Name:_____ Date:_____

AMDM Final Review Guide

UNIT 1: Number Applications

1) How many phone numbers are possible in the (770) area code if: For the form ABC-XXXX, A is restricted to 2-9 and B is restricted to 1-9. X and C can be any digit 0-9?

8 · 9 · 10 · 10 · 10 · 10 · 10 = 7,200,000
A B C X X X X
2-9 1-9 0-9

2) Write out one valid UPC code and one invalid UPC code. Show the math on both to prove they are valid or invalid

1 2 5 0 1 3 4 3 0 0 1 2
3+2+15+0+3+3+12+3+0+0+3+2 = 46
INVALID

1 2 5 0 1 3 4 3 0 0 1 6
3+2+15+0+3+3+12+3+0+0+3+6 = 50
VALID

3) You finished your class with the following: 90 test average, 84 on the final exam, 85 homework average, and 100 in participation. Calculate your final grade in the class using both grading systems:

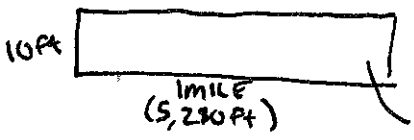
Grading System 1:
Tests: 65% 90 = 58.5
Final Exam: 10% 84 = 8.4
Homework: 10% 85 = 8.5
Participation: 15% 100 = 15
90.4

Grading System 2:
Tests: 70% 90 = 63
Final Exam: 20% 84 = 16.8
Homework: 5% 85 = 4.25
Participation: 5% 100 = 5
89.05

4) A combination lock has 6 digits, none of which can repeat. How many different combinations are possible?

10 · 9 · 8 · 7 · 6 · 5 = 151,200

5) You are standing among a crowd that is 10 feet deep and 1 mile long at a parade. You want to estimate how many people are there. If 30 people occupy 25 square feet (that is a 5 ft by 5 ft square), estimate the size of the crowd watching the parade along a 1 mile stretch (there are 5,280 feet in one mile)



A = 10 × 5,280 = 52,800 ft²

$\frac{30 \text{ people}}{25 \text{ ft}^2} = \frac{x \text{ people}}{52{,}800 \text{ ft}^2}$ ← cross multiply!

1,584,000 = 25x

x = 63,360 people

UNIT 2: Probability

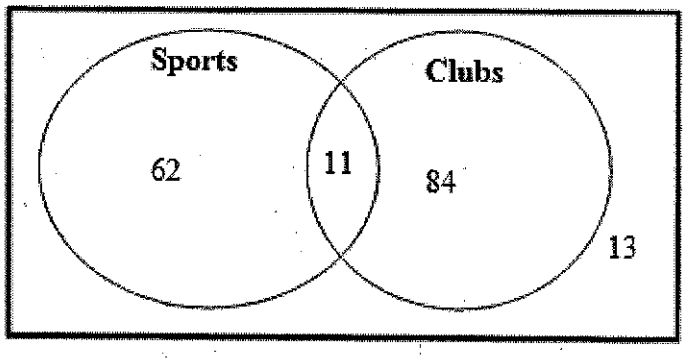
6) There is a 10% chance of snow on Sunday and a 15% chance on Monday. What is the probability that it will snow both days?

(.10)(.15) = .015 = 1.5%

WHEN MULTIPLYING PERCENTS IT MUST BE IN DECIMAL FORM AND IS MULTIPLY FOR %

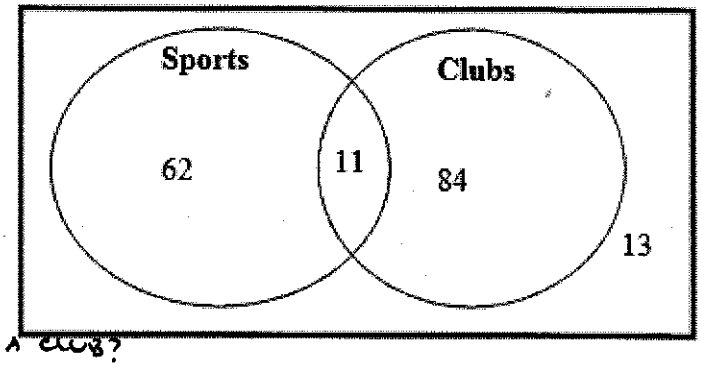
7) What is the probability that a person only participates in sports?

62/170 = 36%



8) What is the probability that someone particpates in both sports and clubs?

$11/170 = 6\%$



9) What is the probability that someone does not participate in neither sports nor clubs?

$13/170 = 8\%$

10) WHAT IS THE PROBABILITY THAT SOMEONE IS IN A CLUB?

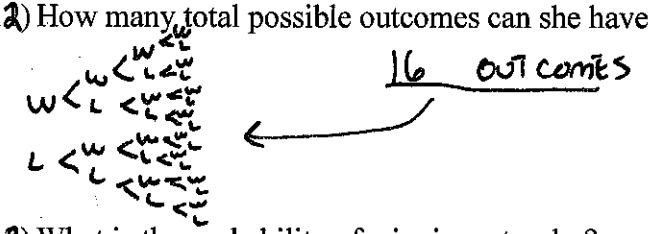
$95/170 = 56\%$

11) What is the probability that someone plays sports **GIVEN THAT** they are in a club?

$11/95 = 12\%$

Kayla plays chess. Next week she will be competing in a tournament in which she will play 4 games. To win a trophy, she must win at least 3 games

12) How many total possible outcomes can she have when she plays her 4 games?



OR

Row 4 → 1 4 6 4 1

$1+4+6+4+1 = 16$

13) What is the probability of winning a trophy?

3 OR 4 WINS SO

$\frac{4}{16} + \frac{1}{4} = \frac{5}{16}$

0 WINS	1 WIN	2 WINS	3 WINS	4 WINS
$\frac{1}{16}$	$\frac{4}{16}$	$\frac{6}{16}$	$\frac{4}{16}$	$\frac{1}{16}$

14) The people who are hosting the chess tournament want to know how many trophies they should plan on bringing. If 50 people enter the tournament, how many trophies should they bring?

$50\left(\frac{5}{16}\right)$ 15.6 = 16 TROPHIES

UNIT 3: Statistics

Define the following terms and give an example of each:

15) Categorical data/ Quantitative data

CATEGORICAL DATA: DATA THAT IS DESCRIBED WITH WORDS. GENDER, CLASS (SOPHOMORE SENIOR etc.)

QUANTITATIVE DATA: DATA THAT IS DESCRIBED BY NUMBERS (AGE, TEMPERATURE)

16) Treatment

IN AN EXPERIMENTAL STUDY, IT IS WHAT IS ADMINISTERED TO SUBJECTS TO LOOK FOR A CHANGE. STUDY: "DOES LISTENING TO MUSIC WHILE TESTING IMPROVE TEST SCORES?" TREATMENT = MUSIC

17) Variable of interest

THE VARIABLE THAT THE RESEARCHER IS LOOKING FOR A CHANGE IN. FOR THE ABOVE STUDY IT WOULD BE THE TEST SCORES.

18) Observational study/Experimental study

OBSERVATIONAL STUDY: A STUDY IN WHICH NO TREATMENT OCCURS AND SUBJECTS ARE MONITORED OR ASKED QUESTIONS ABOUT THE TOPIC. EXAMPLE: A SURVEY ON THE EFFECTS OF WORKING AFTER SCHOOL AND GPA

EXPERIMENTAL: A STUDY WITH 2 OR MORE GROUPS WHERE A TREATMENT IS ADMINISTERED TO LOOK FOR A CHANGE. EXAMPLE: ONE GROUP GETS A COOKIE BEFORE A TEST AND ANOTHER GROUP DOES NOT THEN WE LOOK AT THEIR TEST SCORES AND COMPARE

19) Open Question:

A QUESTION WHERE THE SUBJECT CAN ANSWER IN ANY WAY

"WHAT ARE YOUR OPINIONS ON THE SCHOOL DRESS CODE?"

20) Closed Question:

A QUESTION WHERE ANSWER CHOICES ARE PROVIDED:

"ON A SCALE OF 0-10 WITH 10 BEING THE HIGHEST. HOW WOULD YOU RATE THE CUSTOMER SERVICE AT CHICK-FIL-A?"

20) NULL hypothesis:

THE HYPOTHESIS ABOUT THE TOPIC THAT IS THE CURRENTLY HELD BELIEF.

H_0: GETTING 8 HOURS OF SLEEP EACH NIGHT IMPROVES GRADES

22) ALTERNATIVE HYPOTHESIS:

THE HYPOTHESIS THAT GOES AGAINST THE NULL HYPOTHESIS

H_a: GETTING 8 HOURS OF SLEEP EACH NIGHT DOES NOT IMPROVE GRADES

23) What are the 5 types of sample, define and give an example of each

SIMPLE RANDOM: EACH MEMBER OF A POPULATION HAS AN EQUAL CHANCE OF BEING SELECTED. EX: BY GETTING EVERY STUDENT'S # AND USING A RANDOM # GENERATOR TO SELECT SUBJECTS

STRATIFIED RANDOM: SAME AS SIMPLE RANDOM BUT THE POPULATION IS SPLIT INTO GROUPS FIRST. EX: SPLITTING STUDENTS UP INTO GRADE LEVEL FIRST THEN SELECTING MEMBERS OF EACH CLASS

SYSTEMATIC: A RULE IS USED TO SELECT SUBJECTS. EX: SELECT EVERY 3RD PERSON IN THE LUNCH LINE

CLUSTER: A MINI POPULATION IS IDENTIFIED AND EVERYONE IS SAMPLED. EXAMPLE: EVERYONE IN D LUNCH

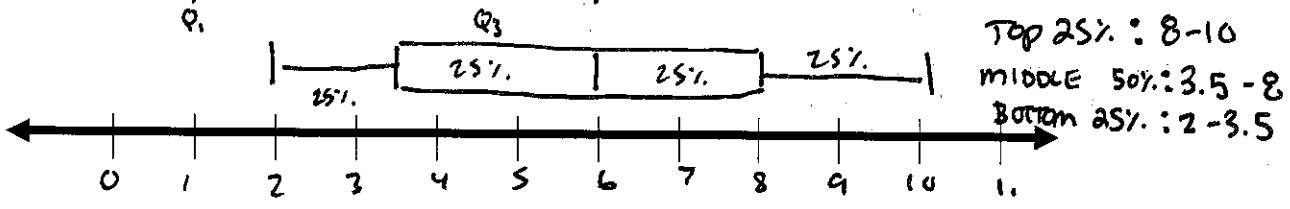
CONVENIENCE: ONLY MEMBERS OF THE POPULATION WHO ARE EASILY ACCESIBLE ARE SELECTED. EXAMPLE: ONLY SELECTING FRIENDS OR PEOPLE IN YOUR CLASSES

24) Create a box and whisker plot for the following data. Then answer the following. The middle 50% of data is between which two values? The top 25% is between which two values? The bottom 25% is between which two values?

6, 5, 2, 3, 8, 9, 8, 6, 5, 4, 10, 9, 8, 6, 3, 2

2, 2, 3, 3, 4, 5, 5, 6, 6, 6, 8, 8, 8, 9, 9, 10

MIN = 2
Q_1 = 3.5
MEDIAN = 6
Q_3 = 8
MAX = 10



TOP 25%: 8-10
MIDDLE 50%: 3.5 - 8
BOTTOM 25%: 2 - 3.5

UNIT 6: Finance

25) Jacob just received a settlement from court case in which he received $3,400. He decided to put this in a savings account which earned him .07% compounded quarterly. How much money will he have at the end of 6 years?

$3400\left(1+\frac{.0007}{4}\right)^{(4\cdot 6)}$

OR TVM

N = 24
I = .07
PV = 3400
PMT = 0
FV = ?
PY CY = 4

$3414.31

26) Pauline is 16 years old and is saving up for a down payment on a car when she turns 18. The down payment of the car is 10% of the cost of the car. The car she wants retails at $26,700. If she is going to put her money into a savings account that accumulates 3.2% compounded monthly how much does she need to put into savings now?

(.10) 26700 = $2670 — WHAT SHE NEEDS FOR THE DOWN PAYMENT

$2670 = PV(1 + .032/12)^(12·2) → $2504.69

OR N=24, I=3.2, PV=?, PMT=0, FV=2670, PY/CY=12

KiKi has racked up a lot of credit card debt over numerous credit cards. Below are her four credit cards with her current balances and rates.

241.29 **Visa: $4,750 at 19.8% APR**
488.43 **MasterCard: $9,927 at 16.5% APR**
58.41 **BP Gas Card: $1,119 at 22.65% APR**
179.70 **Kohl's Credit Card: $3,445 at 21.99% APR**

N=24, I=, PV=, PMT=?, FV=0, PY/CY=12

27) She wants to pay off all of her debt in 2 years. What would the minimum payment be for each credit card? $241.29 $488.43 $58.41 $178.70

28) So how much would she be paying total for all 4 credit cards each month?

ADD TOGETHER $966.83 TOTAL

29) She makes $3,000 gross monthly income as an assistant manager. Her monthly taxes are 15% in income tax, 1.45% in medicare, 6.2% in social security and 7% in state income tax

a) What is her after-tax monthly income? 15 + 1.45 + 6.2 + 7 = 29.65%

3000(.2965) = 889.5

3000 − 889.5 = $2110.50

b) If her monthly bills + utilities come to a total of $1120 per month, what does that leave left over for food and other expenses?

2110.50 − 1120 (UTILITIES) − 966.83 (CREDIT CARD BILLS) = $23.67

YIKES! KIKI NEEDS TO MAKE SOME SERIOUS ADJUSTMENTS

30) You are buying a new car for $55,000. You are taking out a five year loan from the bank with an interest rate of 3.9%

AND 7% DOWN PAYMENT → 55,000(.07) = 3850 (DOWN PAYMENT)

a. What is the monthly price of the car

$939.70

N=60, I=3.9, PV=55,000 − 3850 = 51,150, PMT=?, FV=0, PY/CY=12

b. What is the total cost of the car?

939.70 × 60 + 3850 = $60,232

(939.70 × 60: EVERY MONTHLY PAYMENT; + 3850: ORIGINAL DOWN PAYMENT)

31) Lance is in credit card debt. He currently owes 8,564 on his Visa. He has decided that he is not going to make any more purchases.

a. If he wants to be out of debt in 2 years how much would he need to make in monthly payments? His APR is 26.99%.

N=24, I=26.99, PV=8564, PMT=?, FV=0, PY/CY=12

$465.67

b. The credit card company only requires him to make a minimum payment of $200 every month. If he only makes the minimum payment how many years would it take him to pay off the credit card?

N=?, I=26.99, PV=8564, PMT=−200, FV=0, PY/CY=12

N = 148 MONTHS = 12 YEARS

31) Heidi just took out a student loan for $23,560. She is using a subsided government loan which is a 4.99% interest compounded monthly and has a 10 year pay back limit. N = 120

a. How much will her monthly payments be?

$249.78

I = 4.99
PV = 23,560
PMT = ?
FV = 0
PY CY = 0

b. If she chose to pay back $350 each month instead how long would it take her to pay it off? How much time does she save?

N = 79 months = 6.6 years

N = X?
I = 4.99
PV = 23,560
PMT = -350

UNIT 4/5: Formulas/Regression

There is a new restaurant (**Buffet Palace**) that charges based on the amount of food that you consume. The following breakdown is how the restaurant charges. Note that you are charged a one-time $2.50 plate fee

Pounds of Food	Price per Pound
Up to 5 pounds	$15 per pound
Greater than 5 pounds but less than 10 pounds	$6 per pound
Greater than 10 pounds	$4 per pound

32) How much would you be charged if you ate 3 pounds of food?

2.50 + 15(3) = $47.50

34) How much would you be charged if you at 8 pounds of food?

2.50 + 5(15) + 3(6) = $95.5

35) How much would it cost for your brother (the bottomless pit) who ate 19 pounds of food?

2.50 + 5(15) + 5(6) + 9(4) = $143.50

36) 24/7 Fitness charges patrons an activation fee $49 and then $15 per month for membership. Write a RECURSIVE rule that describes the income of the gym from one patron.

$a_0 = 49$

$a_n = a_{n-1} + 15$

37) Write an EXPLICIT rule that describes the income of the gym from one patron.

$y = 15x + 49$

38) How much money would the gym make on a 3 year member?

y = 15(36) + 49

3 = 36 months

$589

39) Jimmy figured out that he had paid 24/7 Fitness $1024 to date. How many months has he been a member?

1024 = 15x + 49
-49 -49

975 = 15x

65 months

40 32) Joanna is saving up for a new tablet and phone. Her parents said that they would help by paying her 12.5% interest on how much money she accumulates each month. Right now she has $250. Write a ***Recursive*** rule that describes Joanna's savings:

$a_0 = 250$

$a_n = 1.125a_{n-1}$

41 ~~40~~) Write an ***Explicit*** rule that describes Joanna's savings

$y = 250(1.125)^x$

10	811.83
11	913.31
12	1027.47

42 ~~41~~) How many months will it take her to save at least $999?

$999 = 250(1.125)^x$

12 MONTHS

43 ~~42~~) Determine if the following are correlations or causations and then determine if they would be positive or negative

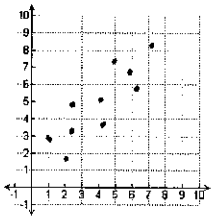
a. There is a strong connection that in many marriages, the older the husband is the older the wide is CORRELATION. PEOPLE TEND TO MARRY SOMEONE CLOSE TO THEIR AGE. EX. OLDER PEOPLE TEND TO MARRY OLDER PEOPLE BUT A HUSBANDS AGE DOES NOT CAUSE THE WIFES AGE. POSITIVE

b. The number of hours of exercise you complete each week and the amount of calories burned. CAUSATION. EXERCISE DIRECTLY AFFECTS CALORIES BEING BURNED. NEGATIVE

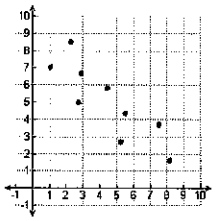
NEGATIVE

CALORIES / EXERCISE

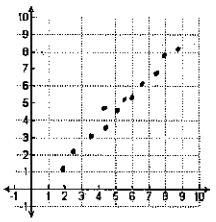
44 ~~43~~) Draw an example of the following types of regression:



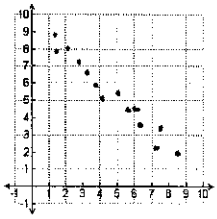
Linear/Positive/Weak



Linear/Negative/Weak



Linear/Positive/Strong



Linear/Negative/Strong

45 ~~44~~) Classify the type of strength and direction of each of the correlation coefficients.

r = 0.9994 STRONG POSITIVE

r = 0.7442 WEAK POSITIVE

r = -0.9987 STRONG NEGATIVE

r = -0.3332 NO CORRELATION

r = -.7992 WEAK NEGATIVE

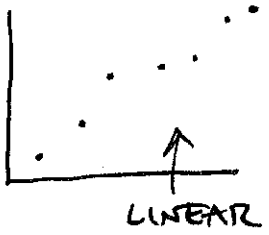
The following data has been collected regarding hours studied and grades on a Final Exam:

Hours	1		2	3	4	5	6	7
Grade	61		68	77	82	85	90	94

46 ~~45~~) Which regression model best represents the data linear or exponential? Why?

LINEAR = $r = .986$ ← LINEAR HAS THE BETTER CORRELATION COEFFICIENT

EXPONENTIAL $r = .975$



LINEAR

47 ~~46~~) What is the correlation coefficient?

$r = .986$

48 ~~47~~) What is the regression model? (equation)

$y = 5.39x + 58$

49 ~~48~~) What equation would you expect someone to get if they studied for 9 hours?

$y = 5.39(9) + 58$

106.51% ← WHAT!? THERE BETTER BE EXTRA CREDIT

50 ~~49~~) Approximately many hours would someone need to study if they would like to make a 100?

$100 = 5.39x + 58$

$x = 7.8$ HOURS