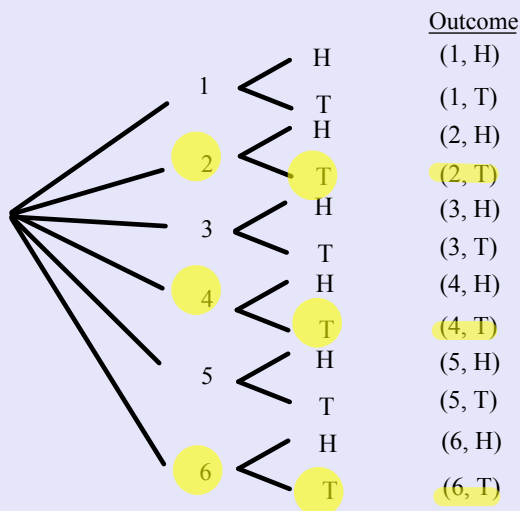


Probability Using Sets

Option 1: Solution

A tree diagram can be used to represent the possible results.



Based on the diagram, the $P(\text{even roll, tails}) = \frac{3}{12} = \frac{1}{4}$

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Option 2: Solution

Consider the addition table provided below.

| + | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |

The event of rolling a sum of 2 shares no elements with that of rolling a sum of 12.

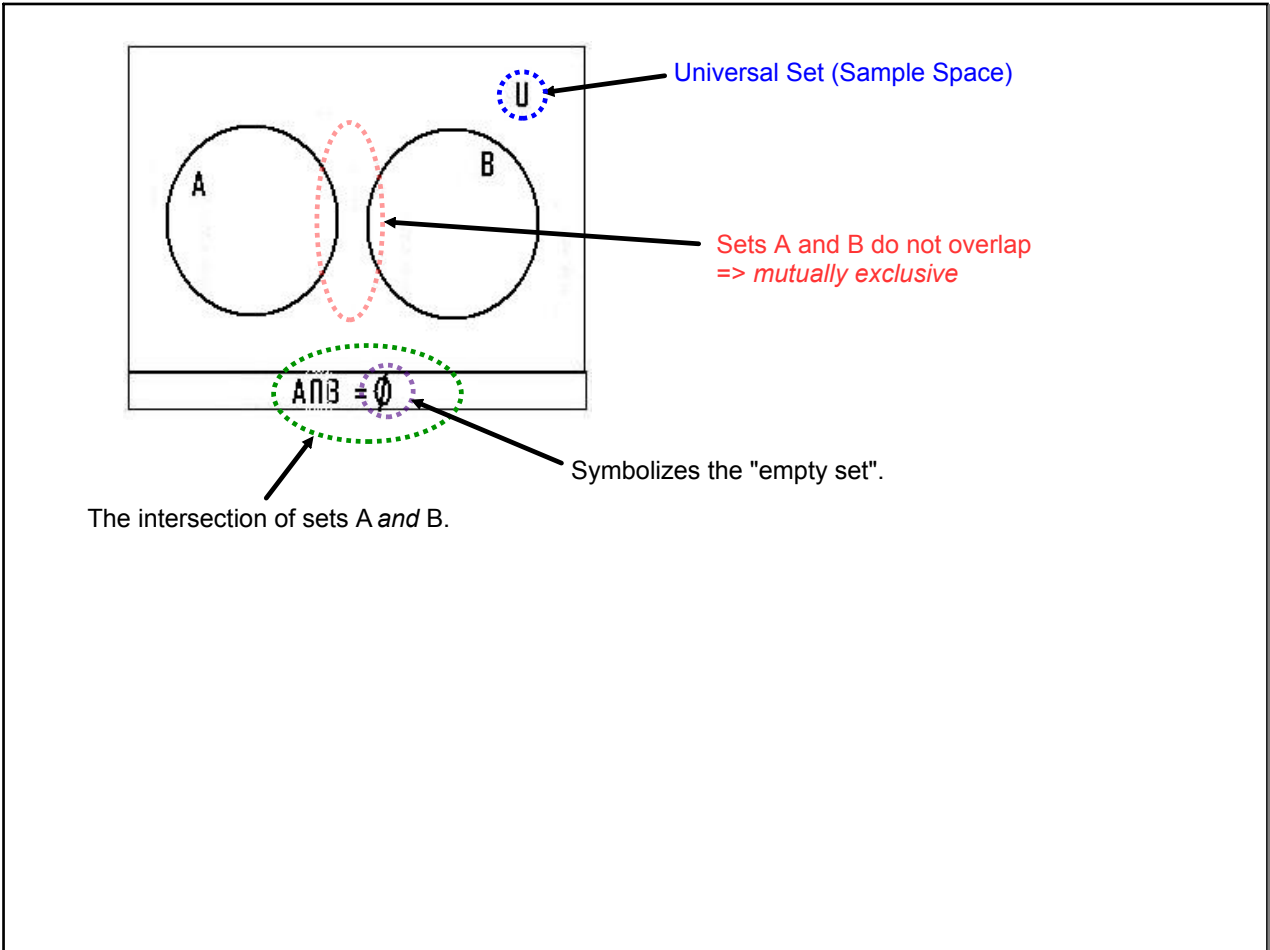
In this case, we say that the events are **mutually exclusive**.

Mutually exclusive events can be modelled by a Venn diagram (above, right), where the events are shown and said to be **disjoint**.



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Probability Using Sets



Option 3: Solution

Consider the addition table provided.

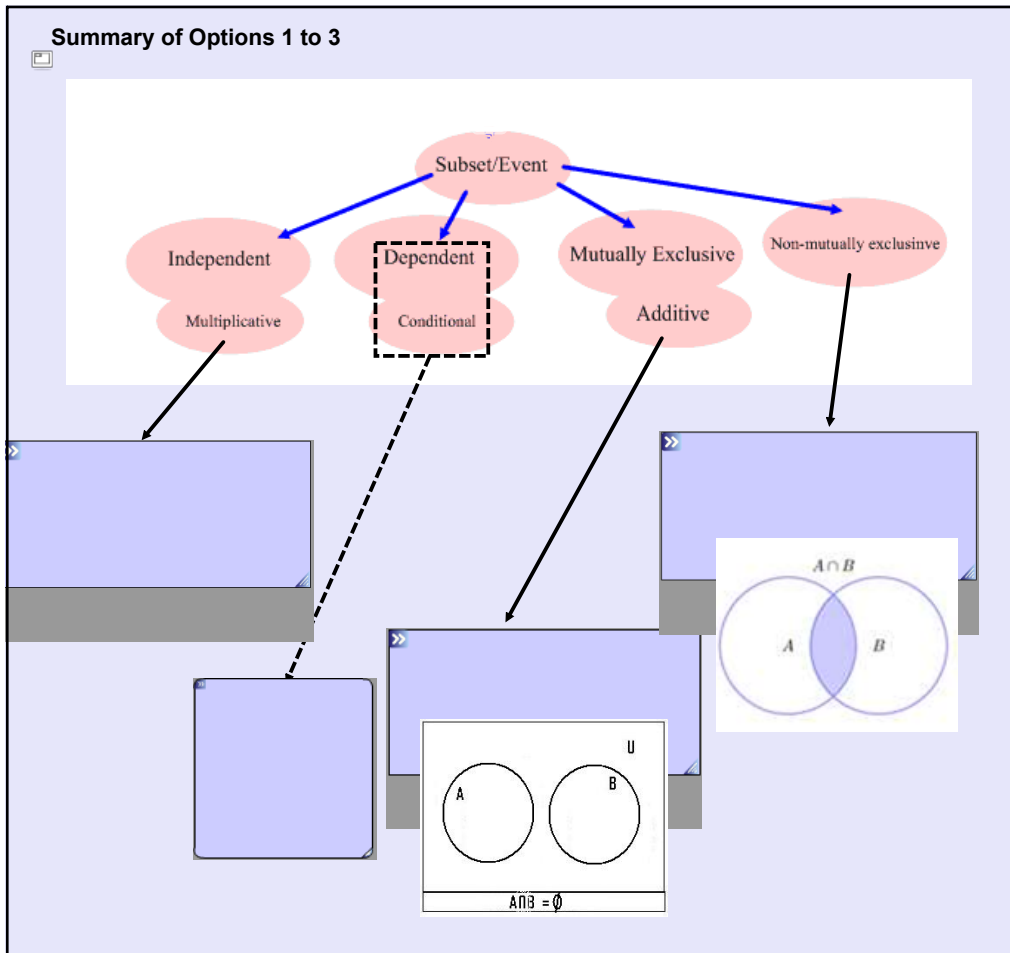
| + | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |

Let A represent the event of rolling a pair; B, the event of rolling a sum of 4.

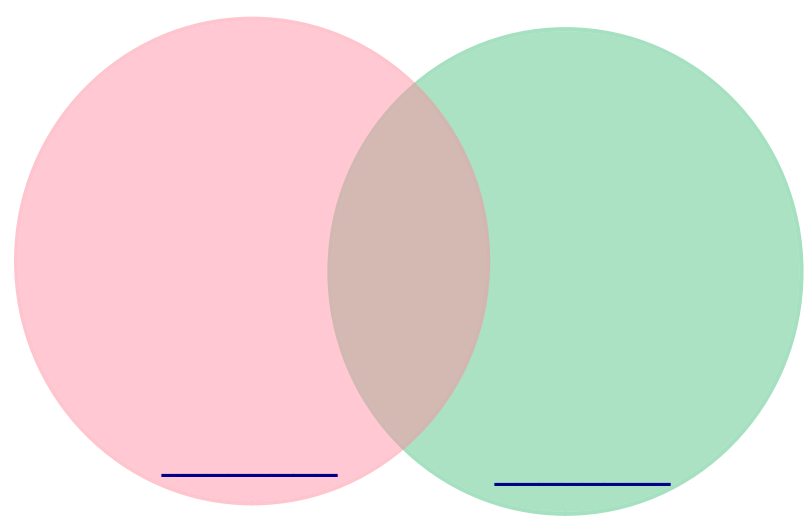
It is clear that these events are NOT mutually exclusive as $n(A \cap B) = 1$ —the pair of 2's will result in a sum of 4 being double-counted.

The Venn diagram for such a situation is shown (above, right).

Probability Using Sets



E.g., 1. Out of a group of people surveyed, 70 say they read the newspaper on-line and 83 say that they get the news by watching television. If 25 people say they do both, draw a venn diagram to represent the scenario (Assume that every person surveyed is involved in at least one of these activities.) How many people get the news by reading or watching television?



Probability Using Sets

A large rectangular area with horizontal lines, intended for student work.

E.g., 2. A game show has three doors labelled A, B, and C behind which there may or may not be a prize. A group of contestants are asked behind which doors they think there is a prize. The results are that 18 people choose A, 19 choose B, 19 choose C, 4 people choose A and B, 7 people choose A and C, 10 people choose B and C, and 3 people choose all three. Complete

1.0

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Practice Problems

Complete p228 #1 to 12, 14 for _____'s class.

EXIT ?
→

Exit Problems

Let's see how things
have gone ... ready?

1 Two sets A and B are said to be *disjoint* if



A $n(A \cap B) = n(A) + n(B)$

B $n(A \cap B) = \emptyset$

C $n(A \cap B) = n(A) = n(B)$

D $n(A \cup B) = \emptyset$

2 If A and B are *mutually exclusive* events, then



A $P(A) + P(B) = 1$

B $P(A \cap B) = P(A) + P(B)$

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

D $P(A \cup B) = 1$

Probability Using Sets

3 Given that $P(A) = 0.4$, $P(B) = 0.5$, and $P(A \cup B)$ is 0.6, the value of $P(A \cap B)$ is

A 1.5

B 1

C 0.3

D 0.1

4 The intersection of two sets is best associated with the word

A both

B and

C or

D none of the above