2.15: **(a):** No.

(b): **i:** If A and B are independent, then

$$\begin{aligned} P(A \text{ and } B) &= P(A) \cdot P(B) \\ &= 0.3 \cdot 0.7 \\ &= \boxed{0.21} \end{aligned}$$

ii: By continuing to assume independence, we can use 0.21 in the general Addition Rule.

$$\begin{aligned} P(A \text{ or } B) &= P(A) + P(B) - P(A \text{ and } B) \\ &= 0.3 + 0.7 - 0.21 \\ &= \boxed{0.79} \end{aligned}$$

iii: When A and B are independent, then $P(A|B) = P(A)$.

$$P(A|B) = \boxed{0.3}$$

(c): No. If $P(A \text{ and } B) \neq P(A) \cdot P(B)$ then A and B are independent.

$$0.1 \neq 0.3 \cdot 0.7$$

(d): We can use the definition of conditional probability.

$$\begin{aligned} P(A|B) &= \frac{P(A \text{ and } B)}{P(B)} \\ &= \frac{0.1}{0.3} \\ &\approx \boxed{0.33} \end{aligned}$$

2.16: We can use the definition of conditional probability.

$$\begin{aligned} P(\text{jelly}|\text{pb}) &= \frac{P(\text{jelly and pb})}{P(\text{pb})} \\ &= \frac{0.78}{0.8} \\ &= \boxed{0.975} \end{aligned}$$

2.17: **(a):** No. The joint probability is 0.18. Disjoint (mutually exclusive) events have a zero joint probability.

(b): We refer to the Addition Rule:

$$\begin{aligned} P(A \text{ or } B) &= P(A) + P(B) - P(A \text{ and } B) \\ &= 0.6 + 0.2 - 0.18 \\ &= \boxed{0.78} \end{aligned}$$

(c): We refer to the definition of conditional probability:

$$\begin{aligned} P(A|B) &= \frac{P(A \text{ and } B)}{P(B)} \\ &= \frac{0.18}{0.2} \\ &= \boxed{0.9} \end{aligned}$$

(d): We refer to the definition of conditional probability:

$$\begin{aligned} P(A|B) &= \frac{P(A \text{ and } B)}{P(B)} \\ &= \frac{0.11}{0.33} \\ &\approx \boxed{0.33} \end{aligned}$$

(e): It appears that liberal democrats are more likely to believe in global warming, so belief in warming and party are **not** independent.

(f): We refer to the definition of conditional probability:

$$\begin{aligned} P(A|B) &= \frac{P(A \text{ and } B)}{P(B)} \\ &= \frac{0.06}{0.34} \\ &\approx \boxed{0.18} \end{aligned}$$

2.18: **(a):** No. Their joint probability is not 0.

(b): 0.2329

(c): $\frac{0.2099}{0.8738} \approx \boxed{0.24}$

(d): $\frac{0.0230}{0.1262} \approx \boxed{0.18}$

(e): Nope, otherwise answers to (c) and (d) would be the same.

2.19: **(a):** No. Their joint probability is not 0.

(b): $\frac{162}{248} \approx \boxed{0.65}$

(c): $\frac{181}{252} \approx \boxed{0.72}$

(d): To answer this, we need to assume that their tastes are independent and that they are represented by this poll.

$$P(\text{“man likes In-N-Out } \textsc{and} \text{ “woman likes In-N-Out}) = 0.65 \cdot 0.72 \approx 0.47$$

(e): $\frac{252+6-1}{500} = 0.514$

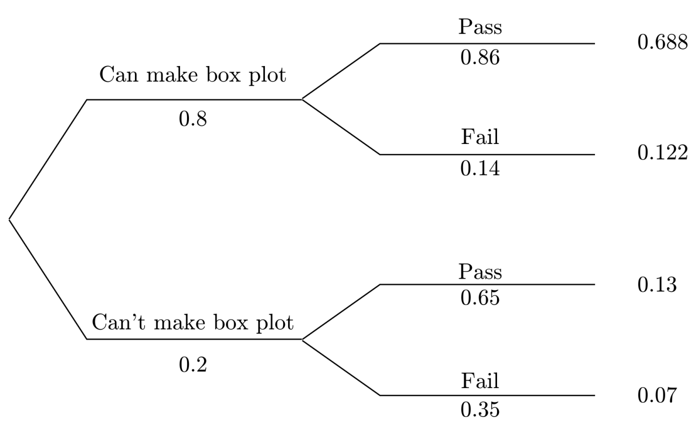
2.20: **(a):** $\frac{108+114-78}{204} \approx \boxed{0.706}$

(b): $\frac{78}{114} \approx \boxed{0.684}$

(c): $\frac{19}{54} \approx \boxed{0.352}$
$\frac{11}{36} \approx \boxed{0.306}$

(d): They do not seem independent. Whether the woman has blue eyes depends on whether the man has blue eyes.

2.21: **(a):** Tree diagram:



(b): $\frac{0.688}{0.688+0.13} = \boxed{0.84}$