

Topic: The addition rule, and union vs. intersection

Question: Which events are mutually exclusive?

Answer choices:

- A The probability of rolling a sum that's divisible by 5 and 2 when two dice are thrown.
- B The probability of drawing a blue gum ball or a pink gum ball from a jar.
- C The probability of drawing a black card or an ace from a deck of cards.
- D The probability of rolling a 10 or a double when a pair of dice is rolled.



Solution: B

The events in answer choice A are not mutually exclusive, because if you roll a 10, it's both divisibly by both 5 and 2, so both events could occur at the same time.

The events in answer choice B are mutually exclusive, because you can only draw one gum ball at a time, so you can't draw a blue gum ball and a pink gum ball at the same time.

The events in answer choice C are not mutually exclusive, because if you draw a black ace, you're drawing a black card and an ace, so both events could occur at the same time.

The events in answer choice D are not mutually exclusive, because if you could roll two 5s, your roll is a double and sums to 10, so both events could occur at the same time.



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Question: Which events are not mutually exclusive?

Answer choices:

- A The probability of drawing an ace and the probability of drawing a king from a deck of cards.
- B The probability of rolling a sum that is either 8 or 10 when two dice are thrown.
- C The probability of rolling three 5s in a row when you roll a six-sided die and the probability you roll three 1s in a row when you roll a six-sided die.
- D The probability of selecting a small dog from an animal shelter and the probability of selecting a brown dog from an animal shelter.



Solution: D

The events in answer choices A, B, and C are mutually exclusive because they can't happen at the same time.

But the events in answer choice D are not mutually exclusive, because you could choose a small, brown dog, which means you can choose a small dog and a brown dog at the same time. The events can occur at the same time, so they are not mutually exclusive.

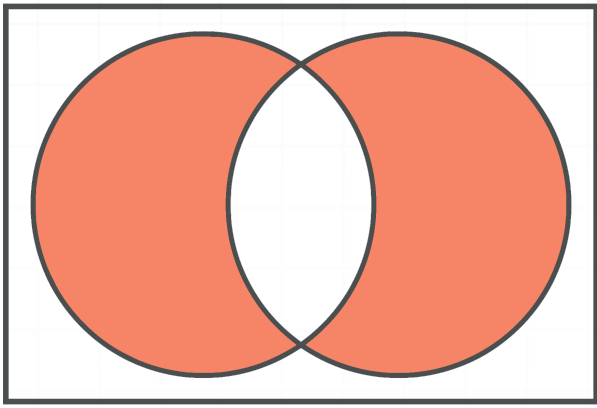


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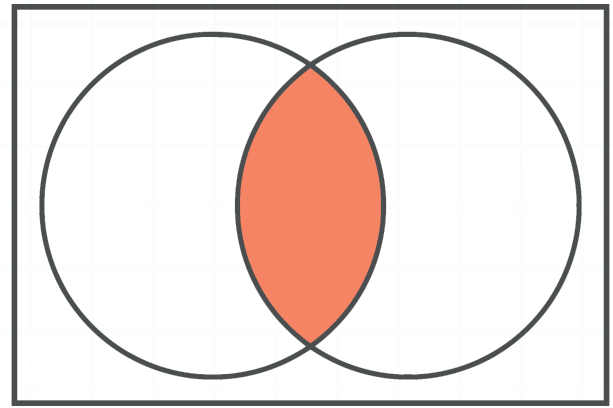
Question: Which Venn diagram has the intersection of two events shaded in red?

Answer choices:

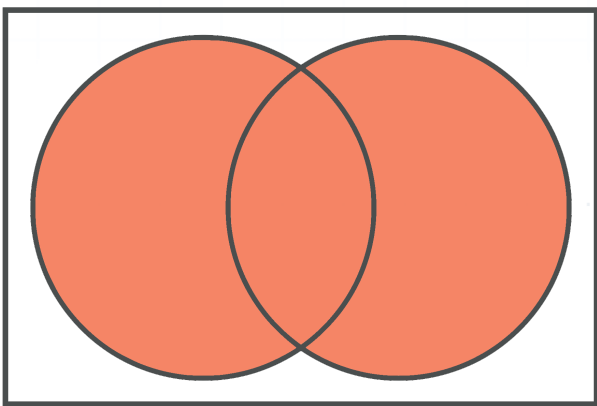
A



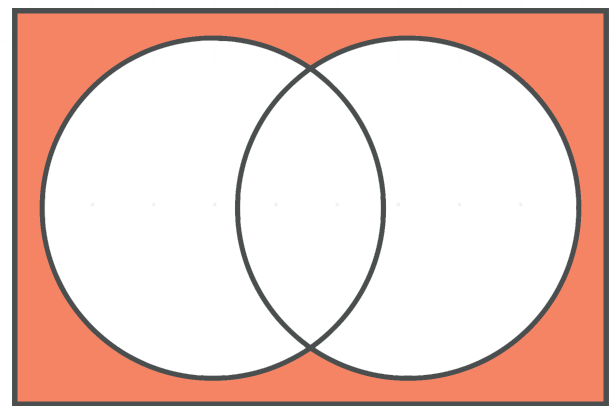
C



B



D



Solution: C

Answer choice A represents the union of two events, minus the intersection of those events: $A \cup B - A \cap B$.

Answer choice B represents the union of two events: $A \cup B$.

Answer choice C represents the intersection of two events: $A \cap B$.

Answer choice D represents the space where neither event A nor event B occur. This is called the compliment of $A \cup B$, and it's written as $(A \cup B)'$

