Quiz 3

Name: _____

Red ID: _____

1. The probability an adult will get the flu is 0.2. The probability an adult will get a flu vaccination is 0.4. If an adult did not get a flu vaccination, the probability they will get the flu is 0.3. What is the probability an adult gets the flu and did not get the flu vaccination?

a) 0.06
b) 0.18
c) 0.12
d) 0.24
e) 0.08

A: flu B: vaccinated $P(A) = 0.2$ $P(B) = 0.4$ $P(A|B^c) = 0.3$

$P(A \cap B^c) = P(A|B^c)P(B^c) = (0.3)(1-0.4) = 0.18$

2. The probability an adult will develop cancer is 0.3. The probability an adult consumes a daily multivitamin is 0.1. Assuming that the probability an adult develops cancer is unaffected by whether or not they consumed multivitamins, what is the probability an adult develops cancer or consumes a daily multivitamin?

a) 0.2
b) 0.4
c) 0.37
d) 0.60
e) Insufficient information to answer this question

A: cancer B: vitamin $P(A) = 0.3$ $P(B) = 0.1$ A, B independent, so $P(A \cap B) = P(A)P(B)$

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.3 + 0.1 - (0.3)(0.1)$

$= 0.37$

3. The probability I am taking a nap at 2:00 pm tomorrow is 0.4. The probability I am having lunch at 2:00 pm tomorrow is 0.2. What is the probability I am taking a nap or having lunch at 2:00 pm tomorrow?

a) 0.60
b) 0.38
c) 0.74
d) 0.52
e) 0.08

A: nap B: lunch $P(A) = 0.4$ $P(B) = 0.2$ $P(A \cap B) = 0$

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.4 + 0.2 - 0 = 0.6$

4. The probability an adult uses tobacco is 0.12. The probability an adult consumes alcohol is 0.74. The probability an adult uses tobacco or consumes alcohol is 0.78. What is the probability an adult uses tobacco and consumes alcohol?

a) 0.77
b) 0.04
c) 0.08
d) 0.09
e) 0.66

A: tobacco B: alcohol $P(A) = 0.12$ $P(B) = 0.74$ $P(A \cup B) = 0.78$

$P(A \cap B) = P(A) + P(B) - P(A \cup B)$

$= 0.12 + 0.74 - 0.78$

5. 62% of adults drink green tea. 15% of adults will develop alzheimer's. Out of those adults who drink green tea, 7% will develop alzheimer's. What is the probability a randomly selected adult drinks green tea or will develop alzheimer's?

a) 0.01
b) 0.73
c) 0.04
d) 0.76
e) 0.70

A: tea B: alzheimer $P(A) = 0.62$ $P(B) = 0.15$ $P(B|A) = 0.07$

$P(A \cap B) = P(B|A)P(A)$

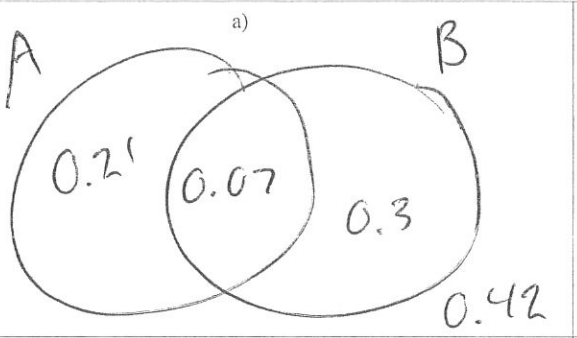
$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= 0.62 + 0.15 - (0.07)(0.62) = 0.73$

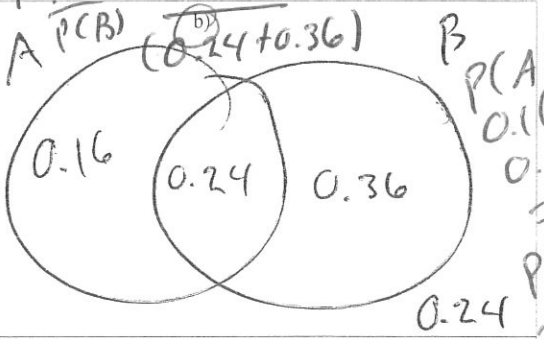
6. In which of the following Venn diagrams are events A and B independent?

$P(A|B) = P(A \cap B) = 0.24 = 0.4$

a)



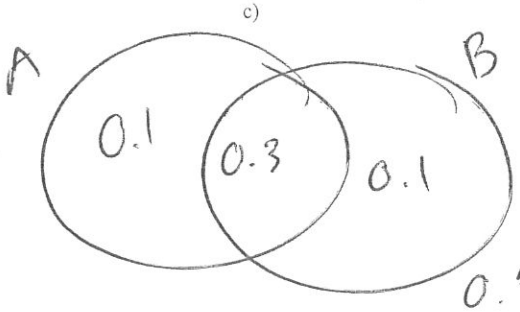
b)



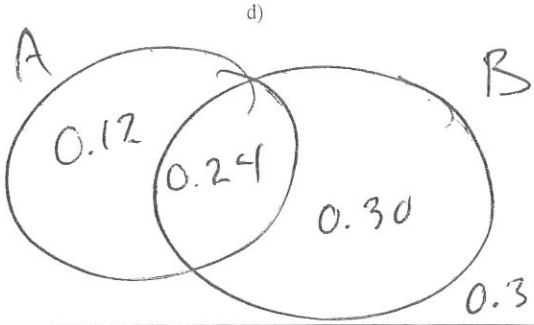
$P(A) = 0.16 + 0.24 = 0.4$

$P(A|B) = P(A)$

c)



d)

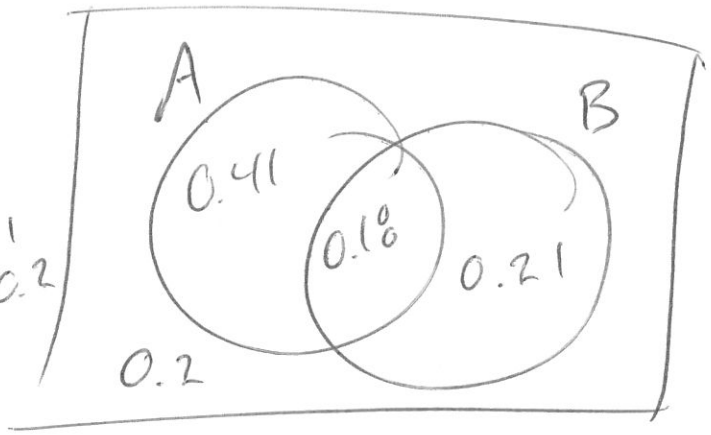


Use the following to answer questions 7 through 9

41% of programmers code in C but not Java
21% code in Java but not C
18% code in C and Java
The remainder code in neither language

Draw a Venn diagram to answer questions 7 through 9

A: C
B: Java



1 - 0.41 - 0.18 - 0.21 = 0.2

7. What is the probability a programmer codes in C or Java?

a) 0.53
b) 0.60
c) 0.18
d) 0.80
e) 0.44

$1 - 0.2 = 0.8$

8. If a programmer codes in C, what is the probability they code in Java?

a) 0.46
b) 0.31
c) 0.18
d) 0.86
e) 0.44

$P(B|A) = \frac{P(A \cap B)}{P(A)} = \frac{0.18}{(0.41 + 0.18)} = 0.31$

9. What is the probability a programmer does not code in C, if you know they do not code in Java?

a) 0.51
b) 0.95
c) 0.54
d) 0.49
e) 0.33

$P(A^c|B^c) = \frac{P(A^c \cap B^c)}{P(B^c)} = \frac{0.2}{(0.41 + 0.2)} = 0.33$

10. Assume that 30% of adults regularly consume coffee. Of adults that regularly consume coffee, 10% will eventually develop dementia, while of those adults who don't regularly consume coffee, 25% will eventually develop dementia. For a randomly selected adult who does not develop dementia, what is the probability they regularly consumed coffee? Use a tree diagram to help answer this question.

a) 0.27
b) 0.41
c) 0.34
d) 0.90
e) 0.66

A: coffee
B: dementia

$P(A) = 0.3$

- $P(B|A) = 0.10$ $\quad P(A \cap B) = (0.3)(0.1) = 0.03$
- $P(B^c|A) = 0.90$ (1 - 0.10) $\quad P(A \cap B^c) = (0.3)(0.9) = 0.27$

$P(A^c) = 0.7$ (1 - 0.3)

- $P(B|A^c) = 0.25$ $\quad P(A^c \cap B) = (0.7)(0.25) = 0.175$
- $P(B^c|A^c) = 0.75$ (1 - 0.25) $\quad P(A^c \cap B^c) = (0.7)(0.75) = 0.525$

$P(A|B^c) = \frac{P(A \cap B^c)}{P(B^c)} = \frac{0.27}{(0.27 + 0.525)} = 0.34$