MATH 173

QUIZ 3

6/26/2017

NAME: _____

1. AN EXPERIMENT CAN RESULT IN EVENTS A AND B WITH THE FOLLOWING PROBABILITIES.

	A	A^c
B	.45	.15
B^c	.35	.05

(a) FIND $P(A|B)$

(b) ARE A AND B INDEPENDENT? WHY/WHY NOT?

(c) ARE A AND B MUTUALLY EXCLUSIVE? WHY/WHY NOT?

2. PLAYER A HAS ENTERED A GOLF TOURNAMENT BUT IT IS NOT CERTAIN WHETHER PLAYER B WILL ENTER. PLAYER A HAS PROBABILITY $\frac{1}{6}$ OF WINNING THE TOURNAMENT IF PLAYER B ENTERS AND PROBABILITY $\frac{3}{4}$ OF WINNING IF PLAYER B DOES NOT ENTER THE TOURNAMENT. IF THE PROBABILITY THAT B ENTERS IS $\frac{1}{3}$. FIND THE PROBABILITY THAT PLAER A WINS THE TOURNAMENT.

3. A SMOKE-DETECTOR SYSTEM USES TWO DEVICES, A AND B. IF SMOKE IS PRESENT, THE PROBABILITY THAT IT WILL BE DETECTED BY DEVICE A IS .95; BY DEVICE B, .98; AND BY BOTH DEVICES, .94. IF SMOKE IS PRESENT, FIND THE PROBABILITY THAT SMOKE WILL BE DETECTED BY DEVICE A OR DEVICE B OR BOTH DEVICES.

4. A WORKER-OPERATED MACHINE PRODUCES A DEFECTIVE ITEM WITH PROBABILITY .01 IF THE WORKER FOLLOWS THE MACHINE'S OPERATING INSTRUCTIONS EXACTLY, AND WITH PROBABILITY .03 IF HE DOES NOT. IF THE WORKER FOLLOWS THE INSTRUCTIONS 90% OF THE TIME, WHAT PROPORTION OF ALL ITEMS PRODUCED BY THE MACHINE WILL BE DEFECTIVE?

5. MEDICAL CASE HISTORIES INDICATE THAT DIFFERENT ILLNESSES MAY PRODUCE IDENTICAL SYMPTOMS. SUPPOSE A PARTICULAR SET OF SYMPTOMS, WHICH WE DENOTE AS EVENT H, OCCURS ONLY WHEN ANY ONE OF THREE ILLNESSES - A, B, OR C - OCCURS. (FOR THE SAKE OF SIMPLICITY, WE WILL ASSUME THAT ILLNESSES A, B, AND C ARE MUTUALLY EXCLUSIVE.) STUDIES SHOW THESE PROBABILITIES OF GETTING THE THREE ILLNESSES:

$$P(A) = .01 \qquad P(B) = .005 \qquad P(C) = .02.$$

THE PROBABILITIES OF DEVELOPING THE SYMPTOMS H, GIVEN A SPECIFIC ILLNESS, ARE

$$P(H|A) = .90 \qquad P(H|B) = .95 \qquad P(H|C) = .75.$$

ASSUMING THAT AN ILL PERSON SHOWS THE SYMPTOMS H, WHAT IS THE PROBABILITY THAT THE PERSON HAS ILLNESS C?