

TASK: Consider an experiment where we first toss a coin and note the outcome and then roll a six-sided die and note the outcome.

(a) Write a set of ordered pairs that represents **all outcomes** for this experiment. For example, (H, 4) means you flip a head on the coin and roll a 4 on the dice. This is called the **sample space**, set **S**.

(b) Write a set of ordered pairs that represents the event of getting a tail and an even number. Call this set **A**.

(c) The **complement of a set A** will be all of the events in the sample space **S** that **DO NOT** fall into set **A**. Write out the complement of set A, called set **B**.

(d) Find the probability of event **A**, or $P(\mathbf{A})$, and the probability of event **B**, or $P(\mathbf{B})$.

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- [What is a Complement?](#)
- [What does it mean to be Mutually Exclusive?](#)

APPLICATION/PRACTICE:

1. Consider rolling a single six-sided die and recording the result. Let set A be the event of rolling a number greater than 4 and let set B be the complement of set A.

(a) Find $P(\mathbf{A})$ and $P(\mathbf{B})$.

(b) What is true of the sum $P(\mathbf{A}) + P(\mathbf{B})$?

2. If the probability I will draw a red marble from a bag is $\frac{3}{17}$, what is the probability that I won't draw a red marble?

3. If the probability that it will rain tomorrow is 20%, what is the probability that it won't rain tomorrow?

4. Consider the experiment of picking one of the 12 months at random. Use complements to determine what is the probability of picking a month that does not start with the letter J?

5. Which of the following pairs of events is mutually exclusive?

(1) Two Cards: Aces and Spades

(3) Two Dice: Odd and Even

(2) Sit down and stand up

(4) Sit down and scratch your nose