

Final Exam Review

Good Luck To _____

After purchasing a bag of delicious Fizzle Skittles, you open it to find 7 red, 5 green, 5 yellow, 4 orange, and 3 purple.

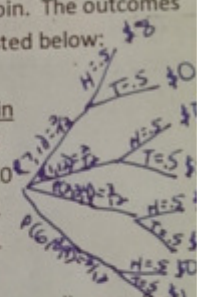
- How many total skittles do you have? 24
- If you randomly take a skittle, what is the probability of getting a purple? Write this solution as both a decimal and as a fraction.
 $.125 = \frac{3}{24} = \frac{1}{8}$
- What is the probability that you get either a green skittle or an orange skittle? $\frac{7}{24} = .375$
- What was the key word in the last question (#3) and what does it tell you to do? $or \rightarrow add$
- What is the probability that I do not get a red skittle (Mr. Henderson's favorite)? Write an explanation on how you get this answer? $P(R) = \frac{7}{24}$
 $P(\sim R) = 1 - \frac{7}{24} = \frac{17}{24}$
- If you plan to eat two skittles, one at a time, what's the probability that you get orange and then green without replacing the 1st skittle? $\frac{4}{24} \cdot \frac{5}{23} = \frac{20}{552}$
- The last question had two key words that help identify what to do. What were those words and what do they tell you to do? *and not replacing, multiply of change amounts*
- If you plan to take two skittles, one at a time, what's the probability that you get red and then purple if replace the first one? $\frac{7}{24} \cdot \frac{3}{24} = \frac{21}{576}$
- The last question had two key words that help identify what to do. What were those words and what do they tell you to do? *replace and multiply and don't change amounts*

A recent survey of dogs found that 72% approved of their owners. The results came from a random sample of 200 of Andover's 624 dogs.

- What is the margin of error for this survey?
 $\frac{1}{\sqrt{200}} = .071$
- Write a 95% confidence statement for this situation. *we are 95% confident that 65% to 79% of Andover dogs approve of their owner.*
- Each dog is numbered 001-624. Use line 122 of your random digit table to select the first 4 dogs selected. *138, 159, 052, 087*
- What type of sampling method was used?
SRS

Mr. Henderson has invented a new game. He is planning to divide the class first into 4 groups: Freshmen, Sophomores, Juniors, and Seniors. He will then randomly select two individuals from each group. Each individual will pay \$2 to play the game. They will roll a 12-sided die and then flip a coin. The outcomes of the game are listed below:

Roll	Coin	Win
7,11	Heads	\$8
1,12	Tails	\$20
2,3,4	Heads	\$1
6,8,9	Tails	\$1



- Draw and label a complete tree diagram for this game. Be sure to label all probabilities and outcomes.
- What is the probability that you win the \$20?
 $\frac{1}{12} = .08\bar{3}$
- What is the probability that you make money?
 $\frac{1}{12} + \frac{1}{12} = \frac{2}{12} = \frac{1}{6} = .16\bar{6}$
- What is the probability that you lose money?
 $.83\bar{3}$
- Find the expected value.
 $8(\frac{1}{12}) + 20(\frac{1}{12}) + 1(\frac{1}{6}) + 1(\frac{1}{6}) = \2.58
- The fact that Mr. Henderson divided the class first and then took a random sample is called **STRATIFIED RANDOM SAMPLING**
- For some strange reason the last 5 people to play rolled 11. You are next to play. What is the probability that YOU will roll 11?
 $\frac{1}{12}$
- When rolling a 12-sided die, what is the probability you get a number less than 5?
 $\frac{4}{12} = \frac{1}{3}$
- If you rolled two 6-sided die, what would be the probability that you get a sum less than 7?
 $\frac{2}{36}$
- When rolling a 12-sided die four times in a row, what is the probability that you do not ever get a 6?
 $(\frac{11}{12})^4 = .706$
- When rolling an 8-sided die three times in a row, what is the probability that you roll all threes?
 $(\frac{1}{8})^3 = .002$

Directions: Use the word-bank that you have been given to find the best word for each of the following explanations. Not every word is used. No words are repeated.

- 1 Placebo Something used in an experiment to make the subject believe that they are receiving a treatment (even though they aren't).
- 2 Correlation A number that is calculated when analyzing linear data. It ranges anywhere from -1 to 1.
- 3 Box Plot A picture representation of data that requires you to first find the five-number summary.
- 4 Median After data is organized numerically, the middle number in the data set.
- 5 IQR A number that is calculated by finding $Q_3 - Q_1$
- 6 Dot-Plot Another picture representation that is almost the same as a histogram.
- 7 Negative Correlation Data is said to have this if you plot it on a graph and it appears to have a downhill linear pattern to it.
- 8 Mean The average.
- 9 Mr. Johnson What is the name of your math teacher (you won't find this answer on the Semester Word Bank).
- 10 5# Summary This consists of the following: Minimum, Q_1 , Median, Q_3 , and Maximum
- 11 Tree Diagram This picture-way of thinking is used to help you better show all of the possible outcomes in probability.
- 12 Sample This word is used to represent the people/things that I select to use while conducting a survey or an experiment.

- 13 SRS When selecting individuals for my study I assign a number to each person/thing in the population. I then use a random number generator to select who/what will participate in my study. This is called?
- 14 Explanatory Variable An experiment tests whether or not increasing sleep helps students get better grades. The number of hours of sleep would be called ___?
- 15 BiModal Looking at a histogram, the bins seem to be very high on the two ends of the data and not very high in the middle. What is this called?
- 16 Standard Deviation A number that is calculated (through a lengthy numerical process) that helps us understand how spread out our data is.
- 17 Q3 In order to calculate the Inter-Quartile range I need to know two numbers: Q_1 and what other number?
- 18 Permutation This word is used to describe organizing things when the order that they appear makes a difference.
- 19 Biased When our data seems to be off the mark (not "on-the-truth"), it is this.
- 20 Variability After collecting data for a study, you noticed that your numbers seem to be very, very spread out. We would say that your study has high ___?
- 21 Confidence Interval $\text{Statistic} \pm \text{MOE}$
- 22 Venn Diagrams This picture way of thinking helps us analyze probabilities of events when they are both mutually exclusive and not mutually exclusive.
- 23 Experimental Design Usually a flow-chart or Tree-Diagram looking diagram that shows what an experiment will do.
- 24 Skewed Right When looking at your histogram you see that most of the data falls on the left side (high "bars" on the left). What is this called?
- 25 Line graph This type of graph is best used to show trends over time.
- 26 Minimum The smallest number in your data set.

- 27 Double Blind What occurs when neither the patient or the doctor know what treatment the patient is receiving.
- 28 Margin of Error A number that is calculated to estimate about how far off your statistic could be.
- 29 Combinations When organizing things (and the order doesn't matter) we use this word.
- 30 Q_1 If I organize my data from highest to lowest and then find the median of the lower half of the data set, what am I finding?
- 31 Statistic
Sample Size
(response variable) If a study is being done to test to see if teacher voice volume effects the number of students who sleep in class, the number of students who sleep in class can be called the ___?
- 32 Observational Study Studies that involve simple collection of data, without interpretation.
- 33 Maximum The largest number in a data set.
- 34 Somewhat Symmetric A histogram that appears to be high in the middle and low on the ends.
- 35 Histogram Contains bins/classes, and requires that both variables be numerical.
- 36 Mutually Exclusive Events that can never happen at the same time.
- 37 Measures of Center Mean and Median.
- 38 Probability A number calculated by taking the number of successes divided by the number of possible outcomes.
- 39 Confidence Statement I am 95% confident that the real number of students who will pass the final exam is between 67% and 78%.
- 40 Voluntary Response Mailing a survey and then using the data from whoever returns it.
- 41 Outlier A data point that just seems too far off to be worth analyzing. This data point is tested analyzing $Q_1 - 1.5(IQR)$ and $Q_3 + 1.5(IQR)$.
- 42 Sample Size This number represents how many people participated in a study.
- 43 _____ A type of "multi-stage" sampling.

- 44 Expected Value A number that is calculated by multiplying all probabilities by their outcomes and then adding all of those results together. This number helps us to understand what the "average" outcome will be.
- 45 Block Design A study that compares things/people that are virtually identical in order to see how a treatment may affect them.
- 46 Rate Looking at the number of people in each country that have a certain disease can be somewhat deceiving. Instead we should look at the ___?
- 47 Mode The most common number in a data set.
- 48 Measures of Spread Range and standard deviation.
- 49 Shape of Data Explained as skewed left/right, somewhat symmetrical, or bimodal.
- 50 Scatterplot A representation of data done by plotting points on a graph (especially with 2-variable numerical data).
- 51 Sampling Error A respondent lies on a survey.
- 52 Validity Not using something for its intended purpose in a study will tamper with the study's ___?

Now that you have completed 1-52, you should have 4 words on your Word Bank that are unused. Write your own definition for these 4 words.
