

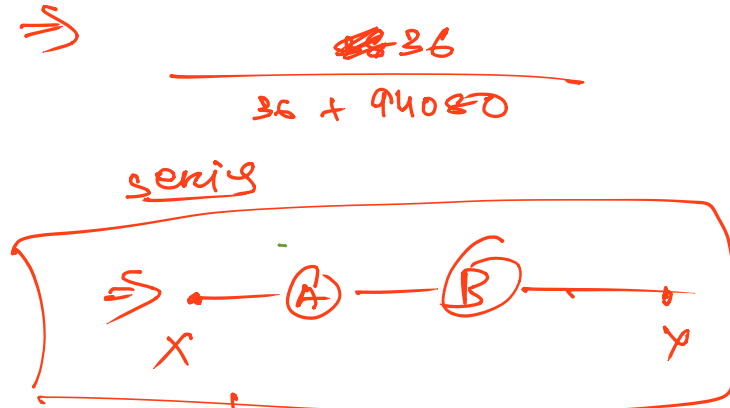
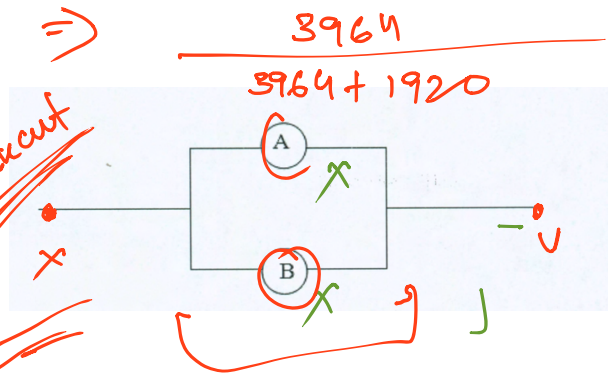
Baye's Problem**Example 1**

- a) Fill in the table using the information below
- Suppose that a known disease occurs in 4% of the population
 - The medical test produces a positive reading on 99.1% of those infected with the disease
 - Suppose that this test gives a positive result in healthy patients 2% of the time
 - Assume we have 100,000 random individuals who follow the above information perfectly

	Has Disease	Does Not Have Disease	Total
Test Positive	$\Rightarrow 3964$	$\Rightarrow 1920$	
Test Negative	$\Rightarrow 36$	$\Rightarrow 94080$	
Total	4000	96000	100,000

- b) Determine $P(\text{Have the Disease} \mid \text{Tested Positive})$

- c) Determine $P(\text{Have the Disease} \mid \text{Tested Negative})$

**Circuit Problems**

Determine the probability that the circuit works given that the component works probability is bellowed.

1. $P(A) = 0.91$, $P(B) = 0.98$

2. $P(A) = 0.99$, $P(B) = 0.84$

$\Rightarrow (0.91)(0.98)$

$\Rightarrow (0.99)(0.84)$

$420 / 1543 \Rightarrow 0.2722$

0.0723

Back to Risk...with some Basic Probability

	Sick	Healthy	Total
Low Vitamin D Consumption	$\Rightarrow 420$	1,123	$\Rightarrow 1543$
Normal Vitamin D consumption	4,567	58,590	$\Rightarrow 63157$
Total	4,987	59,713	$\Rightarrow 64700$

1. Calculate the RR: Relative Risk

\Rightarrow

$P(A) \rightarrow \text{large}$
 $P(B) \rightarrow \text{smaller}$

$\Rightarrow \frac{0.2722}{0.0723} \Rightarrow 3.7649$

2. Calculate the AR:

$$\Rightarrow \boxed{P_L - P_S} \Rightarrow 0.2722 - 0.0723$$

3. Calculate the AR%:

$$\frac{P_L - P_S}{P_L} \times 100 \Rightarrow$$

4. Calculate the NNC:

$$\Rightarrow \frac{1}{AR} \Rightarrow$$

5. P (Low Vitamin D Consumption u Healthy)

 \Rightarrow

$$\frac{1543 + 59713 - 1123}{64700}$$

added twice

6. P (Normal Vitamin D Consumption n Sick)

$$4567 / 64700 = 0.070587$$

Expected Value and Negative Test

- Suppose that the current positivity rate is 3.5%. That is, 3.5% of those that get tested actually test positive. If we decide to do batches of size 12, what is the probability that a batch of 12 independent individuals will produce a negative test.
- Suppose that we are doing batch testing with batches of size 16. Suppose that the probability that a batch of size 16 tests negative is 0.835. Determine the expected number (expected value) of tests needed for a group of size 16.