## Probability Worksheet 1

## Introduction

These initial problems will help get us oriented in a context that is more familiar. In each, we will be referring to a standard "die" (singular of dice) that has 6 faces, each with an equal chance of being rolled

Part A What is the chance of getting a 1 when rolling a die once?

Part B When rolling a die once, what is the chance of rolling a 1 or a 2?

Part C When rolling a die once, what is the chance of rolling a 1 and a 2?

**Part D** What is the chance of rolling a 1,2,3,4,5, or 6?

**Part E** What is the chance of *not* rolling a 2?

## Problem 1 (Addition Rule)

**Question 1** Here, we concern ourselves with 10,000 individuals who either (1) rent their home (3,858), (2) have a mortgage on their home (4,789), or (3) own it outright (1,353).

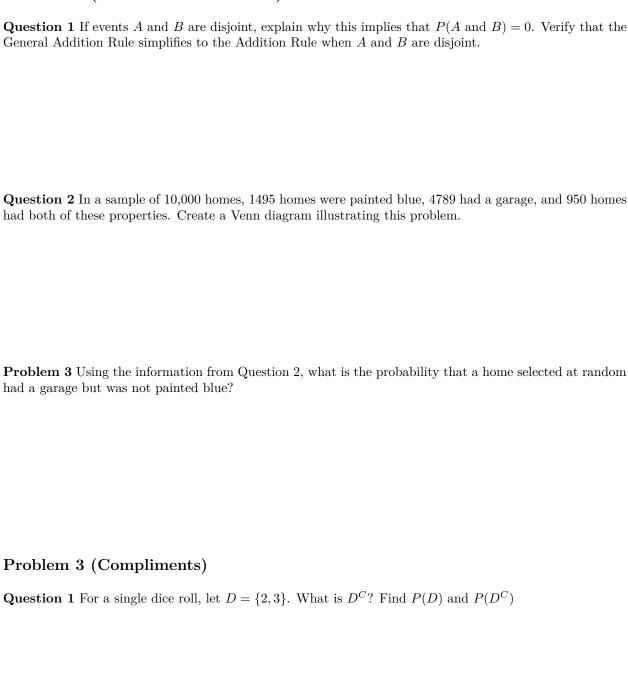
- What proportion of individuals have either a mortgage or own it outright?
- If we select one person out of this 10,000 at random, what is the probability that this person either owns their own or has a mortgage?

Question 2 Consider rolling a dice where we define three different events:

$$A = \{1, 2\}, \quad B = \{4, 6\}, \quad D = \{2, 3\}$$

- What is the probability of event A?
- Are events B and D disjoint? Confirm the addition rule by finding the probability that either B or D occurs

Problem 2 (C	General	Addition	Rule)
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	Hear		
Treatment	Attack	No Attack	Total
Placebo	189	10,845	11,034
Aspirin	104	10,933	11,037
Total	293	21,778	22,071

## Problem 4 (Empirical Probabilities)

This data is from a report published in 1988 that summarizes the results of a Harvard Medical School clinical trial determining effectiveness of aspirin in preventing heart attacks in middle-aged male physicians}.

For all questions, restate the probability in terms of probability notation you've seen.

Question 1 What is the probability that a randomly selected physician had a heart attack?

Question 2 What is the complement of the event in question 1? What is the probability of the complement?

Question 3 What is the probability that a randomly selected physician was taking aspirin?

Question 5 Using your previous answers, what is the probability that a randomly selected physician was taking aspirin or had a heart attack?

**Question 4** What is the probability that a randomly selected physician was taking aspirin *and* had a heart attack? Think about where this number comes from on the table and why it's called an intersection.