Bell Ringer   do #1 and #3   vertex (h,k)

Thursday 5/2

Write a quadratic equation in standard form for the given zero's.

$y = ax^2 + bx + c$

1. $x = -2, 5$ $x = -2$
   $x = 5$

$x + 2 = 0$
$x - 5 = 0$

$(x+2)(x-5)$ -10
(h,k)
(x,y)

2. $x = \dfrac{1}{4}, 7$

$\boxed{y = x^2 - 3x - 10}$

$x^2 - 5x + 2x - 10$

Write a quadratic equation in vertex form given the vertex and a point on the parabola.

3. Vertex: $(4,5)$
   Point: $(3,6)$

$6 = a(3-4)^2 + 5$
$6 = a(1) + 5$
$6 = a + 5$
$-5 \quad -5$
$1 = a$

4. Vertex: $(-2,-3)$
   Point: $(1,-30)$

$y = \underline{a}(x - \underline{h})^2 + \underline{k}$
$y = (x - \underline{4})^2 + \underline{5}$

correct 14.2

Unit 14 – Probabilities: ASSIGNMENT 14.2

Describing Subsets   Name: __Key__

For all probabilities with cards assume one card is being drawn.   Hour: _____

Find the probability of the following events.

1. Avery has been learning to play some new card games and is curious about the probabilities of being dealt different cars from a standard 52 – card deck. Help him figure out the probabilities listed below:
Express answers as a percent rounded to the nearest tenth.

   a. P(king)   b. P(queen)   🙂 c. P(diamond)

   7.7% 7.7% 25%

   d. P(black)   e. P(face card)   f. P(three or four)

   50% 23% 15.4%

2. Assume that two standard dice are being rolled and the sum is being calculated. *Express answers as fractions.*

   a. P(sum 2) $\dfrac{1}{36}$ b. P(sum of 9) $\dfrac{1}{9}$

   🙂 c. Event A = {the sum is a multiple of 3}, find P(A)

   $\dfrac{1}{3}$

   d. Event B = {the sum is a multiple of 4}, find P(B)

   $\dfrac{1}{4}$

Set

3. Using the situation described in problem #1 answer the following:
Express answers as a decimal rounded to the nearest hundredth.

   a. What is P(king or diamond)? How does your answer relate to the probabilities you calculated in problem #1?

   $.31$

   b. What is the P(king or queen)? Again, how does your answer relate to the probabilities you calculated in problem #1?

   $.15$

   🙂 c. P(diamond or face card)   d. P(10 or black)

   $\dfrac{13}{52}+\dfrac{12}{52}-\dfrac{3}{52}$ $.42$ $\dfrac{22}{52}$ $.54$

   $\dfrac{2}{26}$

   🙂 e. P(8 and red)   f. P(less than 5)

   $.04$ $.23$

   g. P(less than 3 or face card)   h. P(greater than 5 but less than 10)

   $.31$ $.31$

4. Using the situation described in problem #2 find the following. *Express answers as fractions.*

   a. What is P(A and B)? $\dfrac{1}{36}$ b. What is P(A or B)? $\dfrac{5}{9}$

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

☺5. In a random sample of 10,000 college students, a research comply found that 35.7% were involved in a club and 27.8% studied 4 or more hours per day. When they reported their findings, the research company indicated that 53.4% of college students were either involved in a club or they studied 4 or more hours per day. Given this information, what is the probability that a college student is involved in a club and studies 4 or more hours per day?

A - club   B - Study 4+ hrs

$P(A \cap B) = 10.1\%$ $P(A) = 35.7\%$ $P(B) = 27.8\%$

$P(A \cup B) = 53.4\%$ $P(A \cap B) = ✗$

Go!

6. Eddie is arguing with Tana about the probability of flipping three coins. They decide to flip a penny, nickel and a dime. If they flip three coins, would a tree diagram or an area model be better for determining the sample space? Justify your answer.

tree diagram - an area model can only do 2 at a time.

☺7. Zelda, the fortune teller at the fair, foresees you meeting a tall dark stranger in the next 140 days. What is the portability that you will meet the stranger on Monday? What is the probability that you will meet the stranger on the weekend? What is the probability you will meet the stranger on a weekday?

$P(m) = \frac{1}{7}$ $P(weekend) = \frac{2}{7}$

$P(weekday) = \frac{5}{7}$

Use the tree diagram to answer 8-11 *Express answers as a decimal rounded to the nearest hundredth.*

8. What is the probability that you order a taco that has a hard shell with chicken?

$.09$

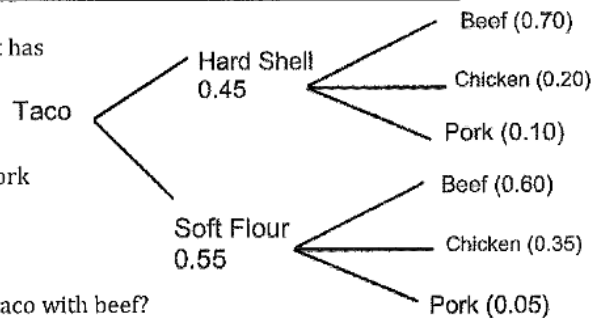9. What is the probability of ordering a taco with pork as the meat?

$.0725$

☺10. What is the probability of ordering a soft flour taco with beef?

$.33$

11. What is the probability of ordering a hard shell taco?

$.45$

Taco
- Hard Shell 0.45
  - Beef (0.70)
  - Chicken (0.20)
  - Pork (0.10)
- Soft Flour 0.55
  - Beef (0.60)
  - Chicken (0.35)
  - Pork (0.05)

Use the tree diagram to answer 12-15 *Express answers as a decimal rounded to the nearest hundredth.*

12. What is the probability that you order a sandwich on white bread?

$.70$

13. What is the probability of ordering a sandwich with turkey on wheat?
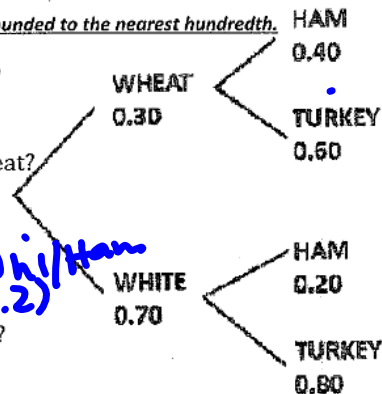
$.18$

14. What is the probability of ordering a sandwich with ham?

$.26$

wheat/ham or wh/ham
$(.3 \times .4) + (.7)(.2)$

15. What is the probability of ordering a sandwich with ham on white?

$.14$

- WHEAT 0.30
  - HAM 0.40
  - TURKEY 0.60
- WHITE 0.70
  - HAM 0.20
  - TURKEY 0.80

14.3 due tomorrow - questions?

Name:_____Hour_____ **14.3 - Probability With and Without Replacement**

1-20 odds, 21-25

You have a jar of gumballs: 4 red, 9 green, 8 blue, 6 yellow, and 3 white. One gumball is drawn randomly.
Find the following probabilities and write as a <u>reduced fraction and as a percent</u>.

1. P(white)   2. P(green)   3. P(blue ∪yellow)   4. P(complement of red)

You roll a 6 sided die one time. Find the following probabilities.
Write as a <u>reduced fraction and as a percent</u>.

5. P(7)   6. P(1 ∪2)   7. P(odd number)   8. P(complement of 6)

In your math class there are whiteboard markers at the board: 2 green, 2 blue, 2 red, 1 purple, and 1 black.
One student randomly chooses a marker and then replaces it. The second student then chooses a marker.
What is the probability of the student randomly choosing the colors listed below?
Write the probability as a <u>reduced fraction and percent</u>.

9. P(green, blue)   10. P(red, purple)

11. P(black, black)   12. P(purple, green)

In your sock drawer you have 10 pairs of white socks, 4 pairs of black, and 2 pairs of brown. You randomly
choose a pair of socks each day. Sometimes you don't replace them because they are dirty. You choose
another pair of socks the next day. Find the probability of the following situations. Write the probability as
a reduced fraction and a percent.

13. P(white, white) **with replacement**   14. P(white, black) **without replacement**

15. P(black, brown) **without replacement**   16. P(brown, brown) **without replacement**

17. P(white, white, white) **with replacement**   18. P(white, black, brown) **with replacement**

19. P(black, white, white) **without replacement**   20. P(brown, brown, brown) **with replacement**

Determine if the following events are dependent or independent. Then calculate the probability of each.

21. Selecting a glazed donut from an assortment of twelve donuts, 4 glazed, ~~4 chocolate bars~~, 4 maple bars, and 4 cake donuts. Then eating it, and then selecting a maple bar from the same box.

$P(glazed, maple)$

$$\frac{4}{12} \cdot \frac{4}{11} = \frac{16}{132} = \frac{4}{33} = 12.1\%$$ **Dependent**

22. Given a bag of marbles with 2 red, 3 green and 2 blue. What is the probability of choosing a red marble keeping it, then choosing another red marble?

$$\frac{2}{7} \cdot \frac{1}{6} = \frac{2}{42} = \frac{1}{21}$$ **Dependent**

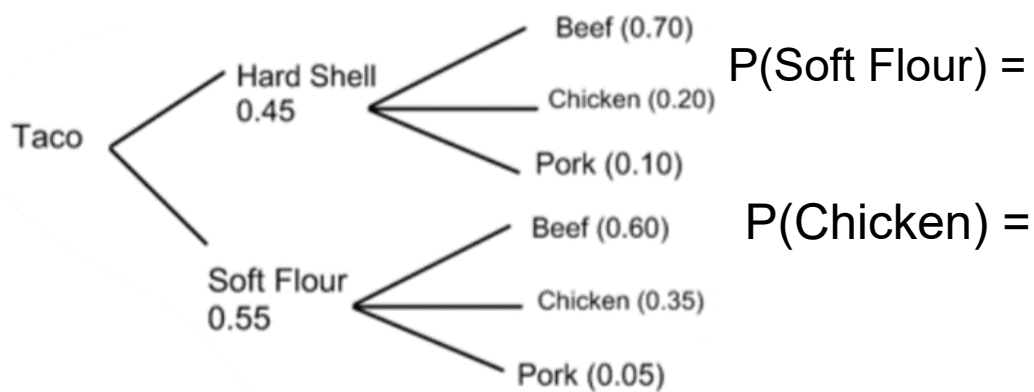23. Rolling a 3 on a dice and then drawing a red card from a deck of cards.

24. You are choosing two cards from a deck. The first card is a queen, if you keep that card what is the probability that the second card is a face card?

25. Flipping a coin, and getting tails both times.

In a random sample of 500 Ridgeline students, a study found that 32.9% are involved in a club and 17.3% study at least 2 hours a day. They also found that 44.1% are involved in a club **or** study at least two hours a day. Given this info, what's the probability that a student is involved in a club **and** studies at least two hours a day?

Use the diagram to find the following probabilities

Taco

Hard Shell
0.45

Beef (0.70)

Chicken (0.20)

Pork (0.10)

Soft Flour
0.55

Beef (0.60)

Chicken (0.35)

Pork (0.05)

P(Soft Flour) =

P(Chicken) =

P(Chicken or Hard Shell Beef) =

14.4 Conditional Probability Task   Name:_____Hr:_____

Probability Notation:

P(A) - Probability of Event A Occurring

✱ P(A|B) - Probability of Event A Occurring Given Event B

given

✱ Complement: ~A, -A, or A' (not A)

OR: U (This is the union of both sets or the probability of A or B or both events occurring)

AND: ∩ (This is the intersection of both sets or the probability of both events occurring)

Example:

You've been invited to tryout to become a circus performer because of your amazing talents. Many other performers will be there and when you arrive in the big tent you discover:

- 100 people are in the big tent for the tryout
- 25 of them use fire in their act
- 38 of them use neither animals or fire
- 20 use both animals and fire in their act

How many of the performers use animals in their act?
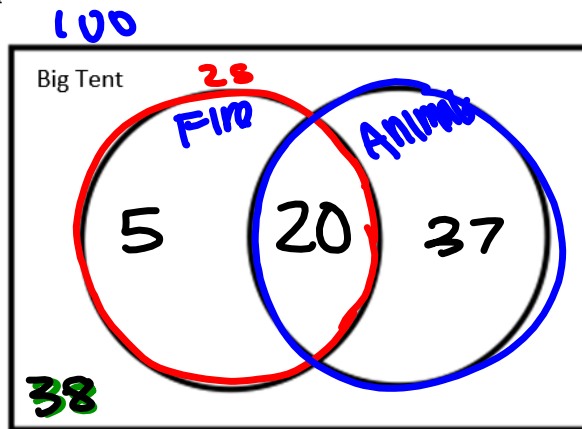
Now let's make a two-way table to help us discover what we have found

	Fire	Not Fire	Total
Animal	20	37	57
Not Animal	5	38	43
Total	25	75	100

1. What information is more obvious from the Venn diagram?

subsets $P(F')$ $P(F')$ $P(\sim F)$

2. What information is more obvious from the two-way table?

totals $P(-F)$

3. Write what this notation is saying in your own words: $P(F'|A)$. Then calculate the probability.

prob not using fire, given use an animal $\frac{37}{57} = 64.9\%$

4. What is the probability that a randomly selected individual uses fire or a an animal or $P(F \cup A)$.

$\frac{25}{100} + \frac{57}{100} - \frac{20}{100} = \frac{62}{100} = 62\%$

5. What is the probability that a randomly selected individual uses fire given they use an animal or $P(F|A)$.

$\frac{20}{57} = 35\%$

6. Write what this notation is saying in your own words: $P(F \cap A)$. Then calculate the probability.
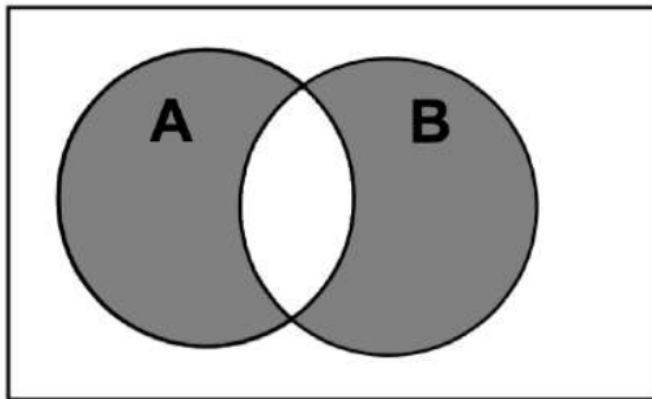
$\frac{20}{100} = 20\%$

7. Write what this notation is saying in your own words: $P(F|A')$. Then calculate the probability.

prob use fire, given don't use animal $5/43 = 11.7\%$

Sally's Error

Sally was assigned to create a Venn diagram to represent $P(A$ or $B)$. Sally remembers that $P(A$ or $B) = P(A) + P(B) - P(A$ and $B)$, so she creates the following diagram.

8. What was Sally's error?

9. Make a Venn diagram that correctly represents $P(A$ or $B)$.

10. Create a Venn Diagram for $P(A$ or $B)$ such that A and B are disjoint[1].

----

[1] Disjoint sets are also known as mutually exclusive sets.

due Monday

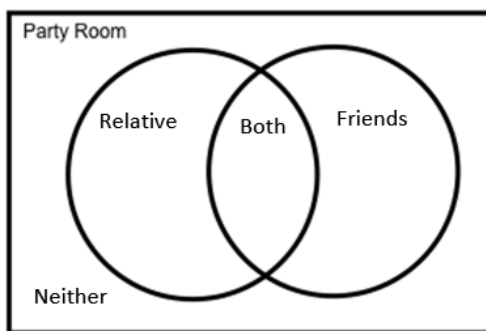## *14.4 Conditional Probability Assignment– Grandma's Birthday*

Name:_____

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.*

```
Party Room
        _____        _____
       /           \      /           \
      /    Relative   Both    Friends   \
     |             | |             |
      \           /  \           /
       _____/    _____/

   Neither
```

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

|	Friend	Not Friend	Total
Relative			
Not Relative			
Total			

Ready: odds on back
Use the information from your table on number 2 to answer the following questions. Use F to represent "Friend" and R to represent "Relative."

3. Find P(F)   4. Find P(R)

5. Find P(R')   6. Find P(F')

7. Find P(R|F)   8. Find P(F|R)

9. Find P(F|R')   10. Find P(R|F')

11. Find P(R'|F')   12. Find P(F ∪ R)

13. Find P(F ∩ R)

Use the Venn diagram to find each of the following.
(Examples 2 and 3)
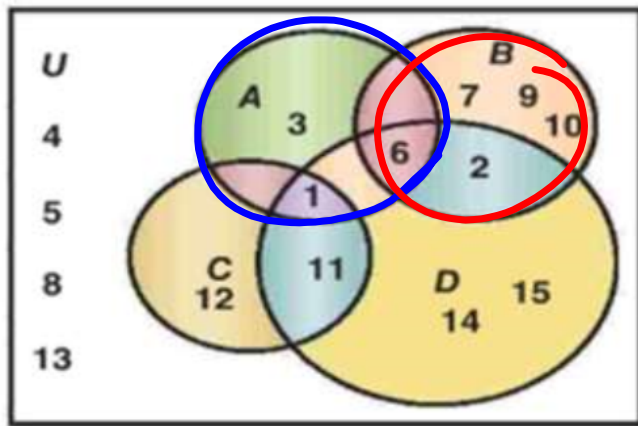
14. A ∪ B   17. A ∩ D {1, 6}   20. Find P(C ∪ D)

15. C ∪ D = {12, 1, 11, 14, 15, 2, 6}   18. A'   21. P(B|A) $\frac{1}{3}$ = 33%

16. A ∩ B ∩ D   19. (A ∪ B) ∪ C   22. Find P(A ∩ B)
                                       {1, 2, 3, 6, 7, 9, 10, 11, 12}