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- A game: You get to open one of two doors.
  - Between one door is \$1000.
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  - OR instead of playing, you can take \$500.

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  - Behind one door is \$10.
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  - Does your certainty equivalent change?

Lawsuit

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  - Trial costs the plaintiff $\$10,000$.
  - There is a 50% chance that the plaintiff will win $\$100,000$.
  - There is a 30% chance that the plaintiff will win $\$20,000$.
  - There is a 20% chance that the plaintiff will lose.
  - How much should you offer as a settlement?

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- An **event** is some collection of outcomes.
- The **probability** of an event is the fraction of times it tends to occur when repeating the experiment many times:

$$P(A) = \frac{\text{number of times event A occurs in } N \text{ trials}}{\text{number of trials, } N},$$

when N is large.

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- i.e., the more ways A can happen, the more likely A is to occur.

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- We can illustrate events using Venn diagrams.

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- For instance, in die rolling, if $A = \{1, 2, 3\}$ and $B = \{4, 5, 6\}$, then $A \cap B = \emptyset$.
- Two events are said to be **mutually exclusive** if $A \cap B = \emptyset$.
- The probability of the empty event is zero, since *some* outcome has to occur: $P(\emptyset) = 0$

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- The probability of the certain event is one, since *some* outcome has to occur: $P(S) = 1$.

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$$P(A \cup B) = P(A) + P(B).$$

- Note: from these axioms you can *deduce* that $P(\emptyset) = 0$ and the probability of any event is at most 1.