Analysis Probability Quiz #2 Student conditioned to a weekly quiz Hannah Kim
2016-17 Calculators not needed 28/30 period B

Just like the last quiz, please leave your answer in exact form using P's, C's, factorial, fractions, exponents.

1. At the local Humane Society there are 10 black kitties and 12 white kitties. Leroy wants to adopt 5 of them but they are too cute to choose from. So he decides to choose 5 at random. What is the probability that he adopts 2 black kitties and 3 white kitties?

$$\frac{\binom{10}{2}\binom{12}{3}}{\binom{22}{5}}$$ ✓

2. Every day on TV Al Roker predicts the weather for New York City in the afternoon. He either predicts it to be "sunny" or "not sunny". He does this for 14 days in a row. Would this be considered a series of Binomial Events (Bournouli Trials)? Explain why or why not.

Yes; it has only two possible options: sunny or not sunny. A Binomial Event must have only two possible outcomes — like this one. -2

3. Let S be the event that my son grows up to be a teacher. Let D be the event that my daughter grows up to be a teacher. Assume that these events are independent.

If P(S) = .3 and P(D) = .2 Find $P(S \cup D)$ P(S or D)

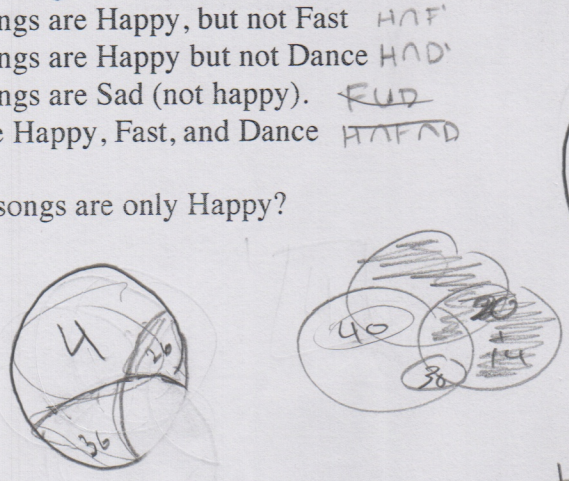
.5 - .06 = .44 ✓

$P(S \cap D) = .3 \cdot .2 = .06$
P(S & D)

4. Bertha has a strange way of arranging her playlists. She sorts her songs into Happy Songs (H), Fast Songs (F) and Dance Songs (D)

She has 100 songs total, **all** of which are either Happy, Fast or Dance songs.
40 of her songs are Happy, but not Fast $H \cap F'$
30 of her songs are Happy but not Dance $H \cap D'$
20 of her songs are Sad (not happy). ~~F∪D~~
14 songs are Happy, Fast, and Dance $H \cap F \cap D$

How many songs are only Happy?



4 songs are only H ✓

H, H∩F, H∩D || 66+14

66 = 40 + 26

36 30

-2

5. In a normal 52-card deck there are 12 face cards and 40 non-face cards. Consider the following:
Felix reaches into the deck and removes one card.
If it is a face card, he rolls a 10-sided die and records the number (1-10).
If it is a non-face card, he rolls a standard 6-sided die and records the number (1 – 6).

✓ a) What is the probability of choosing a face card and then rolling a 5?

$\frac{12}{52} \cdot \frac{1}{10} = \boxed{\frac{3}{130}}$

✓ b) What is the probability he rolls a 2?

$\frac{100}{780} + \frac{18}{780} = \frac{118}{780} = \boxed{\frac{59}{390}}$

✓ c) What is the probability of rolling an 8, given that he rolled a non-face card?

$\boxed{0}$

✓ d) What is the probability that he picked a face card, given that he rolled a 2?

$P(FC \mid 2) = \frac{18}{118} = \boxed{\frac{9}{59}}$

✓ 6. What is the probability of rolling a 6-sided die 100 times and recording exactly 17 5's?

$\boxed{\binom{100}{17}\left(\frac{1}{6}\right)^{17}\left(\frac{5}{6}\right)^{83}}$