1. a. P(A): patient had surgery $\frac{398}{803} = 0.4596$
P(B): patient experienced improvement

P(B|A): improvement given they had surgery. $= 0.63$

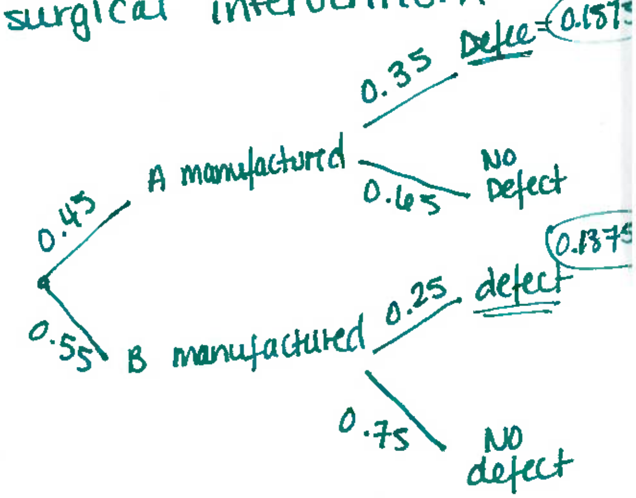
$$p(A \wedge B) = P(B|A) \cdot P(A) = 0.63 \cdot 0.4596 = \boxed{0.3122}$$

b. p(A): patient did not have surgery $= \frac{405}{803} = 0.5043$

p(B|A): improvement given they did not have surgery $= 0.29$

$$p(A \wedge B) = P(B|A) \cdot P(A) = 0.29 \cdot 0.5043 = \boxed{0.1462}$$

c. A surgical center can make a claim like:
" If patients elect to have surgery at their location, the probability of having improvements on their condition is more than twice the probability when compared to ~~of~~ no surgical intervention."



$(0.45)(0.35) / 0.1575 + 0.1375$

2. a. $0.1575 / 0.295 = \boxed{0.5338}$

b. $0.1375 / 0.295 = \boxed{0.4661}$

$(0.55)(0.25) / 0.1575 + 0.1375$

c. I would recommend they choose factory "B" since their defective rate given the number of batteries they produce is lower.

3. $C_{12,5} = \frac{12!}{5!(12-5)!} = \boxed{792}$ Combination since order does not matter

4. Combination since order does not matter. $C_{10,3} \; \frac{10!}{3!(10-3)!} = 120$

- calculate the total # of outcomes possible:
- calculate the probability of the event you care about

$= p(A) = \frac{1}{120} = \boxed{0.0083}$

you and two ~~three~~ your ~~kids~~ friends are chosen