AMDM Fall Final Exam Review

1. Given that an average of 18 people can fit inside a square measuring 5 feet by 5 feet, estimate the size of a crowd that is 10 feet deep on both sides of the street standing along a 1-mile section of a parade route. (1 mile = 5,280 ft)

2. The size of a television is the length of the diagonal of its screen in inches. The aspect ratio of the screens of older televisions is 4:3, while the aspect ratio of newer wide-screen televisions is 16:9. Find the width and height of an older 25-inch television whose screen has an aspect ratio of 4:3.
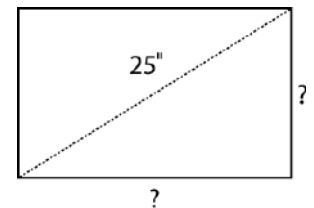


Consider two grading systems for determining your final class average. Each system is a weighted average of measures that include test grades, final exam grade, homework, and class participation.

| Grading System I | Grading System II |
|---|---|
| Test average – 40% | Test average – 60 |
| Final Exam Grade – 25% | Final Exam Grade – 15% |
| Homework – 25% | Homework – 15% |
| Class Participation – 10% | Class Participation – 10% |

3. If your values are the following, which grading system do you prefer and why?
   - Test average = 84
   - Final exam grade = 68
   - Homework = 90
   - Class participation = 95

4. If you score 10 points higher on the final exam, how does your final grade average change under each system?

The Midtown Meteors keep track of the distance each member runs per week. The distances, in kilometers, are listed below:

| 48 | 62 | 54 | 38 | 46 | 40 | 53 | 63 |
| 34 | 45 | 36 | 63 | 51 | 60 | 52 | 44 |
| 33 | 47 | 55 | 42 | 39 | 57 | 49 | 56 |

5. What is the standard deviation for the data?

6. What information does the standard deviation give you?

Ms. Snow conducted a survey of her homeroom. She asked students what math course and what science course they were taking this semester. Next page are the results.

Students in Ms. Snow's Homeroom
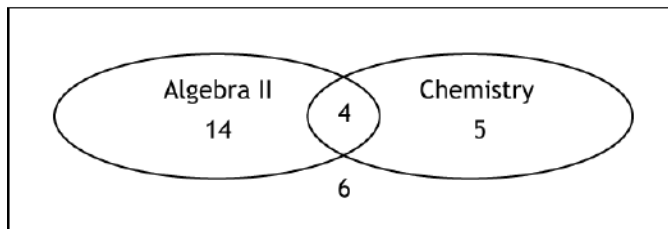


7. If a student is selected at random from Ms. Snow's homeroom, what is the probability that the student is taking Algebra II and Chemistry?

8. If a student is selected at random from Ms. Snow's homeroom, what is the probability that the student is not taking Algebra II or Chemistry?

As president of the high school band, Catrina needs to pick a committee of 2 to accompany her each time she visits middle schools. The director told her that each committee had to consist of 1 boy and 1 girl; 5 boys and 4 girls volunteered to go. To be fair, Catrina makes a spinner with the boys' names and a spinner with the girls' names. Each time she schedules a visit, Catrina spins each spinner once to determine who goes with her. If a spinner lands on a line, she spins again.
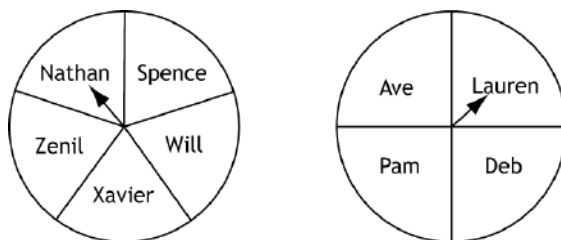


9. How many outcomes are in the sample space?_____

10. What is the probability that Nathan will be selected?_____

**Given the following area model:**

| No Pumpkins | No Pumpkins |
|---|---|
| Pumpkins | |
| No Pumpkins | No Pumpkins |

11. What is the probability of a person randomly selecting a pumpkin?

At the National Baseball Batting Contest, the organizers have set up game booths for the contestants. Marcus wants to win a large stuffed animal. The rules of the game are as follows:
- You are pitched 5 fastballs, and you must hit them into a fair zone to count.
- If you successfully hit all 5 pitches, you win a large stuffed animal.
- If you successfully hit 3 or 4 pitches, you win a small stuffed animal.
- If you successfully hit 1 or 2 pitches, you win a bat-shaped pencil.

12. What is the probability of Marcus winning a large stuffed animal?

13. What is the probability of Marcus winning a small stuffed animal?

14. Some information on a tire reads P230/60R. What is the diameter in inches?

15. Recall slugging percentage is found by using the formula below

$$SLG = \frac{(1 \cdot S) + (2 \cdot D) + (3 \cdot T) + (4 \cdot HR)}{AB}$$

Find the SLG for a player with 52 doubles, 31 singles, 2 triples, 61 homeruns, and 335 at bats.

16. Determine the check digit for the UPC number 61230032451d. Recall the check digit is chosen so that the calculation below has 0 for the final digit when $a_1$ through $a_{11}$ are the first 11 digits of the UPC and d is the check digit.

$$3a_1 + a_2 + 3a_3 + a_4 + 3a_5 + a_6 + 3a_7 + a_8 + 3a_9 + a_{10} + 3a_{11} + d$$

17. Use the information below to find your nine week grade in AMDM.

- test grades 50% of nine weeks grade
- daily grades 25% of nine weeks grade
- group presentation grades 25% of nine weeks grade

Your test scores were {85, 57, 82}. Your daily grades were {75,86,98,97,65,79, 85}. Your group presentation grades were {86, 87,65,91}.

18. Which size would you see on the box for a new television whose screen measures 32 inches wide by 18 inches high?

19. Find the aspect ratio for a computer screen that measures 7.5 inches high by 13.5 inches wide.

20. If your speedometer reading is 53 mph, but your tires are larger than factory-installed tires, how fast is your SUV actually moving? The circumference of the factory-installed tires should be 77.1 inches, but your tires are 81.4 inches around.

21. Find the width and height of an older 50-inch television whose screen has an aspect ratio of 16:9. Find the area of the screen. Make a drawing and justify your answer.

Answer each of the following Fermi Questions to the best of your ability. Please list all of your assumptions, in addition to all steps used to complete the problem.

22. If Bill Gates' net worth was doled out to him by the minute, how much is his time worth per minute? (Bill Gates' current net worth is $54 billion and he was born on October 28, 1955)

23. How many text messages will you send and receive in your lifetime?

24. A new concert venue just opened in downtown Houston and they are in the process of deciding how many tickets they can sell for each show. The venue has three levels, two general admission that only have standing room, and one level with 150 seats. The first level of standing room is a square with one side measuring 75'. The second level, also standing room, is a rectangle measuring 100' by 50' ft. The third level has 150 seats. The venue thinks each person will occupy 2.25 square feet. How many tickets should they sell?

25. For tire size P225/45R17, give the following:
   a. Width(mm): _____
   b. Aspect Ratio (%): _____
   c. Height (in.): _____
   d. Diameter (in): _____
   e. Circumference (in.): _____

Seniors at Central High School
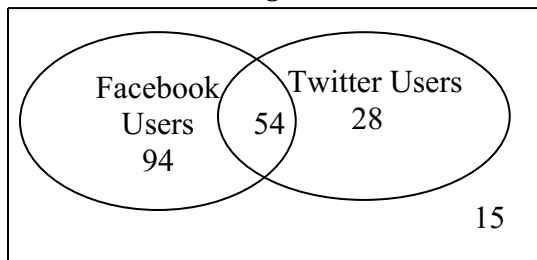


26. What is the probability that a student is a Facebook user?

27. What is the probability that a student is not a Twitter user?

28. How many students are in the senior class?

You are hungry after school and walk across the street to Bruster's. You plan to purchase a sundae. You have a choice of a cup, sugar cone, or waffle cone. Ice cream choices are limited to chocolate and vanilla. Topping choices are sprinkles, hot fudge, and crushed cookies. You are limited to one choice per category. Make a Tree diagram to model this situation then answer questions 4-5.
   29. (Draw the tree diagram.)

30. If you order a waffle cone sundae with vanilla ice cream and sprinkles, what is the probability that the next person in line orders the exact same sundae?

31. What is the probability that your best friend will order crushed cookies on her sundae?

At Yahoo Farms, the corn maze has the paths shown. Only some paths have a prize at the end of the path.

Enter
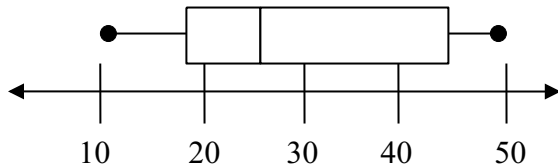
1 Prize

1 Prize

No Prize

2 Prizes
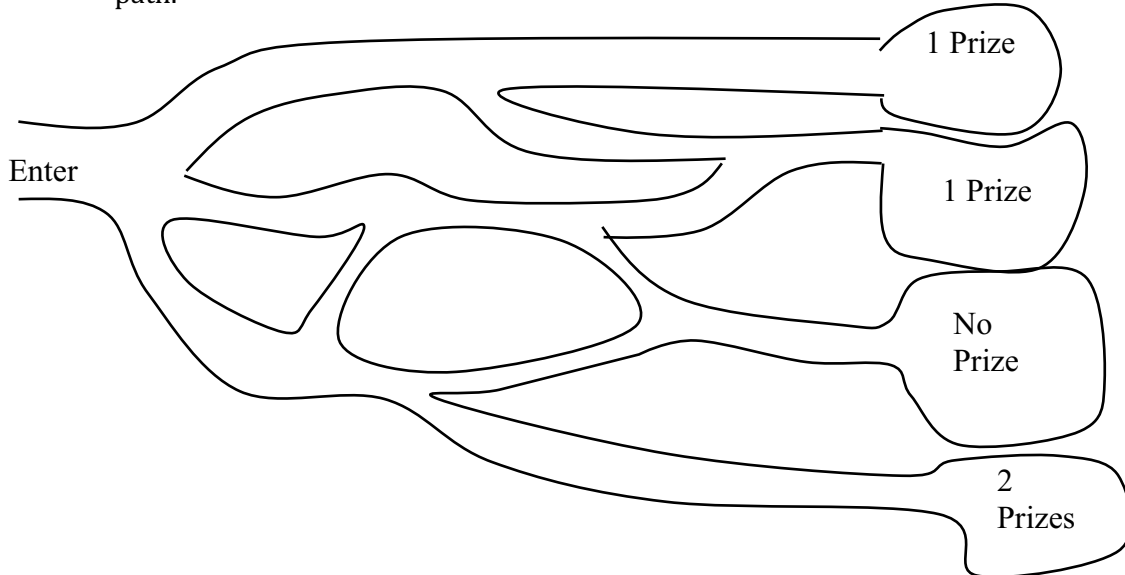
32. If only forward motion is allowed (no backtracking), draw the area model for the corn maze.
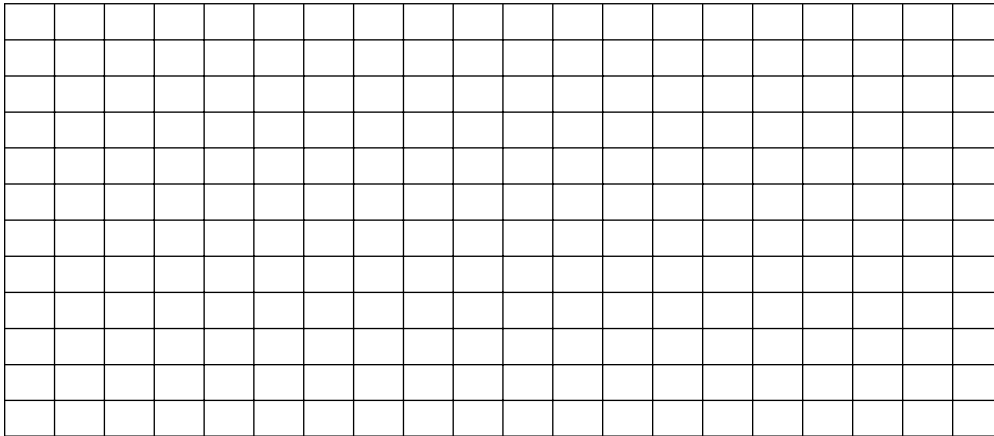
33. Identify the 5 number summary for the following.

a)

10    20    30    40    50

34. 75% of the data is found above what point?

35. 200 students have applied to Harvard and the University of Florida. She thinks the probability that Harvard will admit 80, the University of Florida will admit 100, and there are 40 students that will get accepted into both universities.

a) Make a Venn diagram to display the given information.

b) What is the probability that neither university admits someone?

c) What is the probability that a student gets into Harvard but not Florida?

36. Maria is playing the bean bag toss at the local fair. The game costs $2 to play. Maria has 4 bean bags to toss into a jar in front of her. The prize she wins is determined by the amount of bean bags she is able to toss in the jar from 8 ft away. Maria is able to successfully throw the bean bag into the jar 35% of the time.

- If Maria gets all 4 bean bags in the jar she will win a free unlimited rides pass.
- If Maria gets 3 bean bags in the jar she will win a ticket to ride the ferris wheel.
- If Maria gets 2 bean bags in the jar she will win a free bag of cotton candy.
- If Maria only gets 1 bean bag in the jar she does not win a prize.

a) What is the probability that Maria wins a free unlimited rides pass or a ticket to ride the ferris wheel?

b) If Maria plays the game 6 times, what is the probability she will win a bag of cotton candy?

c) While Maria is playing, 7 of her friends join her in playing the same game with the same rules. If it costs the fair owners $5 for the unlimited ride pass, $1 for the ferris wheel ride pass and $.50 for a bag of cotton candy, how much profit do you expect the fair owners to make when all 8 people play? Show your work.

The psychology department at a local college is studying the effects of sleep deprivation on student test performance of the 1099 students at the college. Every 7th student enrolled at the college according to an ordered list of student ID numbers was chosen for the study. There was a total of 157 students participating in the study. All the students took an exam at 8am after a good night's sleep to get a baseline score for each student. The students then stayed up all night before an 8 am exam (a variation of the same exam) one week later. Their grades on the exam were recorded and compared to the score they received after good night's sleep to see if there was any effect. The effect was recorded as the change in the number of points (+ or -) on the second exam. With 73% of the students, the score was at least 10 points lower.

a) What type of sample was used in the study?

b) What was the variable of interest in the study? (Define variable of interest)

c) Was this study experimental or observational? (Define each term)

d) What is the difference between an experimental and observational study?

e) What would the treatment be in this case? (define treatment)

f) Why is *informed consent* of human subjects important to a researcher.

*Name the type of sampling defined by each of the following.  Explain why.*

g)  Every fifth person boarding a plane is searched thoroughly.

h)  At a local community College, five math classes are randomly selected out of 20 and all of the students from each class are interviewed.

i)  A researcher randomly selects and interviews fifty male and fifty female teachers.

j)  A researcher for an airline interviews all of the passengers on five randomly selected flights.

k)   A community college student interviews everyone in a biology class to determine the percentage of students that own a car.

**The Golden State Warriors of the NBA have 14 players on the roster for the 2012-2013 season.  The players, their minutes per game (MIN), rebounds per game(RPG), points per game (PPG), and assists per game (APG) are shown below.**

**2012 – 2013 Golden State Warriors**

| PLAYER | MIN | PPG | RPG | APG |
|---|---|---|---|---|
| Stephen Curry, PG | 37.3 | 19.7 | 3.9 | 6.5 |
| David Lee, PF | 37.6 | 18.5 | 11.3 | 3.5 |
| Klay Thompson, SG | 35.5 | 16.2 | 4.2 | 2.3 |
| Carl Landry, PF | 26.1 | 13.2 | 7.0 | 1.1 |
| Jarrett Jack, PG | 25.6 | 9.9 | 2.9 | 4.6 |
| Harrison Barnes, SF | 27.5 | 9.3 | 4.8 | 1.6 |
| Brandon Rush, SG | 12.5 | 7.0 | 0.5 | 1.0 |
| Andrew Bogut, C | 18.3 | 6.0 | 3.8 | 2.0 |
| Richard Jefferson, SF | 15.2 | 4.2 | 1.4 | 1.2 |
| Festus Ezeli, C | 16.3 | 3.3 | 4.2 | 0.2 |
| Draymond Green, SF | 13.0 | 2.6 | 3.2 | 0.6 |
| Charles Jenkins, PG | 5.1 | 2.3 | 0.6 | 0.5 |
| Jeremy Tyler, PF | 2.0 | 1.6 | 0.2 | 0.0 |
| Andris Biedrins, PF | 9.1 | 0.6 | 2.6 | 0.3 |
| Kent Bazemore, SG | 1.1 | 0.0 | 0.2 | 0.1 |

l)  Compute the descriptive statistics for the warriors minutes per game.