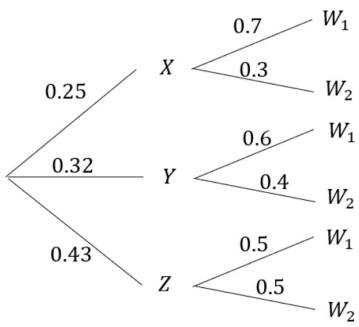
Question 1

Use the probability tree to compute $P(X|W_1)$:



$$P(X \mid W_1) = \frac{P(W_1 \cap X)}{P(W_1 \cap X) + P(W_1 \cap Y) + P(W_1 \cap Z)}$$

$$= \frac{(0.25)(0.7)}{(0.25)(0.7) + (0.32)(0.6) + (0.43)(0.5)}$$

$$= \boxed{0.301}$$

Question 2

1 points Sav

Suppose that three cards are randomly selected from a standard deck of 52 cards. What is the probability that each card is a King (K) if the sampling is done without replacement?

$$P(C_1 \cap C_2 \cap C_3) = \boxed{\frac{4}{52} \times \frac{3}{51} \times \frac{2}{50}}$$

Question 5

Which one of the following is false?

- $P(C \cap D) = P(C) \cdot P(D)$ for independent events C and D.
- $P(A \cup B) = P(A) + P(B) - P(A) \cdot P(B)$ for independent events A and B.
- (selected) $P(A \cup B) = P(A) + P(B) - P(A) \cdot P(B)$ for all events A and B.
- $P(Y|X) = \dfrac{P(X \cap Y)}{P(X)}$ for dependent events X and Y.
- $P(W \cap Z) = P(W) \cdot P(Z|W)$ for dependent events W and Z.

Question 6

1 points Save Ans

Among employees of a certain company, 80% know C/C++, 60% know R, and 40% know both languages. Let A = knows C/C++ and B = knows R. If someone knows R, what is the probability that they know C/C++? Type your answer as a decimal value rounded to three places (for example, write 0.333 and not 1/3).

condition B

A = know C/C++ $\Rightarrow$ P(A) = 0.8

B = know R $\Rightarrow$ P(B) = 0.6

P(A ∩ B) = 0.4

$P(B|A) = \dfrac{P(B \cap A)}{P(A)} = 0.5$

Find P(A | B)

$P(A|B) = \dfrac{P(B \cap A)}{P(B)}$

$= \dfrac{0.4}{0.6}$

$= \boxed{0.667}$

Question 7 1 points Save Answ

The 1000 students of a local high school are categorized by their attendance and GPA in the table. If a student has skipped few classes, what is the probability that their GPA is greater than 3.0?

condition

GPA	< 2.0	2.0–3.0	> 3.0	Total
Many Skipped Classes	80	25	5	110
Few Skipped Classes	175	450	265	890
Total	255	475	270	1000

A = GPA > 3

B = Skipped few class Find P(A|B)

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

$$= \frac{265/1000}{890/1000}$$

$$= \boxed{0.298}$$

Question 8 1 points Save An

The 1000 students of a local high school are categorized by their attendance and GPA in the table. If a student has a GPA greater than 3.0, what is the probability that they skipped few classes?

condition

GPA	< 2.0	2.0–3.0	> 3.0	Total
Many Skipped Classes	80	25	5	110
Few Skipped Classes	175	450	265	890
Total	255	475	270	1000

$$P(B|A) = \frac{P(A \cap B)}{P(A)}$$

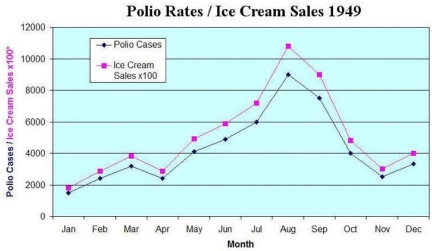
$$= \frac{265/1000}{270/1000}$$

$$= \boxed{0.981}$$

Question 9

Read the following plot and caption. Then, determine which variable is the confounding variable of this real data example.

The Real Cause of Polio!



In the late 1940s, before there was a polio vaccine, public health experts in America noted that polio cases increased in step with the consumption of ice cream and soft drinks, Eliminating such treats was even recommended as part of an anti-polio diet. It turned out that polio outbreaks were most common in the hot months of summer, when people naturally ate more ice cream, showing only an association.

http://www.nytimes.com/2009/08/06/technology/06stats.html

RtAVM

** Ice cream sales for illustration purposes only*

Question 11 — 1 points — Save Answer

Suppose a box contains 20 red marbles, 15 blue marbles, and 8 green marbles. Three marbles are selected. The first marble is selected with replacement. The second marble is selected without replacement. What is the probability that all three marbles are blue?

Red = 20

Blue = 15

Green = 8

Total : $20 + 15 + 8 = 43$

$P(R) = P(B_1 \cap B_2 \cap B_3)$

$= \frac{15}{43} \cdot \frac{15}{43} \cdot \frac{14}{42}$

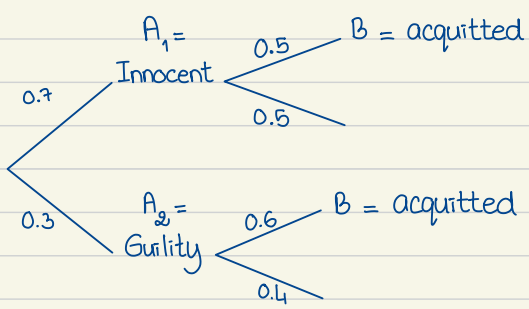
$= 0.0406$

$P(G) = \frac{8}{43} \cdot \frac{8}{43} \cdot \frac{7}{43}$

$= 0.0058$

Question 4 — 0.5 points — Save A

In a court case, the defendant is truly innocent with probability 0.7 and truly guilty with probability 0.3. If they are truly innocent, they are acquitted with probability 0.5. If they are truly guilty, they are acquitted with probability 0.6. What is the probability that the defendant will be acquitted?



$P(\text{acquitted}) = (0.7)(0.5) + (0.3)(0.6) = 0.53$

Question 3 **1 points** Save An

A new test is developed for cancer detection with sensitivity 0.80 and specificity 0.91. Assume this cancer affects 6% of the population. Calculate the probability that an individual has cancer if their test result is positive.

Question 2

1 points

The 1000 students of a local high school are categorized by their attendance and GPA in the table. If a student has skipped many classes, what is the probability that their GPA is less than 2.0?

GPA	< 2.0	2.0–3.0	> 3.0	Total
Many Skipped Classes	80	25	5	110
Few Skipped Classes	175	450	265	890
Total	255	475	270	1000

A = GPA < 3

B = Skipped many classes Find P(A|B)

$$P(A|B) = \frac{P(A \cap B)}{P(B)}$$

$$= \frac{80/1000}{110/1000}$$

$$= \boxed{0.727}$$