5.5 Conditional Probability Assignment– Grandma's Birthday

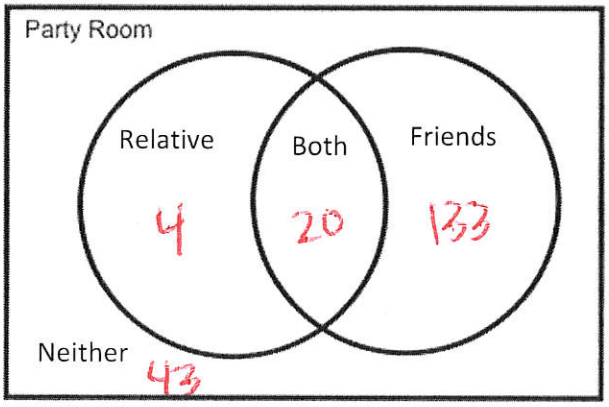
Name: Key

Hr:_____

You've been invited to Grandma Adam's birthday party at the haunted mansion! All your crazy relatives and friends will be there. When you arrive, this is what you discover:

- 200 people are at the party
- 24 are relatives
- 43 are neither a friend or a relative
- 20 are both a friend and a relative

1. How many of your friends came to the party? Use the information above to complete the Venn diagram. *Note: a friend is anyone you've met. You are that kind of guy or gal.*



2. Once you've completed the Venn diagram, create a two-way table that displays the same data.

	Friend	Not Friend	Total
Relative	20	4	24
Not Relative	133	43	176
Total	153	47	200

Use the information from your table on number 2 to answer the following questions. Use F to represent "Friend" and R to represent "Relative." Remember: $\cap$ means "**and**", $\cup$ means "**or**"

3. Find $P(F)$ $\frac{153}{200} = .765$

4. Find $P(R)$ $\frac{24}{200} = .12$

5. Find $P(\overline{R})$ $\frac{176}{200} = .88$

6. Find $P(\overline{F})$ $\frac{47}{200} = .235$

7. Find $P(R|F)$ $\frac{20}{153} = .131$

8. Find $P(F|R)$ $\frac{20}{24} = .833$

9. Find $P(F|\overline{R})$ $\frac{133}{176} = .756$

10. Find $P(R|\overline{F})$ $\frac{4}{47} = .085$

11. Find $P(\overline{R}|\overline{F})$ $\frac{43}{47} = .915$

12. Find $P(F \cup R)$ (or) $\frac{153}{200} + \frac{24}{200} - \frac{20}{200} = \frac{157}{200} = .785$

13. Find $P(F \cap R)$ (and) $\frac{20}{200} = 0.1$

In a standard deck of playing cards (52 total cards) there are 4 suits (hearts, diamonds, clubs, spades) with 2 suits being red (hearts and diamonds) and the others being black (clubs and spades). In each suit there is one card of each number 2-10, 1 Jack, 1 Queen, 1 King, and 1 Ace (making 13 total in each suit). Face cards are Jack, Queen, and King. In each of the following situations you are drawing 1 card. Find the probability: Remember: $\cap$ means "**and**", $\cup$ means "**or**"

14. Find $P(\text{king} \cap \text{heart})$ (and) $\frac{1}{52}$

15. Find $P(\overline{red}\,|\,facecard)$ $\frac{6}{12} = \frac{1}{2}$

16. Find $P(\text{club} \cup \text{spade})$ (or) $\frac{26}{52} = \frac{1}{2}$

17. Find $P(2 \cap \text{facecard})$ (and) 0

18. Find $P(\text{black} \cap 10)$ (and) $\frac{2}{52} = \frac{1}{26}$

19. Find $P(4\,|\,black)$ $\frac{2}{26} = \frac{1}{13}$

20. Find $P(\text{diamond} \cup \text{red})$ (or) $\frac{13}{52} + \frac{26}{52} - \frac{13}{52} = \frac{1}{2}$

21. Find $P(8 \cup \text{red})$ (or) $\frac{4}{52} + \frac{26}{52} - \frac{2}{52} = \frac{28}{52} = \frac{7}{13}$

For 22-23, you randomly select 3 cards from a standard well shuffled deck of 52 playing cards.

22. Find the probability that all 3 cards are hearts when you replace each card before selecting the next card.

$P(\heartsuit) = \frac{13}{52} = \frac{1}{4}$

$\frac{1}{4} \cdot \frac{1}{4} \cdot \frac{1}{4} = \frac{1}{64}$

23. Find the probability that all 3 cards are hearts when you **do not** replace each card before selecting the next card

$\frac{13}{52} \cdot \frac{12}{51} \cdot \frac{11}{50} = \frac{11}{850}$