Bayes Rule

$$P(c|m) = \frac{P(m|c)P(c)}{P(m)}$$

- $P(c|m)$: observing class c given the contents of the message
- $P(m|c)$: observing m if it really belongs to c
- $P(c)$: unconditional prob. of class c
- $P(m)$: unconditional prob. of observing message with contents m we drop it, it's always the same

word	P(word | spam)	P(word | not spam)
watch	(1+1)/(8+13) = 0.095	(0+1)/(6+13) = 0.053
anime	(1+1)/(8+13) = 0.095	(0+1)/(6+13) = 0.053
now	(1+1)/(8+13) = 0.095	(0+1)/(6+13) = 0.053
takeout	(0+1)/(8+13) = 0.0476	(1+1)/(6+13) = 0.105
my	(0+1)/(8+13) = 0.0476	(0+1)/(6+13) = 0.053
house	(1+1)/(8+13) = 0.095	(1+1)/(6+13) = 0.105
sell	(1+1)/(8+13) = 0.095	(0+1)/(6+13) = 0.053
me	(0+1)/(8+13) = 0.0476	(0+1)/(6+13) = 0.053
your	(1+1)/(8+13) = 0.095	(0+1)/(6+13) = 0.053
collection	(0+1)/(8+13) = 0.0476	(0+1)/(6+13) = 0.053

P("watch anime now" | spam) = 0.095 * 0.095 * 0.095 = 8.57375e-4
P("watch anime now" | not spam) = 0.053 * 0.053 * 0.053 = 1.48877e-4

"watch anime now" most likely spam

P("takeout and anime at my house" | spam) = P("takeout anime my house" | spam) = 0.0476 * 0.095 * 0.0476 * 0.095 = 2.044849e-5
P("takeout anime my house" | not spam) = 0.105 * 0.053 * 0.053 * 0.105 = 3.096922e-5

"takeout and anime at my house" most likely not spam

P("sell me your anime collection" | spam) = 0.095 * 0.0476 * 0.095 * 0.095 * 0.0476 = 1.942605e-6
P("sell me your anime collection" | not spam) = 0.053 * 0.053 * 0.053 * 0.053 * 0.053 = 4.181954e-7

"sell me your anime collection" most likely spam