

Grab a Bell Ringer and HW Tracker

Monday 5/6

Identify the center and radius of each circle.

1. $(x-2)^2 + (y-9)^2 = \frac{16}{25} = r^2$

$(2, 9)$

$r = \frac{4}{5}$

2. $(x+11)^2 + y^2 = 5 = r^2$

$(-11, 0)$

$r = \sqrt{5}$

3. $x^2 + y^2 + 18x - 30y = 18$

$x^2 + 18x + 81 + y^2 - 30y + 225 = 18 + 81 + 225$

$(x+9)^2 + (y-15)^2 = \sqrt{324}$
 $\downarrow \sqrt{}$

$(-9, 15) \quad r=18$

correct 14.4

14.4 Conditional Probability Assignment- Grandma's Birthday



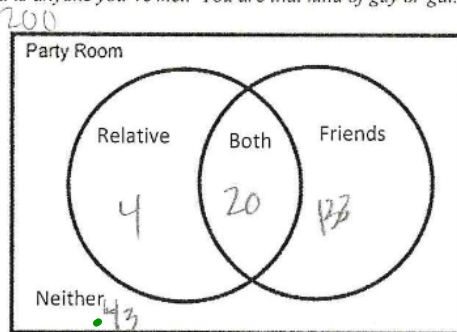
Name: _____

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.*



$$\begin{array}{r}
 200 \\
 - 4 \\
 - 20 \\
 \hline
 176
 \end{array}$$

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

Ready:

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) $\frac{153}{200} = 76.5\%$

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

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

6. Find P(F')

7. Find P(R|F) $\frac{20}{153} = 13.07\%$

8. Find P(F|R) $\frac{20}{24} = 83.3\%$

9. Find P(F|R')

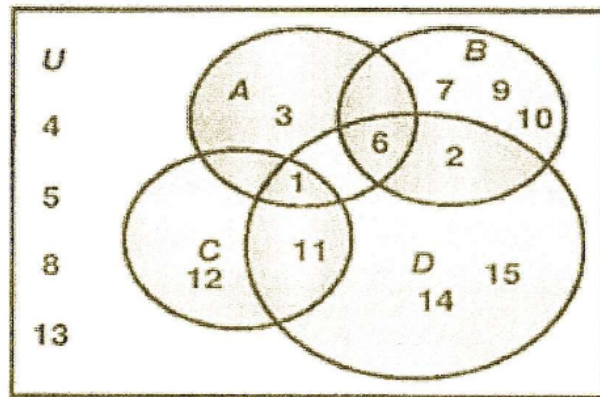
10. Find P(R|F')

11. Find P(R'|F')

12. Find P(F ∪ R) $\frac{153}{200} + \frac{24}{200} - \frac{20}{200} = 78.5\%$

13. Find P(F ∩ R) $\frac{20}{200} = 10\%$

Use the Venn diagram to find each of the following.
(Examples 2 and 3)



15 total

14. A ∪ B {1, 2, 3, 6, 7, 9, 10}

17. A ∩ D {1, 6}

20. Find P(C ∪ D) $\frac{15}{15} = 100\%$

15. C ∪ D {1, 2, 6, 11, 12, 14, 15}

18. A' {2, 4, 5, 7, 8, 9, 10, 12, 13, 14, 15}

21. P(B|A) $\frac{6}{18} = 33\%$

16. A ∩ B ∩ D {6}

19. (A ∪ B) ∪ C {1, 2, 3, 6, 7, 9, 10, 11, 12}

22. Find P(A ∩ B) $\frac{6}{15} = 0.67$ or 67%

Turn in Hw Tracker - **WEEK 8**

14.1 Sample Space

14.2 Unions and Intersections

14.3 Compound Prob w/ and w/o replacement

14.4 Conditional Probability

/40

14.5 Probability Task Using Tables – TB or Not TB

What is probability?

A probability provides a quantitative description of the likely occurrence of a particular event. Probability is conventionally expressed on a scale from 0 to 1 or 0 to 100%; a rare event has a probability close to 0, a very common event has a probability close to 1 or 100%.

To find the probability of event E use: $P(E) = \frac{\text{number of outcomes corresponding to event E}}{\text{total number of outcomes}}$

Let's try an example:

If you ever had chicken pox, measles, rubella, or other viruses, then for the rest of your life you will have antibodies for those diseases in your blood, and a simple blood test will be able to detect the presence of those antibodies. In a similar way, if someone has tuberculosis, then they will have antibodies for tuberculosis in their blood.



Blood tests are designed to detect the presence of specific antibodies, but the tests are not perfect. Sometimes, even if there are no antibodies present, other factors will trigger the test to come back positive. So, a positive test result isn't absolute evidence that the person has the disease.

To test for tuberculosis (TB) patients are administered a skin test which involves injecting a bubble of serum underneath the skin, then several days later, observing the skin to see if the person has shown a reaction to the serum. A skin reaction indicates the presence of TB antibodies. Suppose that a young adult with no prior evidence of tuberculosis has a skin reaction to the serum. The person wonders "*Do I really have tuberculosis?*" Below are the test results from a large sample of people from countries with insufficient health care.

	Test is Positive	Test is Negative	Total
Has Tuberculosis (TB)	361	19	380
Doesn't Have Tuberculosis (TB)	62	558	620
Total	423	577	1,000

- 1) Complete the missing parts of the table. Based on this large sample find the following values:
- 2) What percent of the population of people from these countries are infected with TB? Or in other words, has tuberculosis antibodies?

$$\frac{380}{1,000} = 38\%$$

- 3) What percent of individuals in those countries will have a positive test result?

$$\frac{423}{1000} = 42.3\%$$

- 4) How accurate is the tuberculosis (TB) test?

pretty accurate ... ish

$$\begin{array}{r} 558 \\ + 361 \\ \hline 919 \end{array}$$

$$\frac{919}{1000}$$

$$91.9\%$$

To answer the person who asks "Do I really have tuberculosis?" we will explore some probabilities.

- 5) Out of all those who tested positive, what percent of individuals actually had tuberculosis antibodies? (The test accurately detected the disease.)

$$\frac{361}{423} = 85.3\%$$

- 6) Out of all those who tested negative, what percent of individuals didn't have TB antibodies? (The test accurately said they were TB free.)

$$\frac{558}{577} = 96.7\%$$

- 7) What percent of those with tuberculosis tested negative? (The test said they were TB free, but they really had the disease. This is called a false negative.)

$$\frac{19}{380} = 5\%$$

- 8) What percent of those who tested positive didn't have tuberculosis (The test said they had TB, but they really didn't. This is called a false positive.)

$$\frac{62}{423} = 14.7\%$$

- 9) Which is worse, a false negative or a false positive? Why?



- 10) Most health tests are designed to be very sensitive, so sensitive that they often come back with false positive results. Why do you suppose tests are planned to be that way?

Try and catch all people w/ diseases...

- 11) What will you say to answer the young adult who tested positive and asks, "Do I really have TB?"

due Wednesday

Name: _____ Hr: _____

14.5

Conditional Probability 2

Use the table below to answer questions 1 through 5.

	Adult	Child	Total
Vanilla	52	26	78
Chocolate	41	105	146
Total	93	131	224

1. What percent of the people like chocolate?
2. What percent of the children like vanilla?
3. What percent of those that like chocolate are adults?
4. What percent of the people surveyed were children that liked chocolate?
5. Is chocolate more popular among children or adults? Explain your reasoning.

The following table represents data from a survey of people asking them if they slept better after eating a big meal. Data indicating whether or not the participants ate a big meal as well as whether or not they slept well is recorded in the table below.

Complete the table:

	Big Meal	Not a Big Meal	Total
Slept Well		505	1517
Didn't Sleep Well		299	
Total			2000

6. Of those that slept well, what percentage ate a big meal?
7. Of those that ate a big meal, what percentage slept well?
8. What is the sample space of this survey? (What are the possible responses?)
9. From the survey data, would you conclude that eating a big meal will help you sleep well?
Why or why not?

