Say 15% of the population is rich, 8% of the population is famous, and 6% of the population is both rich and famous. If you meet a famous person on the street, what is the probability that she is rich?
Quiz Practice Problem 1

Say 15% of the population is rich, 8% of the population is famous, and 6% of the population is both rich and famous. If you meet a famous person on the street, what is the probability that she is rich?

Solution:

\[
P(R \mid F) = \frac{P(R \cap F)}{P(F)} = \frac{0.06}{0.08} = \frac{3}{4} = 75\%
\]
Quiz Practice Problem 2

A person in the U.S. has a 0.2% chance to have a heart attack. If your father has a heart attack, then there is a 0.5% chance that you will have a heart attack. What is the probability that you have a heart attack but your father does not?
Quiz Practice Problem 2

A person in the U.S. has a 0.2% chance to have a heart attack. If your father has a heart attack, then there is a 0.5% chance that you will have a heart attack. What is the probability that you have a heart attack but your father does not?

Solution:

\[ P(Y - F) = P(Y) - P(Y \cap F) \]

Difference Rule
Quiz Practice Problem 2

A person in the U.S. has a 0.2% chance to have a heart attack. If your father has a heart attack, then there is a 0.5% chance that you will have a heart attack. What is the probability that you have a heart attack but your father does not?

Solution:

\[ P(Y - F) = P(Y) - P(Y \cap F) \]  \hspace{1cm} \text{Difference Rule}

\[ = P(Y) - P(Y | F)P(F) \]  \hspace{1cm} \text{Multiplication Rule}
Quiz Practice Problem 2

A person in the U.S. has a 0.2% chance to have a heart attack. If your father has a heart attack, then there is a 0.5% chance that you will have a heart attack. What is the probability that you have a heart attack but your father does not?

Solution:

\[ P(Y - F) = P(Y) - P(Y \cap F) \]
\[ = P(Y) - P(Y \mid F)P(F) \quad \text{Difference Rule} \]
\[ = 0.002 - 0.005 \times 0.002 \quad \text{Plug in numbers} \]
Quiz Practice Problem 2

A person in the U.S. has a 0.2% chance to have a heart attack. If your father has a heart attack, then there is a 0.5% chance that you will have a heart attack. What is the probability that you have a heart attack but your father does not?

Solution:

\[
P(Y - F) = P(Y) - P(Y \cap F)
\]

Difference Rule

\[
= P(Y) - P(Y | F)P(F)
\]

Multiplication Rule

\[
= 0.002 - 0.005 \times 0.002
\]

Plug in numbers

\[
= 0.00199 = 0.199\%
\]