

EXAM #1: SOLUTIONS

$$\begin{aligned}
 (1) \quad P(\text{catches at least 2 fish}) &= P(\text{catches 2 or catches 3}) \\
 &= P(\text{FFF or FFF or FFF}) + P(\text{FFF}) \\
 &= [(.4)(.4)(.6) + (.4)(.6)(.4) + (.6)(.4)(.4)] + (.4)(.4)(.4) \\
 &= .288 + .064 = \boxed{.352}
 \end{aligned}$$

$$(2) \quad P(\text{need more than 2 tries to get 1st H}) = P(\text{first two are T}) = \frac{1}{2} \cdot \frac{1}{2} = \boxed{\frac{1}{4}}$$

$$\begin{aligned}
 (3) \quad P(\text{at least one is left-handed}) &= 1 - P(\text{none are left-handed}) \\
 &= 1 - (.88)(.88)(.88)(.88) = 1 - .60 = \boxed{.4}
 \end{aligned}$$

$$(4) \quad P(\text{sum is six}) = P((1,5) \text{ or } (5,1) \text{ or } (2,4) \text{ or } (4,2) \text{ or } (3,3)) = \frac{5}{36} = .1388$$

$$\begin{aligned}
 (6) \quad B_1 &= \text{coin 1 chosen} \quad B_2 = \text{coin 2 chosen} \quad A = \text{chosen coin yields 2 Heads} \\
 P(B_2|A) &= \frac{P(B_2)P(A|B_2)}{P(B_1)P(A|B_1) + P(B_2)P(A|B_2)} = \frac{(\frac{1}{2})(\frac{3}{4})^2}{(\frac{1}{2})(\frac{1}{4})^2 + (\frac{1}{2})(\frac{3}{4})^2} = \boxed{\frac{9}{10}}
 \end{aligned}$$

$$(7) \quad \text{Let } L = \text{the homeowner files a LIABILITY claim} \\ P = \text{ " " " " PROPERTY claim}$$

$$\text{GIVEN: } P(L) = .04 \quad P(P) = .10 \quad P(L \cap P) = .01$$

$$\text{FIND: } P(\bar{L} \cap \bar{P}) \quad (= 1 - P(L \cup P))$$

EQ. 1

$$\begin{aligned}
 P(\bar{L} \cap \bar{P}) &= 1 - \{P(L) + P(P) - P(L \cap P)\} \\
 &= 1 - \{.04 + .10 - P(L \cap P)\}
 \end{aligned}$$

so we need $P(L \cap P)$ now: $P(L)$ can be written as $P(L \cap P \text{ or } L \cap \bar{P})$

$$\text{so: } P(L) = P(L \cap P) + P(L \cap \bar{P})$$

$$.04 = .01 + P(L \cap \bar{P}) \Rightarrow P(L \cap \bar{P}) = .03$$

so: from EQ(1) above

$$\begin{aligned}
 P(\bar{L} \cap \bar{P}) &= 1 - \{.04 + .10 - .03\} \\
 &= 1 - .11 \\
 &= \boxed{.89}
 \end{aligned}$$

(5)

$$\frac{\binom{7}{2} \binom{4}{2} \binom{1}{1}}{\binom{12}{5}} = \frac{\frac{7 \cdot 6}{2 \cdot 1} \cdot \frac{4 \cdot 3}{2 \cdot 1} \cdot 1}{\frac{12 \cdot 11 \cdot 10 \cdot 9 \cdot 8}{5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}}$$

$$= \frac{126}{792} = \boxed{.159}$$

many students
also correctly
did this
with a Venn
diagram

