P(A|B) • P(B) = P(B|A) • P(A)

P(A) • P(B) ≠ 0

P(A|B) = \frac{P(A) • P(B)}{P(B)}

P(A) = \frac{P(A) • P(B)}{P(B)}

\text{Events A, B are independent of C if } P(A \cap B) = P(A) • P(B)

\text{is equivalent to}

P(A|C) = P(A)

and

P(B|C) = P(B)

by A and B independent the information about C hasn't changed probability of B.

P(A|B) • P(B) = \frac{P(A • B)}{P(B)}

X = \text{height in inches of a student from Stats class}

Y = \text{weight in pounds of a student from Stats class}

\text{Here we find the conditional expectation}

\text{Mean of X given that Y = y is}

\text{Conditioned mean of X given that Y = y is}

\text{Expected value of random variable Y given that the random variable X takes value y is}

\text{The expected value of random X given that the random variable Y takes value y is}

\text{So finally}

P(X | Y) = P(X | Y | Y = y)

\text{is a function of the independent random variable } Y.