5.3a

Conditional Probability: the probability that one event happens given another event already happened.

$P(A|B)$ = "probability of A given B"

ex: home owner - H.S. grad problem

$P(\text{homeowner} \mid \text{H.S. grad}) = \frac{221}{310} = 0.713$

$P(\text{not a H.O.} \mid \text{H.S. grad}) = \frac{89}{310}$

$P(\text{H.S. grad} \mid \text{homeowner}) = \frac{221}{340}$

Independent Events

2 events are independent if knowing one does not change the probability of the other

* if $P(A|B) = P(A)$ and $P(B|A) = P(B)$

ex: $P(\text{home owner}) = \frac{340}{500} = 0.68$

$P(\text{homeowner} \mid \text{H.S. grad}) \neq P(\text{homeowner})$

So these are not independent.

rule #7 **general multiplication rule**

$$P(A \cap B) = P(A) \cdot P(B|A)$$

ex: 55% of H.S. students participate in H.S. sports

5% of those go on to play college sports

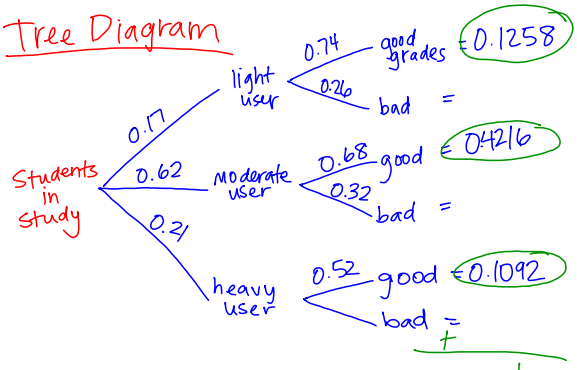
What % of H.S. students play in H.S. and college?

$P(\text{play in H.S. and college}) =$

$P(\text{play in H.S.}) \cdot P(\text{play in college} \mid \text{play in H.S.})$

$0.55 \cdot 0.05 = 0.0275$

Tree Diagram



P(students who get good grades) =

$0.1258 + 0.4216 + 0.1092 =$

0.6566