AMDM
Fall 2017

Name: KEY Period: _____

FINAL EXAM STUDY GUIDE

1 mile = 5280 ft

1. You are standing amongst a crowd that is 30 feet deep and 3 miles long at a parade on both sides of the street. You want to estimate how many people are there. If 10 people occupy 40 square feet, estimate the size of the crowd watching the parade along the 3 mile stretch.

3 miles x 5280 ft = 15840 ft

Area of crowd = 15,840 x 30 = 475200 ft²

x 2

950,400 ft²

$\frac{x}{950{,}400} = \frac{10}{40}$

$40x = 9504000$

$x = 237{,}600$ people

2. A game is packaged in a box. Each game cube has a side length of 2 inches. How many games can be packed inside of a box whose dimensions are 1 foot by 1 foot by 2 feet?

Volume of game cube: $2 \times 2 \times 2 = 8\ in^3$

x12 x12 x12

12 in 12 in 24 in

V of box: $12 \times 12 \times 24 = 3456\ in^3$

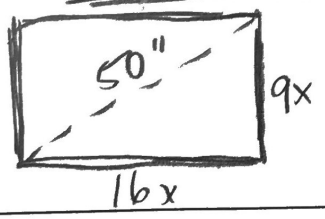
$\frac{1}{8} = \frac{x}{3456} \Rightarrow 8x = 3456$

$x = 432$ games

3. The license plates for a particular state contain 3 letters followed by 3 numbers. The exceptions are that the letter "O" cannot be used at all, the first letter cannot be an "I", and no plates can have a 3 digit number greater than 899.

$\frac{24}{L} \cdot \frac{25}{L} \cdot \frac{25}{L} \cdot \frac{9}{\#} \cdot \frac{10}{\#} \cdot \frac{10}{\#} = 13{,}500{,}000$

4. You bought a new 50 inch Plasma TV with an aspect ratio of 16:9. Find the area of the TV. Round everything to nearest whole number.



$(16x)^2 + (9x)^2 = (50)^2$

$256x^2 + 81x^2 = 2500$

$337x^2 = 2500$

$x^2 = 7.42 \quad x = 2.7 \approx 3$

Width: 16(3) = 48 in

height: 9(3) = 27 in

Area: 48(27) = 1296 in²

5. Zeke replaces his original factory tires (P215/75 R 15) on his Camero with P245/45 R 17 tires.
   a. Find the circumference of each of the sets of wheel / tire combinations.

original circumference = 27.7 (π) = 87

New circumference = 25.7 (π) = 80.7

   b. If after changing the tires, the odometer shows he has traveled 20,000 miles, how many miles has he actually travelled? Don't round k value.

$K = \frac{80.7}{87} = .927$

(20,000)(.927) = 18,540 miles

6. Use the following grading system to find Leo's final grade in Latin

5% homework → .05 70% tests → .70 15% final exam → .15 10% quizzes → .10	His grades are: Tests: 72, 76, 67, 81 Avg: 74 Quizzes: 89, 78, 0, 92, 86 Avg: 69 Homework average: 90 Final exam: 92

Final Grade: $74(.70) + 69(.10) + 92(.15) + 90(.05) = \boxed{77}$

7. Using the information from question 6, if Suzette's averages are Homework = 95, quizzes = 85, and tests = 72, what grade does she need on the Latin Final exam to get an 80 in the class?

$95(.05) + 85(.10) + 72(.7) + x(.15) = 80$

$63.65 + .15x = 80$

$.15x = 16.35$

$x = 109$

She would need to make a 109% on Final.

8. If your grades are the following, which grading system (to the right) do you prefer and why?

Test average = 84
Final exam grade = 68
Homework = 90
Class participation = 95

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%

Grading system II would give you a grade of 83.6% versus grading system I which would give you a 82.6%

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

Grading System 1 – 95.1
Grading System 2 – 85.1
] Same results.

10. The check digit in a UPC number (that is, the twelfth digit) is determined in the following manner:
    - Multiply the first digit by 3.
    - Add the second digit.
    - Multiply the third digit by 3.
    - Add the fourth digit.
    - Continue this alternating process for the Digits 5 to 12.

Determine the check digit (d) for the UPC number 024679361 63d

$3(0+4+7+3+1+3) + 2 + 6 + 9 + 6 + 6 + d$

$83 + d \Rightarrow \boxed{d = 7}$

$$QR = \frac{25 + 10(\%comp) + 40(\%TD) - 50(\%\text{int}) + 50(YDS/A)}{12}$$

11. Peyton Manning, quarterback of the Denver Broncos, has completed 378 passes out of his 425 attempts for 4,290 yards so far this season. He has thrown 31 touchdowns and 6 interceptions. What is his quarterback rating? Round everything to the nearest tenth. (Use the above formula to find the quarterback rating).

$\%\text{Comp} = \frac{378}{425} \times 100 = 88.9\%$ $YD = \frac{4290}{425} = 10.1$ $QR = \frac{25 + 10(88.9) + 40(7.3) - 50(1.4) + 50(10.1)}{12}$

$\%TD = \frac{31}{425} \times 100 = 7.3\%$

$\%INT = \frac{6}{425} \times 100 = 1.4\%$

$QR = 136.8$

12. A **check digit** is used to help validate credit card numbers. The credit card companies use the Codabar method to determine the check digit. This method consists of the following steps:
   1. Add the digits in the odd-numbered positions and double this total.
   2. Add the *number* of odd-position digits that are more than 4 to the total.
   3. Add the even-position digits.
   4. Choose a check digit that makes this calculation total a number whose final digit is 0.

What is the check digit (**d**) for the MasterCard number 5424 9813 2720 008**d**?

$2(5+2+9+1+2+2+0+8) + 3 + 4 + 4 + 8 + 3 + 7 + 0 + 0 + d$

$87 + d \Rightarrow d = 3$

Use the Venn Diagram at right for questions 13-15

A class of 40 students completed a survey on what snacks they liked. The choices were: chips, nuts, and popcorn.

13. How many students did not like any of the three choices?

5 students

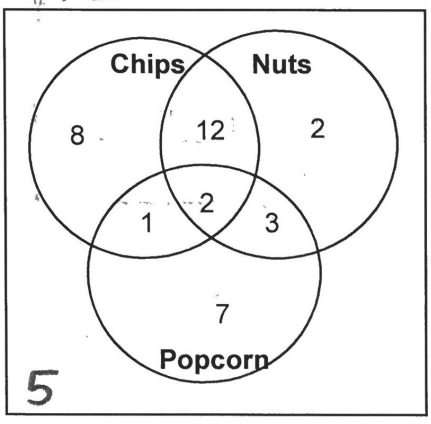
14. What is the probability that a student chosen at random would like nuts and popcorn but not chips

$\frac{3}{40}$

15. What is the probability that a student chosen at random would like chips given that they like popcorn?

$\frac{3}{13}$

Students' Favorite Type of Pets



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

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

$$SLG = \frac{31 + (2 \cdot 52) + (3 \cdot 2) + (4 \cdot 61)}{335}$$

$SLG = 1.149$

b. Find the SLG for a player with 152 singles, 13 doubles, 20 triples, 33 homeruns, and 420 at bats.

$$SLG = \frac{152 + (2 \cdot 13) + (3 \cdot 20) + (4 \cdot 33)}{420} = .881$$

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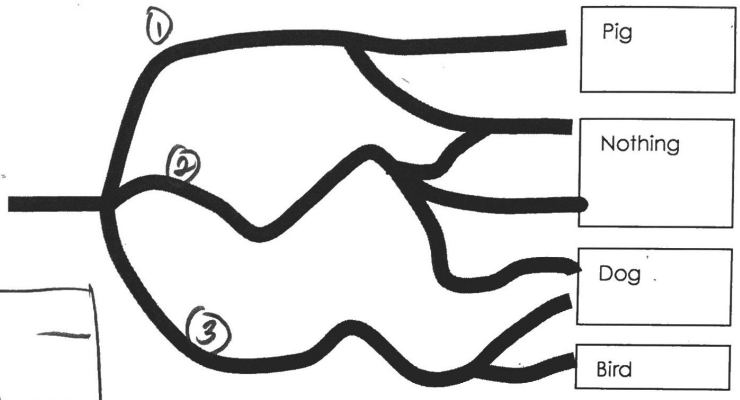
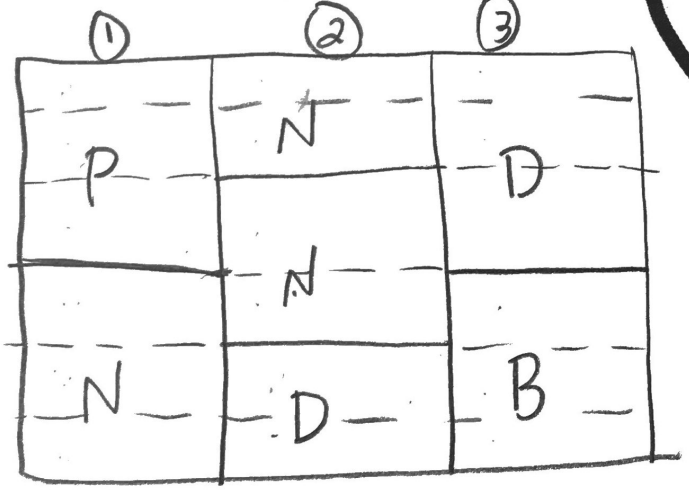
17. You visited a animal shelter over spring break and there was a maze. Depending on where you arrive, you could win a pig, god, bird, or nothing. The basic maze is drawn at right.



a. Draw an area model.



b. Calculate the probabilities of each possibility:

P (Pig) $= \frac{3}{18} = \frac{1}{6}$	P (nothing) $= \frac{7}{18}$
P(dog) $= \frac{5}{18}$	P(bird) $= \frac{3}{18} = \frac{1}{6}$

Use the following situation for questions 18 – 20:

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, cake cone, sugar cone, or waffle cone. Ice cream choices are limited to chocolate, vanilla, and strawberry. Topping choices are nuts, hot fudge, and crushed cookies. You are limited to one choice per category. $(4)(3)(3) = 36$ possible outcomes

18. If you order a waffle cone sundae with strawberry ice cream and hot fudge, what is the probability that the next person in line orders the exact same sundae?

$$\left(\frac{1}{4}\right)\left(\frac{1}{3}\right)\left(\frac{1}{3}\right) = \frac{1}{36}$$

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

$$\left(\frac{4}{4}\right)\left(\frac{3}{3}\right)\left(\frac{1}{3}\right) = \frac{12}{36} = \frac{1}{3}$$

20. What is the probability that you will select a cup or sugar cone, vanilla ice cream, and hot fudge or nuts?

$$\left(\frac{2}{4}\right)\left(\frac{1}{3}\right)\left(\frac{2}{3}\right) = \frac{4}{36} = \frac{1}{9}$$

Use the following situation for questions 21 – 22:
The area model at right represents the number of people own a house.

		N			
N		Y		N	
	Y			N	
Y	N	Y	N	Y	N

21. What is the probability that someone owns house?

$$\frac{8}{24} = \frac{1}{3}$$

22. If 50 people are surveyed, about how many will own a house?

$$50 \cdot \left(\frac{8}{24}\right) = 16.6 \approx \text{around 17 people}$$

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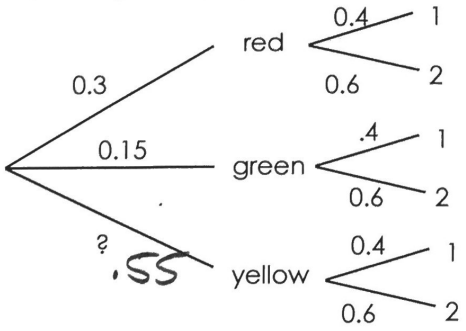
23. Shantay goes to a carnival and considers playing a game. In order to play she would have to pay $2.00, and if she wins she gets a prize worth $6.00. Her chances of winning are 0.2. What is the expected value?

$$-\$2.00 + (.2)(\$6.00) = -.80$$

She would expect to lose 80¢ per play

Use the following situation for questions 24 – 26:

Garth is playing a game that requires him to spin two spinners. The first spinner has 3 colors (red, green, and yellow) that are *not* evenly distributed. The probability of spinning red is 0.3 and the probability of spinning green is 0.15. The second spinner has the numbers 1 and 2; the probability of spinning 1 is 0.4 and the probability of getting a 2 is 0.6. $1-.3-.15=.55$



24. What is the probability of spinning a green on the first spinner? 0.15

25. What is the probability that you spin a green on the first spinner and 1 on the second spinner?

$(.15)(.4) = .06$

26. What is the probability that you <u>do not</u> spin a yellow on the first spinner but that you do get a 2 on the second spinner?

$(.3+.15)(.6) = .27$

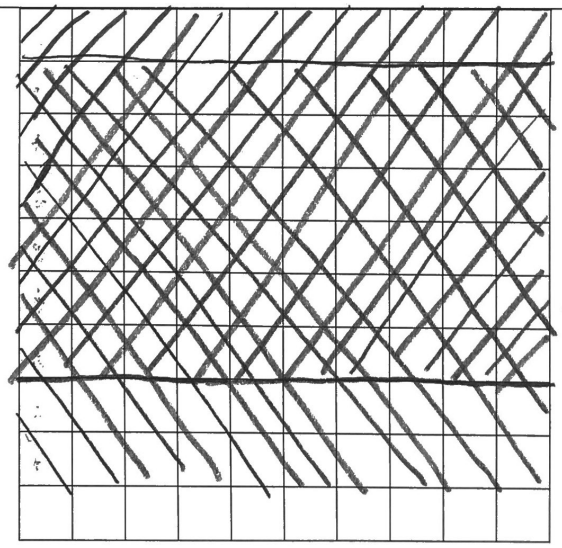
For 27 – 29 create an area model to answer the questions for the following situation.

There is a 70% chance that you are going to pass math and there is a 80% chance that you will pass lit. There is a 60% chance that you will pass both.

27. What is the probability that you will pass Lit but not Math? 20%

28. What is the probability that you will pass neither? 10%

29. What is the probability that you will pass Math or Lit? 90%



Key: ▨ – Math ▩ – Both ▨ – Lit □ – Neither

For questions 30-33,determine which type of sample is being implemented. Random, Systematic, Stratified, Cluster, Convenience

30. Student organization looking to get signatures for a petition camp out in front of Class of 1950 Lecture Hall. Convenience

31. Select three students from a class to receive ice cream by putting all the students' names in a hat and picking out three names randomly.

Random

32. Select 25 small-town newspapers out of all the small-town newspapers in the country and interview every employee of the selected newspapers.

Cluster

33. Divide the class into four groups (freshman, sophomore, junior and senior) and take a random sample of two students from each group

Stratified Random

For questions 34 and 35. Experimental or Observational?

34. Dr. Smith and Dr. Fuller want to study the effects on a patient's arthritis that occur when the patient believes that he or she has used a new ointment. The patients visiting Dr. Smith are given a placebo medicine. The patients visiting Dr. Fuller receive the actual medicine.

Experimental

35. A researcher conducts a survey to determine the approval rating of the current mayor of a city. He surveys registered voters in the mayor's district. The researcher wants to determine of the mayor's approval rating is more than 60%.

Observational

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36. Find the sample size required to achieve a margin of error of $\pm 2.5\%$. Round your answer to the nearest whole number. $n = \left(\frac{1}{.025}\right)^2 = 1600$

Use the following data set for questions 37, 38 & 39:

{11,15, 12, 37, 7, 30, 24, 9, 20, 30, 20, 32, 8}

37. What is the mean of the data set? 19.6

38. What is the 5 number summary for the data set?

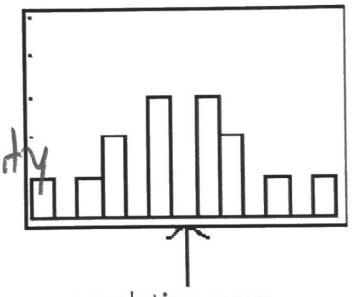
min = 7 Q1 = 10 median = 20 Q3 = 30 max = 37

39. If the Interquartile range (IQR) is defined as the difference between Q1 and Q3, calculate the IQR for this data. IQR = 30 − 10

IQR = 20

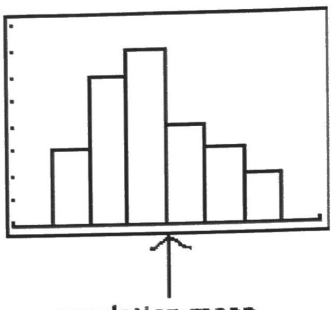
40. Classify the histograms by statistical bias and variability.

c.



Low bias
High variability

d.



Low bias
Low variability

For questions 41-44, determine which type of bias is being described (response, nonresponse, observer effect, or wording of questions).

41. Some men do not want to answer certain questions if the interviewer is a woman, or vice versa. In addition, some people are reluctant to answer personal questions asked by people of other ethnicities.

Response bias

42. In a study of mental health issues, for example, some people with emotional problems are less likely to participate. This leads to an underreporting of these problems in the study results.

Nonresponse bias

43. Acting differently when the researcher is in the classroom.

Observer effect

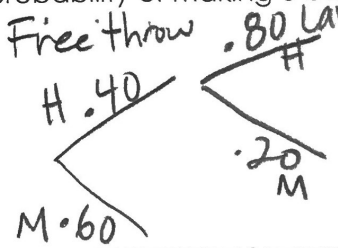
44. Questions can influence the results is they are not worded in a neutral way.

Wording of questions

After Yvonne starts her allowance deal with her dad, she tells her cousin CJ. CJ's dad agrees that he wants to offer a similar allowance to his son. Since CJ is only 8 years old, he takes his first shot from behind the free throw line, and the second shot is a lay-up. If his son misses the first shot, he gets only $6. If he makes the first shot, he gets $10 and a chance to shoot again for $6 more.

CJ makes 40% from the free throw line and makes 80% of his lay-ups.

45. Find the probability of making 0 baskets, 1 basket, and 2 baskets. Draw an appropriate model.



$P(0 \text{ baskets}) = .60$

$P(1 \text{ basket}) = (.40)(.20) = .08$

$P(2 \text{ baskets}) = (.40)(.80) = .32$

46. Suppose you conduct the investigation into Lay's Potato Chips and find that the mean weight of the chips in your sample is 25 grams, rather than 28.3 grams (= 25 grams). Write the null and alternative hypotheses in words and in symbols.

Null: The mean weight is 28.3 grams Ho: $\mu = 28.3$ grams

Alternative: The mean weight is ~~different~~ than 28.3 grams Ha: $\mu \neq 28.3$ grams

47. Find the FCI for the following based on 4 adult tickets, 3 soft drinks, 2 other drink, 5 hot dogs, 1 parking pass, and 1 program.

Team	Average Ticket Price	Soft Drink	Other Drink	Hot Dog	Parking Pass	Program	FCI
NY Mets	\$50.42 x 4	\$4.25 x 3	\$8.00 x 2	\$3.50 x 5	\$20.00 x 1	\$0 x 1	
	\$201.68	\$12.75	\$16	\$17.50	\$20	\$0	\$267.93
	+	+	+	+	+		

GOOD LUCK ON FINALS ☺