HW Conditional Probability

(9) $P(R_1 R) = \frac{8}{22} \cdot \frac{7}{21} = \boxed{\frac{4}{33}}$

(13) $P(R_1 Y) = \frac{8}{22} \cdot \frac{9}{21} = \boxed{\frac{12}{77}}$

(19) $P\left(\begin{array}{c}\text{sum of 7 if}\\ \text{first die a 5}\end{array} \cup \begin{array}{c}\text{sum of 9 if}\\ \text{first die a 5}\end{array}\right) = \frac{1}{6} + \frac{1}{6} - \underbrace{\frac{0}{6}}_{\text{mutually exclusive}} = \boxed{\frac{1}{3}}$

$\underline{5},2 \qquad\qquad \underline{5},4$

$S = \{(5,1),(5,2),(5,3),(5,4),(5,5),(5,6)\}$

(20b) $P(A \cap B) = P(A) \cdot P(B|A) = \frac{1}{2} \cdot \frac{1}{3} = \boxed{\frac{1}{6}}$

These events <u>are not</u> <u>independent</u>. Event B <u>can</u> <u>only</u> <u>happen</u> if Event A occurred.

A = even # rolled $\quad P(A) = \frac{1}{2} \quad$ 1, $\underline{2}$, 3, $\underline{4}$, 5, $\underline{6}$

B = 2 is rolled $\quad P(B|A) = \frac{1}{3} \quad$ $\underline{2}$, 4, 6

* Can't use $P(A \cap B) = P(A) \cdot P(B)$ because events <u>are not independent</u>.

(21a) $P(B \cap A) = \boxed{\frac{1}{3}}$ $A = 2, 4, 6$

$B = 2$

(21c) $P(A|B) = \boxed{1}$

"even given that you rolled a 2?" That will happen 100% of the time!

(24) $P(B|A) = \frac{P(B \cap A)}{P(A)} = \frac{\frac{1}{4}}{\frac{1}{2}} = \boxed{\frac{1}{2}}$

(26) $P(A \cap B) = P(B|A) \cdot P(A) = \frac{1}{3} \cdot \frac{1}{2} = \boxed{\frac{1}{6}}$

(32) $P(\text{married} \mid 20 \text{ to } 24) = \frac{P(\text{married} \cap 20 \text{ to } 24)}{P(20 \text{ to } 24)}$

$= \frac{4407}{18142} = \boxed{24.3\%}$

(36) $P(\text{never married} \mid 20 \text{ to } 29) = \frac{P(\text{never married} \cap 20 \text{ to } 29)}{P(20 \text{ to } 29)}$

$= \frac{21,745}{37,543} = \boxed{57.9\%}$

(38) $P(\text{purchase product} \mid \text{see ad}) = \frac{P(\text{purchase product} \cap \text{see ad})}{P(\text{see ad})}$ $.09 = \frac{x}{.20}$

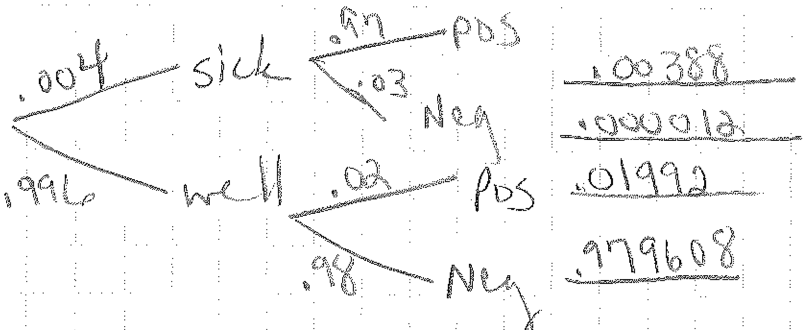
$x = .018$

(39) A = buy computer in electronics store

$B \cap A$ = buy computer in electronics store and buy software from computer store

$$P(B|A) = \frac{P(B \cap A)}{P(A)} = \frac{.41}{.77} = \boxed{53.2\%}$$

(40)



a) $$P(\text{inaccurate} \mid \text{positive test}) = \frac{P(\text{inaccurate} \cap \text{positive})}{P(\text{positive})}$$

$$= \frac{.01992}{.00388 + .01992} = \frac{.01992}{.0238} = \boxed{83.7\%}$$

b) $$P(\text{accurate} \mid \text{positive}) = \frac{P(\text{accurate} \cap \text{positive})}{P(\text{positive})}$$

$$= \frac{.00388}{.0238} = \boxed{16.3\%}$$