Math 10 Practice Quiz Chapter 3 KEY

1. [*9 points*] A small chain of ice cream stores has locations (A, B, D, R).
They have five flavors (C,V,S,M,F).
They surveyed 450 customers among the 5 stores to find out their favorite flavor ice cream..
The table categorizes flavor preferences by store location

	Store Location				
	Alameda (A)	Berkeley (B)	Danville (D)	Richmond (R)	Total
Chocolate (C)	21	38	47	8	114
Vanilla (V)	19	45	33	15	112
Strawberry (S)	26	30	19	15	90
Mint Chip (M)	13	18	21	22	74
Fudge Walnut (F)	11	19	15	15	60
Total	90	150	135	75	450

State answers in unreduced fractional form OR rounded to 3 decimal places (thousandths).

Suppose a customer from the survey is randomly selected:

a. [*1 point*] Find the probability that the customer does not prefer fudge walnut.

$P(F') = 1 - P(F) = 1 - \frac{60}{450} = \frac{390}{450} = .867$

b. [*1 point*] Find the probability that the customer was at the Berkeley store (B) **and** prefers Mint Chip (M).

$P(B \text{ and } M) = \frac{18}{450} = .04$

c. [*1 points*] Find the probability that the customer was at the Danville store (D) **or** prefers Strawberry (S)

$P(D \text{ OR } S) = P(D) + P(S) - P(D \text{ and } S)$

$= \frac{135}{450} + \frac{90}{450} - \frac{19}{450} = \frac{206}{450} = .458$

d. [*1 point*] Find the probability that customer was at the Richmond (R) store if we are **given that** the customer prefers Fudge Walnut (F).

$P(R|F) = \frac{15}{60} = .25$

e. [*1 point*] Find the probability that customer prefers strawberry (S) **given that** the customer is at the Alameda store (A).

$P(S|A) = \frac{26}{90} = .289$

f. [*2 points*] Are events Alameda (A) and Vanilla (V) independent? NO
Clearly state your conclusion and show appropriate numerical justification using probabilities.
You must show correct supporting work to receive credit. No correct work = no credit, even if answer is correct.

$P(V|A) = \frac{19}{90} = .211$ $\quad P(V) = \frac{112}{450} = .249$

$P(V|A)$ does not equal $P(V)$

g. [*2 points*] Are events Strawberry (S) and Berkeley (B) independent? YES
Clearly state your conclusion and show appropriate numerical justification using probabilities.
You must show correct supporting work to receive credit. No correct work = no credit, even if answer is correct.

$P(S|B) = \frac{30}{150} = .2$ $\quad P(S) = \frac{90}{450} = .2$

$P(S|B)$ equals $P(S)$

See page 2 for Questions 2 & 3

2. [*6 points*] At Donut Shack, 65% of all customers order coffee (Event C) $P(C) = .65$
42% of all customers order donuts (Event D) $P(D) = .42$
22% of all customers order muffins (Event M) $P(M) = .22$
15% of all customers order both coffee and muffins $P(C \text{ and } M) = .15$
Of the customers who order coffee, 36% also order donuts $P(D|C) = .36$

Show work using probability rules. Round your final answer to 3 decimal points (thousandths)

a. [*2 points*] Find the probability that a person purchases both coffee (C) **and** donuts (D)

$$P(C \text{ and } D) = P(D|C)\,P(C) = (.36)(.65) = .234$$

b. [*2 points*] Find the probability that a person orders coffee (C) **given that** the person orders a muffin (M)

$$P(C|M) = \frac{P(C \text{ and } M)}{P(M)} = \frac{.15}{.22} = .682$$

c. [*2 points*] Find the probability that a person orders coffee (C) **or** the person orders a muffin (M)

$$P(C \text{ OR } M) = P(C) + P(M) - P(C \text{ and } M)$$
$$= .65 + .22 - .15 = .72$$

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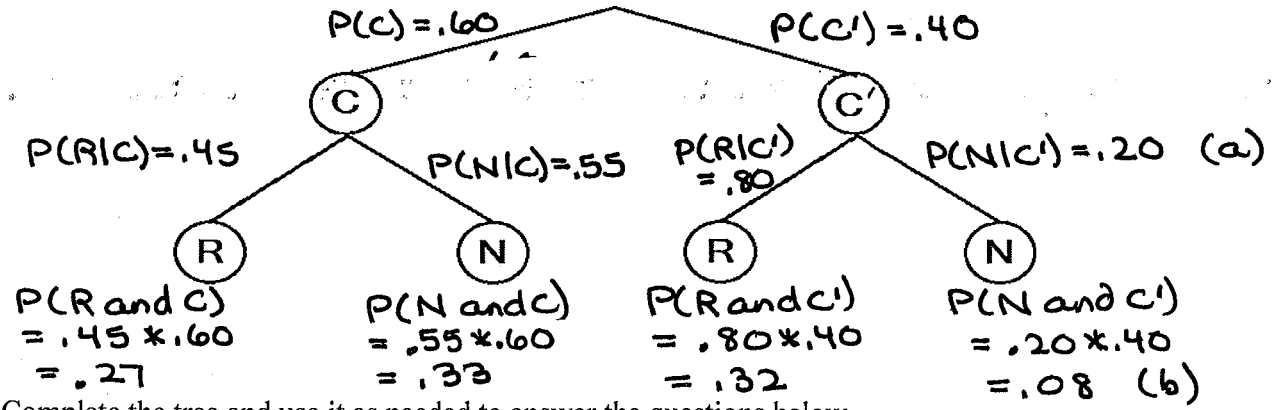
3. [*5 points*] In Emerald City: 60% of people own cars; the rest of the people do not.
Of the people who own cars, 45% use ride sharing apps at least occasionally
Of the people who do not own cars, 80% use ride sharing apps at least occasionally

Events: C = owns a car C′ = person does not own a car.
R = uses ride sharing apps. N = does not use ride sharing apps



Complete the tree and use it as needed to answer the questions below.
Show work. Round answer to 2 decimal places (hundredths).

For a randomly selected person in Emerald City:

a. [*1 point*] Find the probability that a person does not use the ride share app, given that they do not own a car.
P(N|C′)

$$P(N|C') = 1 - P(R|C') = 1 - .80 = .20$$

b. [*2 points*] Find the probability that a person does not own a car and does not use ride sharing apps.
P(C′ and N)

$$P(C' \text{ and } N) = P(N|C')\,P(C') = (.20)(.40) = .08$$

c. [*2 points*] Find P(R), the probability that a person uses ride-sharing apps.

$$P(R) = P(R \text{ and } C) + P(R \text{ and } C') = .27 + .32 = .59$$