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Module 2 Quiz

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1. **Prompt 1:** For each of the following scenarios, answer the question with a numerical answer or a "Yes" or "No". If you do not have enough information, write "Can't tell". For all situations, assume $0 < P(A) < 1$ and $0 < P(B) < 1$. **1 / 1 point**

If A and B are two events such that $P(A) = 0.7$, $P(B) = 0.5$, and $P(B|A) = 0.6$, find $P(A \cup B)$. If possible, round your answer to two decimal places.

0.78

Correct

2. **Prompt 1:** For each of the following scenarios, answer the question with a numerical answer or a "Yes" or "No". If you do not have enough information, write "Can't tell". For all situations, assume $0 < P(A) < 1$ and $0 < P(B) < 1$. **1 / 1 point**

If A is a subset of B, can A and B be independent? (Answer Yes, No, or Can't tell.)

No

Correct

3. **Prompt 1:** For each of the following scenarios, answer the question with a numerical answer or a "Yes" or "No". If you do not have enough information, write "Can't tell". For all situations, assume $0 < P(A) < 1$ and $0 < P(B) < 1$. **1 / 1 point**

If A is a subset of B, calculate P(B|A), if you can. (If you can't, answer Can't tell.)

1

Correct

4. **Prompt 1:** For each of the following scenarios, answer the question with a numerical answer or a "Yes" or "No". If you do not have enough information, write "Can't tell". For all situations, assume $0 < P(A) < 1$ and $0 < P(B) < 1$. **1 / 1 point**

If A is a subset of B, calculate P(A|B), if you can. (If you can't, answer Can't tell.)

Can't tell

Correct

5. **Prompt 1:** For each of the following scenarios, answer the question with a numerical answer or a "Yes" or "No". If you do not have enough information, write "Can't tell". For all situations, assume $0 < P(A) < 1$ and $0 < P(B) < 1$. **1 / 1 point**

If P(A) = 0.8, P(B|A) = 0.5 and A and B are dependent (not independent), then is P(B) ≤ P(A)? (Answer Yes, No, or Can't tell)

Yes

Correct

6. **Prompt 2:** An unfair coin is flipped four times. The probability of a heads is 0.6 and the probability of a tails is 0.4. Every flip is independent of every other flip. **1 / 1 point**

Find the probability of getting exactly 2 heads and 2 tails. Round your answer to four decimal places.

0.3456

Correct

7. **Prompt 2:** An unfair coin is flipped four times. The probability of a heads is 0.6 and the probability of a tails is 0.4. Every flip is independent of every other flip. **1 / 1 point**

Find the probability of getting exactly 2 heads and 2 tails given that the first coin flip was a head. Round your answer to three decimal places.

0.288

Correct

8. **Prompt 3:** 70% of the light aircraft that disappear while in flight in a certain country are subsequently found. Of **1 / 1 point**

60% 10%

the aircraft that are found, 60% have an emergency locator, whereas only 10% of the aircraft not found have such a locator. Suppose a light aircraft has disappeared.

If the aircraft has an emergency locator, what is the probability that it will not be found? Round your answer to three decimal places.

0.067

Correct

1/15

? $P(E|A) = P(E)$

0.6 0.45

9. **Prompt 3:** 70% of the light aircraft that disappear while in flight in a certain country are subsequently found. Of the aircraft that are found, 60% have an emergency locator, whereas only 10% of the aircraft not found have such a locator. Suppose a light aircraft has disappeared. **1 / 1 point**

Are the two events L = the plane has a locator and F = the plane is found independent?

- Yes
- No

Correct

No since $P(L \cap F) = P(L|F)P(F) = 0.42 \neq P(L)P(F) = (.45)(.7)$.

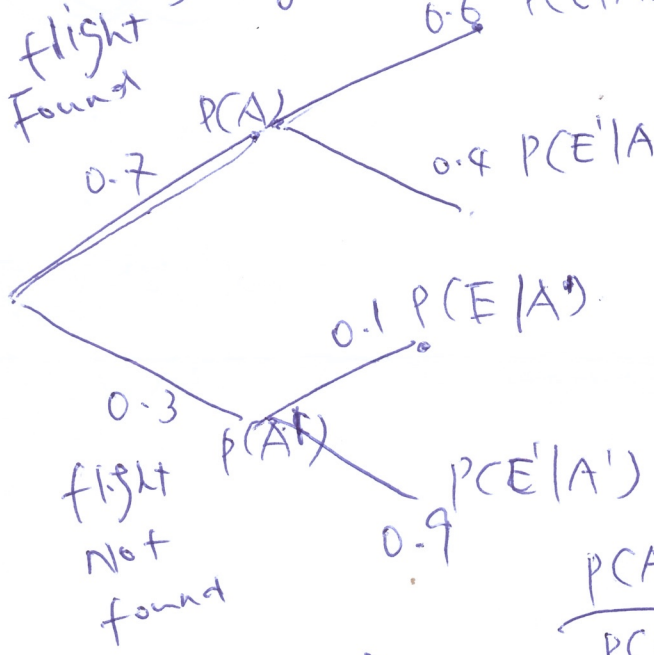
E A

$P(A \cap E) \neq P(A) \cdot P(E)$

0.42 .7 .45

A → Disappeared flight discovered

E → Emergency locator



$= \frac{0.3 \times 0.1}{0.6 \times 0.7 + 0.1 \times 0.3}$

$= \frac{0.03}{0.42 + 0.03}$

$= \frac{0.03}{0.45}$

$= 0.067$

$\frac{P(A'|E)}{P(E|A')} = \frac{P(A')}{P(E)}$

find $P(A'|E)$ ←

$P(A'|E) = P(A') \cdot P(E|A') / P(E)$

$= \frac{P(A') \cdot P(E|A')}{P(E)}$

0.3 0.1

$= \frac{P(A') \cdot P(E|A')}{P(E|A) \cdot P(A) + P(E|A') \cdot P(A')}$

0.6 0.7 0.1 0.3

$\frac{P(A|E)}{P(E|A)} = \frac{P(A)}{P(E)}$

$\Rightarrow P(A|E) = \frac{P(E|A) \cdot P(A)}{P(E)} = \frac{P(E|A) \cdot P(A)}{P(E|A) \cdot P(A) + P(E|A') \cdot P(A')}$

$= \frac{0.6 \times 0.7}{0.6 \times 0.7 + 0.1 \times 0.3} = \frac{0.42}{0.42 + 0.03} = \frac{0.42}{0.45}$