2.7 – Probability Distributions with Discrete Random Variables

– **discrete random variable** → a variable whose _____ is the _____

– **probability distribution** → a function that maps the _____ to the _____

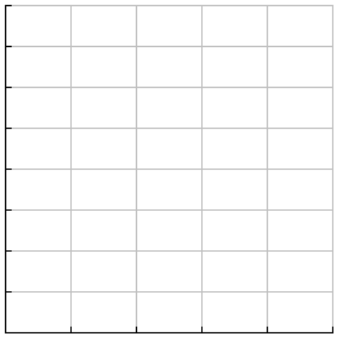
of the _____ in the sample space which can be visually represented by a _____

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 then 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:

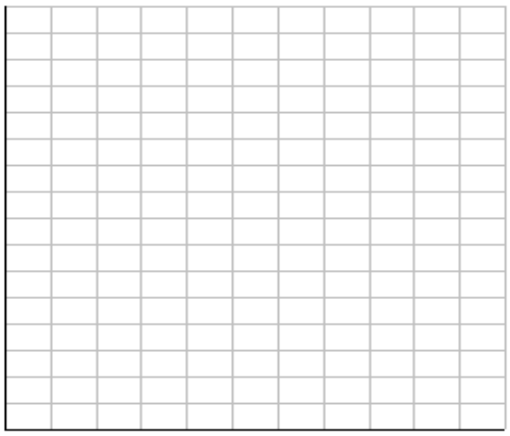
Roll a pair of dice forty times and find the sum of the dice that is rolled for each trial.
Write your information on the provided table.

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!!