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Task 1:

a. M->Sensor in Maine; Mn->compliment
S->Sensor in Sahara; Sn->compliment
T->temp>=80; Tn->compliment
$P(Tn)=P(M)*P(Hn|M) + P(S)*P(Hn|S) = .05*.8+.95*.1=.135$
$P(M|Tn) = [P(M)*P(Tn|M)]/P(Tn) = [.05*.8]/.135 = .2963$

b. E1->first email indicates high under 80 degrees
E2->second email indicates high under 80 degrees
$P(E2|E1,M)=P(Hn|M)=1-.2=.8$
$P(E2|E1,S)=P(Hn|S)=1-.9=.1$
Using Product Rule, Chained Version
$P(E2|E1)= P(M|T)*P(E2|E1,M) + P(S|Tn)*P(E2|E1,S)$
$= (.2963*.8)+(1-.2963)(.1)=.3074$

c. E3->third email indicates high under 80*
$P(E3 | E1, E2) = P(E3) * P(E1,E2) = .6828 * .3074 = .20989$

Task 2:

The 2 Conditions for a function to be valid are
• The probability of any event cannot be less than 0 or greater than 1.
• The sum of probabilities of all possible atomic events is 1.
In this case only 2 of the probabilities are given, adding up to .9. The individual values of each of the probabilities also stay under 1. Given this, we can conclude that it is possibly a function, but we can't be certain until $P(C)$ and $P(D)$ are given.

Task 3:

The 2 Conditions for a function to be valid are
• The probability of any event cannot be less than 0 or greater than 1.
• The sum of probabilities of all possible atomic events is 1.We are given $P(x)=.3$ if $0<=x<=10$. Based on this information we can integrate the function to find the final value. When integrating .3 from o to 10, we get a value of 3, which exceeds the limit of 1. From here we can conclude that $P(x)$ is not a function.

Task 4:

$p(a) = p(a|r) * p(r) + p(a|b) * p(b) = .25 * .4 + .75 * .6 = .55$
$p(o) = 1-p(a) = 1 -.546 = .45$

Task 5:

Classification accuracy = .4483

FINAL GRADE: 85%

COMMENTS:
Task 1: part c is incorrect, -5 points task 4: we want the total probability that the classifier is correct. so the probability that it is correct when the fruit is an orange + the probability that it is correct when the fruit is an apple