

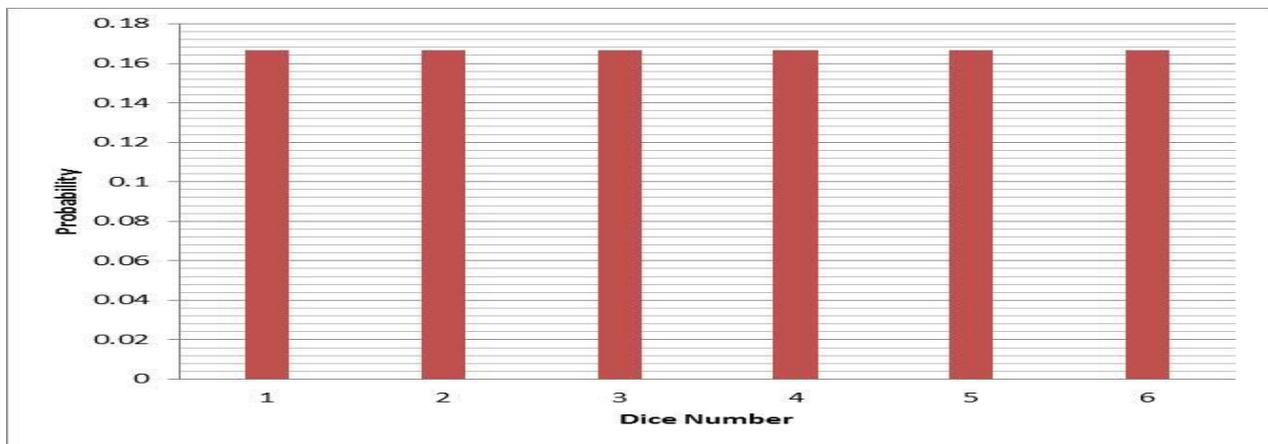
Probability Distributions and Expectation Values – Practice

Name: _____ Date: _____

Example:

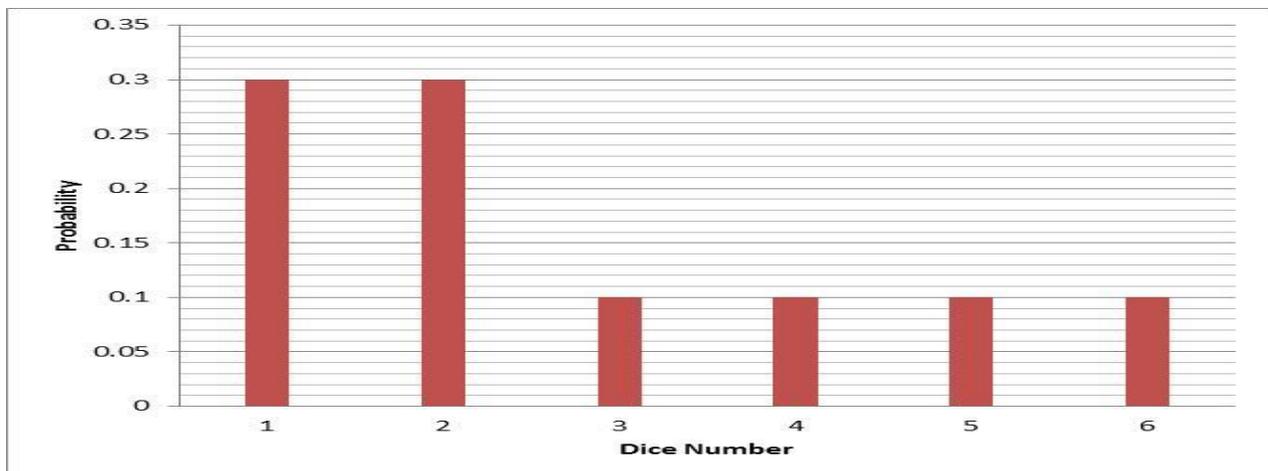
A normal die when rolled has a $1/6$ probability of landing on any one of the 6 faces. This type of probability distribution is called a **uniform** distribution.

Graphing the **probability histogram** looks like this:



Example 2:

Consider a dice that is “loaded.” The outcomes of each face are not equally likely. The probability of rolling a 1 is $P(1) = 0.3$, and the probability of rolling a 2 is $P(2) = 0.3$ and the probability of the other four remaining numbers is 0.1. This is a **non-uniform** distribution.



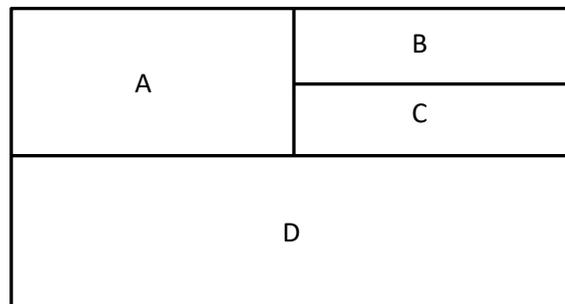
1. What does the sum of the probability distribution always equal? Check with the distributions above.
2. Calculate the expected value for both of the die in the examples above.
 - a) The regular die.
 - b) The “loaded” die.

Try These:

1. Given the distribution below:

x	$P(x)$
1	0.35
2	0.42
3	0.11
4	0.12

- a) Draw the probability histogram for the following distribution
 - b) Calculate the expectation value.
2. A game consists of bean bag that is thrown blind folded onto a game board (so it is a random where the bean bag lands). I always lands on the board in this example. The board is shown below. Region A awards 1 point if the bag lands there, Region B awards 2 points, Region C awards 3 points and region D penalizes the player by 4 points.



- a) Calculate the expectation value of the game.
 - b) Is the game fair? Why or why not.
3. A game consists of a spinner that has the following attributes. Half of the spinner is red and awards 3 points. Three quarters of the remaining half is blue and deducts 7 points. The remaining section is yellow. How many points must it be worth (awarded or deducted) such that the game is fair? Also, sketch the circle with the sections clearly labelled.