) What percent of the class is passing?

- d.) What percent of the class has a B or better?

- 3.) The table shows the probabilities for the number of people who live in a typical U.S. household.

x = number of occupants	1	2	3	4	5	6	7
Probability	0.25	0.32		0.15	0.07	0.03	0.01

- a.) What is the probability of people in the U.S. leaving in a household with 3 occupants?

- b.) If a random U. S household is selected, how many occupants would we expect to find leaving there?

- c.) What percent of U.S. households have at least 5 people living there?

- d.) What percent of U.S. households have no more than 3 people living together?

Simulation Activity:

Roll a pair of dice forty times and find the sum of the dice that is rolled for each trial.

Write your information on the provided table.

Trial #	Dice # 1	Dice # 2	Sum of Dice	Trial #	Dice # 1	Dice # 2	Sum of Dice
1				21			
2				22			
3				23			
4				24			
5				25			
6				26			
7				27			
8				28			
9				29			
10				30			
11				31			
12				32			
13				33			
14				34			
15				35			
16				36			
17				37			
18				38			
19				39			
20				40			

- a.) Complete the probability table from your chart above. Hint: Denominator in the probability row should be 36 (from multiplying $\frac{1}{6} \times \frac{1}{6} = \frac{1}{36}$) but each numerator should be different based on its sum from your simulated activity.

X = Sum	2	3	4	5	6	7	8	9	10	11	12
Prob as a fraction											

- b.) Make a histogram of your probability table.



- c.) Which sum showed up the most frequent?

- d.) A certain sum will show up more than any others. What sum do you think this is?
EXPLAIN!!